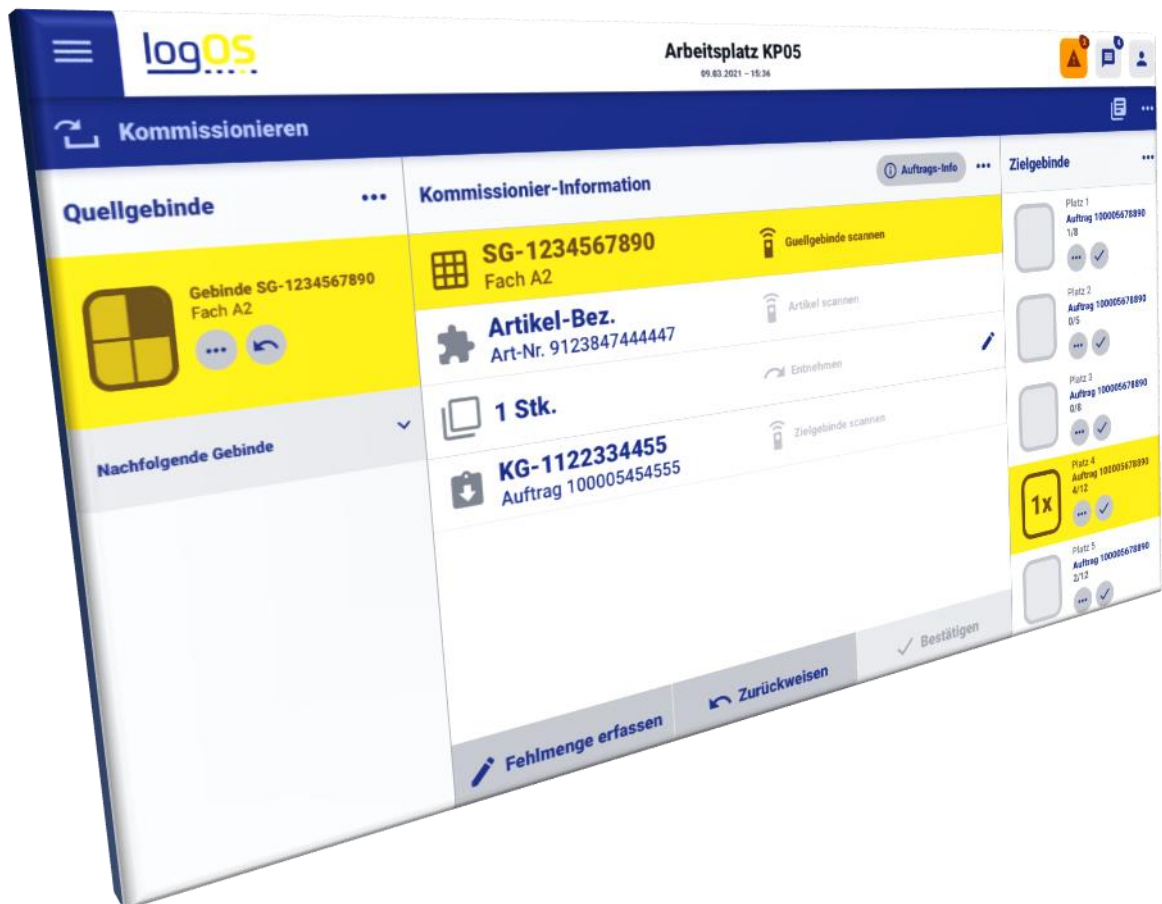


logOS WMS

Warehouse Management Module (WMS)



Product information

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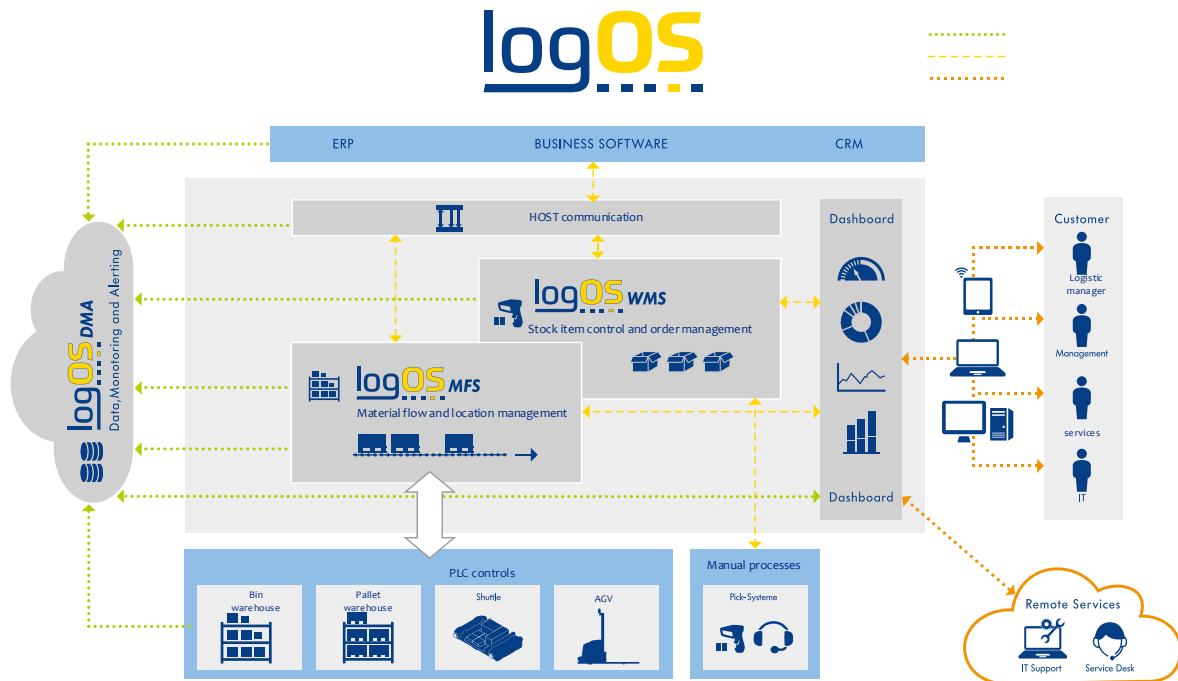
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1 Overview of the Stöcklin Software Suite logOS

The Stöcklin Software Suite consists of the main modules logOS WMS, logOS MFS and logOS DMA.



The **logOS WMS**, a warehouse and order management system, controls all intralogistics processes from goods receipt to goods out gates. In doing so, it managed inventories, also depending on batches, expiration date, serial number, etc. within the managed storages and workstations. It executes retrieval orders sent by the host system. This depends on the best choice of material and the specified provision time. All retrieval processes such as picking, order consolidation, packing and ramp management are supported.

The **logOS MFS**, a storage location management and material flow module for automated warehouses can be controlled by the logOS WMS or directly from an external host system (e.g. ERP, MES, customer WMS) via transport orders.

In doing so, the system can manage all types of storage bins, depending on the required system delineation, and use intelligent goods in, relocation and retrieval strategies to optimize throughput and ensure necessary storage restrictions.

The logOS MFS also contains a material flow control with control station. The material flow control, equipped with a visualization of the plant, executes transport orders and optimizes them depending on sequencing, failed routes, etc.

logOS DMA, the web-based statistics and monitoring tool, provides an in-depth view of business processes and plant stability and is also used for predictive maintenance. As a result, downtimes can be avoided and thus the availability of machines and plants can be increased. Relevant key figures can be retrieved - also mobile - via different end devices and evaluated in freely definable time periods.

2 Operation range and benefit

The **logOS WMS**, a warehouse and order management system, controls all intralogistics processes from goods receipt to goods out gates.

In doing so, it managed inventories, also depending on batches, expiration date, serial number, etc. within the managed storages and workstations.

It executes retrieval orders sent by the host system. This depends on the best choice of material and the specified provision time. All retrieval processes such as picking, order consolidation, packing and ramp management are supported.

2.1 Languages

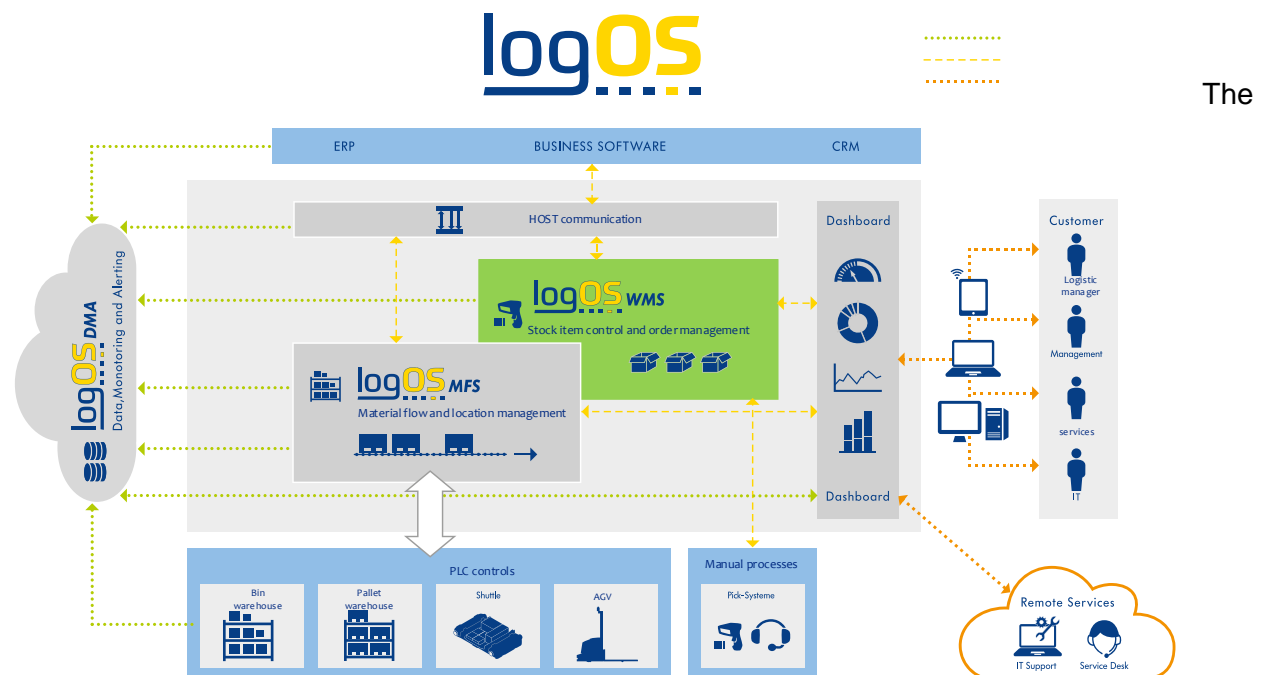
The standard system languages

- German
- English
- French
- Spanish

are available. Other languages can also be implemented on request.

3 System structure

The logOS WMS can be operated as a stand-alone system, independent of the logOS MFS. It is built as a client-server architecture. The server processes (business logic) are executed together with the database on the server. The server processes communicate with the higher-level host (ERP) via the host communication, which is also executed on the server.

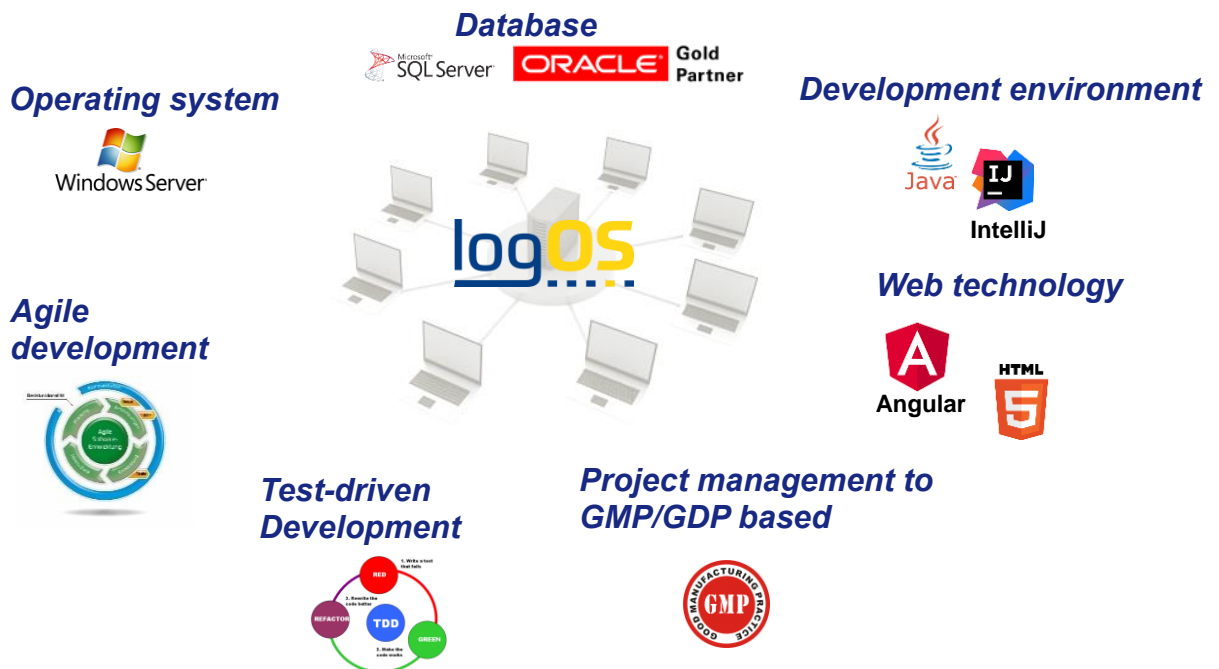


clients (control station and workstations) of logOS WMS are connected to the server processes via the data network. The clients do not have their own logic. However, they provide the user interface of the logOS WMS.

A possible integration of the logOS MFS is realized with an internal interface.

4 Technologies and methods used

The logOS WMS is developed and commissioned with widely used technologies and methods. The following figure shows the tools and methods used

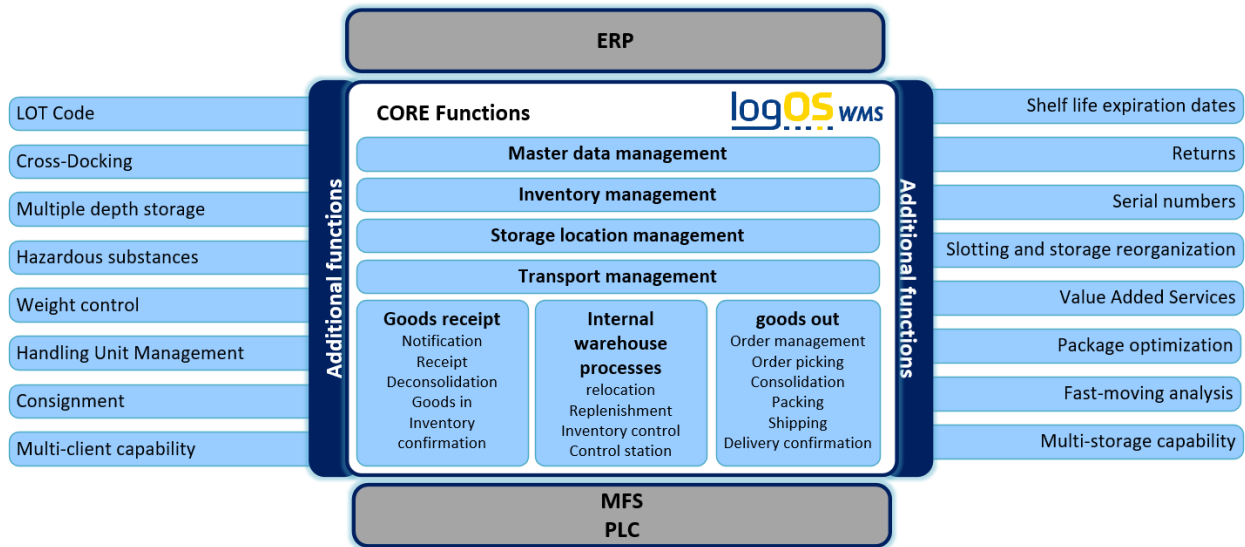


The advantages of the technologies and methods used can be seen in:

- High system stability
- Scalability
- Extensibility for future requirements
- easy maintenance
- intuitive operability of the overall system

5 Functions overview

The following figure shows an overview of the core functions as well as the possible additional functions available in logOS WMS.



Screens are available for the individual main functions for their monitoring and analysis.

6 Core functions goods receipt

6.1 Notification

In logOS, orders can either be transmitted via an ERP interface or an input screen is also available, where an employee can enter orders manually.

An order consists of an order header and the order positions.

By default, the logOS can be provided with the necessary information in the order header as well as in the order positions.

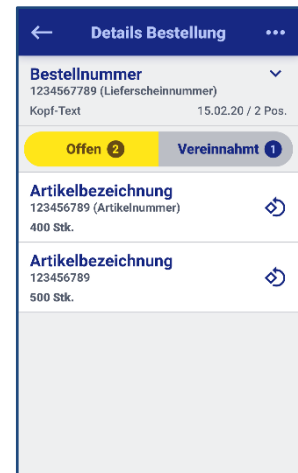
6.2 Goods receipt

Basically, it is possible to perform the goods receiving on a mobile terminal as well as on a PC.

It is possible to participate orders in terms of quantity and also to attach additional information.

Stored instructions in the article master data and/or also via the purchase order can be displayed to the employee during collection.

By default, a goods receipt document can also be printed.



6.3 Deconsolidation

In order to divide a received quantity into storable sizes and to book it to carriers, several options are available in logOS.

6.3.1 Manual quantity split

The collected quantity can be manually divided and booked to existing or newly created storage carriers.

6.3.2 Automatic quantity split

Based on the article master data, a quantity dividing is automatically carried out and, depending on the specifications, the required storage carriers are automatically generated and the stock booked to them.

For safety reasons, the carriers can be scanned at the end.

6.3.3 Dispatch Advise

This process is used for quickly handle of deliveries of already recorded and labelled carrier series.

The carrier numbers and quantities are already sent with the order notification in sub-items under the order item (Dispatch Advice).

There is a possibility that the pallets may have different quantities. This must have already been correctly transmitted by means of Dispatch Advice.

For security, each carrier can be scanned at the end.

6.4 Storage Inbound

In the article master, each article is assigned a preferred warehouse, which is then suggested to the employee at goods receipt. An employee can accept the preferred warehouse at receipt or also overwrite it for this storage inbound.

After the goods receipt is completed, a transport order is created in the system, which can be processed either via a mobile terminal or a goods receipt printout (printout with bin coordinates).

The logOS assigns the final storage location in the automatic warehouses as late as possible, at the latest when the carrier has arrived on the automatic conveyor.

In the case of manual warehouses, a storage bin is assigned at the time of receipt and displayed to the employee. However, it is also possible to override the proposed storage location by having the employee select a suitable alternative location and scan it. If the location is not allowed from the system's point of view, this is displayed to the employee.

6.4.1 Add to current storage

In logOS, it is possible to add goods in quantities to an empty carrier part within a partially filled carrier.

The possible carrier part that are in the warehouse can be displayed in logOS. The carrier part selected by an employee are thus moved out of the warehouse for addition to stock and the article to be stored in them is displayed.

6.5 Collection carrier

In logOS there is the possibility to create a collective carrier.

The purpose of a collective carrier is to group together for transportation different smaller quantities of goods that are to be transported to the same warehouse.

Upon arrival at the destination warehouse, the collective carrier can be scanned and all items contained in the collective carrier are available for quick storage inbound processing.

7 Core function outgoing goods

7.1 Order management

7.1.1 Order entry

Usually, the orders are transmitted automatically by the higher-level HOST system. These consist of an order header and order positions.

It is also possible to create orders manually via an input screen.

Order overview

Search Criteria

Order header | Order position

Order code: * Requested delivery time Start: : Order state code: RESERVED (Reserved) Search

Order group: * Requested delivery time to: : Order type code: * Reset

Customer order code: * Staging area: *

Order headers: (46)

Order code	Order group	Shipping group	Order type code	Priority	Creation mode	Requested delivery time	Order state code	State time	Selected
CC36	G42		NORMAL (Normal)		1 MANUAL	Apr 16, 2014 12:00:00 AM	RESERVED (Reserved)	Feb 3, 2021 16:59:10.254	<input type="checkbox"/>
CC37	G42		NORMAL (Normal)		1 MANUAL	Apr 16, 2014 12:00:00 AM	RESERVED (Reserved)	Feb 3, 2021 16:59:10.614	<input type="checkbox"/>
CC4711	G4711		NORMAL (Normal)		1 MANUAL	Apr 16, 2014 12:00:00 AM	RESERVED (Reserved)	Feb 3, 2021 16:59:10.817	<input type="checkbox"/>
ORD3	GORD3		NORMAL (Normal)		1 MANUAL	Jan 30, 2021 3:41:28 PM	RESERVED (Reserved)	Feb 3, 2021 16:59:14.411	<input type="checkbox"/>
ORD3EGHL	GORD3EGHL		NORMAL (Normal)		1 MANUAL	Jan 30, 2021 3:41:28 PM	RESERVED (Reserved)	Feb 3, 2021 17:00:17.091	<input type="checkbox"/>
ORD3EGRL	GORD3EGRL		NORMAL (Normal)		1 MANUAL	Jan 30, 2021 3:41:28 PM	RESERVED (Reserved)	Feb 3, 2021 17:00:13.935	<input type="checkbox"/>

Order positions: (5)

Order position	Article code	Owner code	Article description	Requested quantity	Open Quantity	Picked quantity	Missing quantity	State code	State time
1	549208	SLD	KABEL F14/R ROLLENE...	89	0	0	0	89 RESERVED (Reserved)	Feb 3, 2021 17:00:17.075
2	549173	SLD	ROLLENENDSCHALTE...	107	0	0	0	107 RESERVED (Reserved)	Feb 3, 2021 17:00:17.154
3	549172	SLD	LENKSTEUERUNG DAC...	98	0	0	0	98 RESERVED (Reserved)	Feb 3, 2021 17:00:17.232
4	549149	SLD	NETZKABEL ZU LADEG...	98	0	0	0	98 RESERVED (Reserved)	Feb 3, 2021 17:00:17.310
5	549026	SLD	NETZKABEL ZU LADEG...	86	0	0	0	86 RESERVED (Reserved)	Feb 3, 2021 17:00:17.389

[Navigate](#) | [Order](#) | [Reservation](#)

Information can be provided which is important for individual order control, such as:

- Shipment date (for a scheduling of the order triggering)
- Customer data (for customized order processing)
- Process variants (for different process flows)
- Shipping sequences

The received orders can be edited at various fields, if the setting allows it.

7.1.2 Material reservation

During material reservation, the required stocks are assigned to carriers for an order. This ensures that an order has "its" stocks for sure after the reservation.

The material search is normally based on a soft or strict FIFO (First In, First out) principle. Optionally, however, other strategies are also possible, which can be defined per article (see chapter "Additional functions").

Normally, the material reservation is performed automatically by logOS in the background, although there may be exceptions (see chapters below).

7.1.2.1 Time

The time for the reservation can be set in the following ways:

- Direct: When the order is transmitted, the material is reserved immediately
- Scheduled: Depending on the shipping time, the reservation is scheduled backwards
- Manual: An employee starts the reservation manually

7.1.2.2 Special treatment

The following special treatments are supported in logOS by default:

- **Specify explicit carriers for order items:**
An employee can reserve explicit (available) stock for an order item for reservation purposes
- **Allow less delivery:**
Depending on the setting, it may be allowed to process the order with the still available material despite missing material, without the missing material ever having to be delivered later.
- **Start partial picking:**
Depending on the setting, it may be allowed to start the order with the currently available material despite the lack of material, but the order remains pending until all material has been picked.

7.1.3 Create picking lists

By default, one picking list is generated for each picking warehouse. This list contains all positions and quantities that are to be picked from the specific picking warehouse. In this process, an order position is split by quantity among different pick lists if the necessary quantities of an item are located in different warehouses.

7.1.3.1 Special treatment

The following special treatments are supported in logOS by default:

- **Create pick list manually:**
If needed or for rare special requirements, a pick list can be compiled manually
- **Pick sequence:**
The pick list also generates a pick sequence, for example to process a pick list efficiently in a manual warehouse.

Depending on customer requirements, the automatic creation of picking lists must be customized in the project.

7.1.4 Built working groups

It is possible to assign picking orders (lists) to a specific workgroup. A workgroup consists of one or more combined workstations.

This allows a dispatcher to distribute pick orders to his teams individually.

7.2 Picking

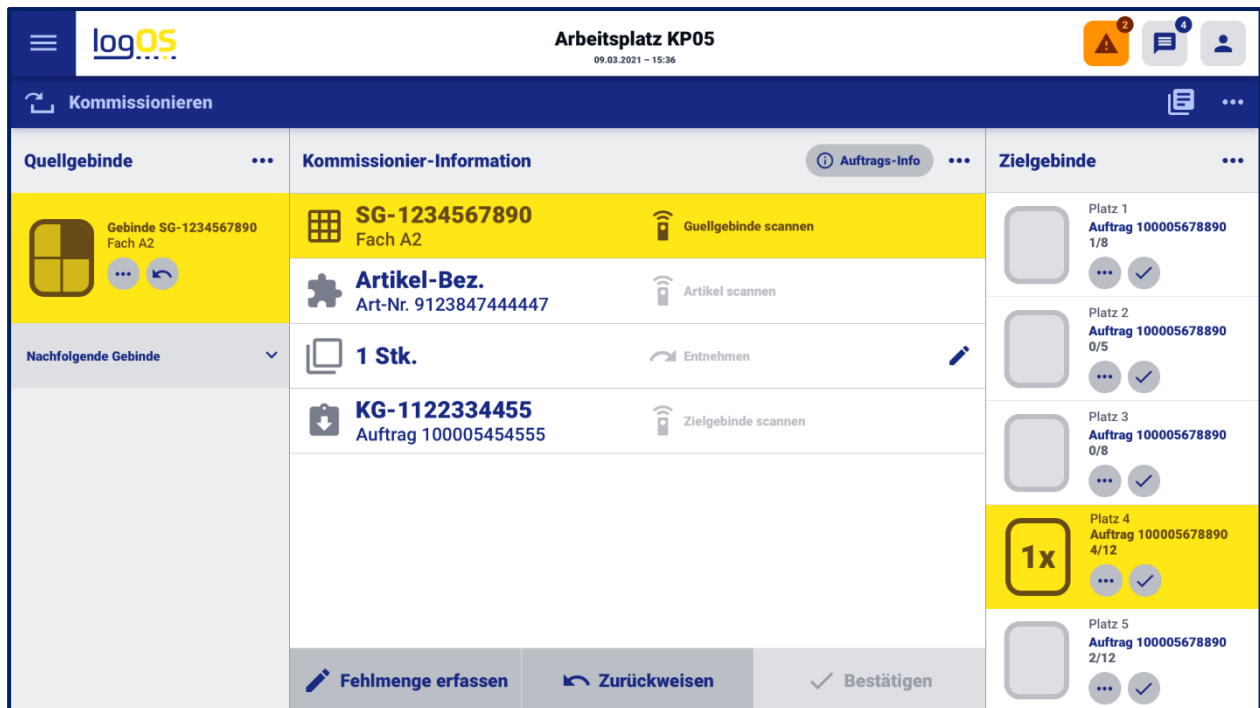
The logOS supports both goods-to-person and person-to-goods picking.

7.2.1 Goods to person

At the picking workstation, an employee can take over one of the assigned picking lists for processing.

Further, the employee can create a picking carrier to book the picked goods to it in a system-monitored manner to track for further processing.

The system optimally supports the employee with flow steps through the picking process.



7.2.2 Person to goods

At the picking device, an employee can take over one of the assigned picking lists for processing.

Furthermore, the employee can create a picking carrier in order to book the picked goods to it in a system-monitored manner and to track further processing.

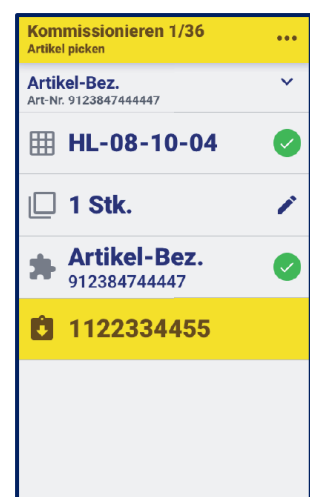
The system guides the employee step by step through the picking process.

The following steps can be set in the project configuration:

- Scan storage location as confirmation (yes/no)
- Scan source carrier as confirmation (yes/no)
- Scan article as confirmation (yes/no)
- Scan picking carrier as confirmation (yes/no)
- Show info fields for order and/or item reference

Other functions in the standard:

- Skip pick position:
The employee can skip a position in the specified order. This will be placed at the end of the list order.



7.2.2.1 Picking with paper list

When working without mobile terminals, a pick list can be printed and at the end of the picking process the pick list can be booked as a lump sum or with corrections if necessary.

7.2.3 Multiorder picking

7.2.3.1 Goods to person

It is possible to process several picking lists at the same time.

A location must be assigned to each target carrier. Depending on the system layout, this location can be a physical place on a conveyor or on a floor marking, or just a virtual place. In any case, no more picking lists may be assigned than configured spaces are available. This is monitored by the logOS.

If there are several positions of the different picking lists in a source carrier, logOS recognizes this and the positions in it are processed in one time.

The assignment of new picking lists to a work center can be done at any time. In the standard, however, no optimization algorithm is applied, since the search requires special requirements in many cases. A possible algorithm can be built in customer specific.

7.2.3.2 Person to goods

It is possible to process several picking lists at the same time.

In the manual area, it is assumed that all pick lists for one picking run are selected at the beginning.

These can be assigned per target location (e.g. part on a picking car).

The logOS optimizes the picking sequence based on all selected picking lists.

7.3 Consolidation

If an order has to be picked from several warehouses, it makes sense to use a consolidation place for this order until all partial orders from the different warehouses have been processed. Further, the order can then also be made ready for shipping in this zone.

7.3.1 Assign consolidation zone

The usable consolidation zones must be parameterized in the system beforehand.

To assign a consolidation zone to a order, the following options are available in logOS by default:

- **Manually at the control station**
Assignment by an employee directly at the control station (condition: consolidation zone must be logically free). The carriers for this order are then assigned directly to the assigned consolidation zone.
- **Manually on site at mobile terminal**
Assignment by an employee via a mobile terminal (condition: consolidation zone must be logically free).
Only the first picked carrier may be freely assigned. For the other carrierer from the same order, the consolidation zone is then known and the system specifies the destination.

It is also possible that the logOS assigns the consolidation zone automatically. However, this is not included in the standard and must be adapted to the customer's needs.

7.3.2 Booking a carrier to consolidation zone

In logOS, it can be parameterized whether a carrier is to be confirmed with a barcode scan of the consolidation zone for safety reasons. This requires that the consolidation zone can be identified with a barcode.

7.3.3 Completion of consolidation

The logOS monitors which partial orders are already in the consolidation zone.

As soon as all partial orders are in the consolidation zone, the follow-up processes for this order are initiated.

7.3.4 Automatic warehouse as consolidation

Pre-picked carrier can be temporarily stored in an automated warehouse until they are needed for shipping.

For this purpose, the picked carriers are stored in the warehouse with the order data.

As soon as the shipment of the order is started, the carriers are again driven out of the warehouse towards the shipping department.

7.4 Packing

At the consolidation zone or shipping zone it is possible to make the partially picked carrierer ready for shipping.

The logOS enables the following processes for this:

- Rearrangement of the carriers (compacting, repacking)
- Implementing customer-specific packaging requirements (an info field is available for this purpose, which is displayed on the mobile or fixed terminal)
- Create and apply customer labels
- Create packing list per carrier
- Create delivery list per order

Edit Shipping Carrier

Search Criteria

Source carrier: Location: Shipping Carrier: Search

Reset

Stocked items on Carrier:							Stocked items on Carrier:						
Order code	Shipping group	Article code	Quantity	Book quantity	Quantity unit	Selected	Order code	Shipping group	Article code	Quantity	Book quantity	Quantity unit	Selected

Change to shipping carrier
Rebook stocked items
Rebook stocked items
CMD_NewShippingCarrier_newMenu...<>

7.5 Shipping

Shipping in logOS includes the provision and loading of orders. Thereby shipping groups (tours) can be formed.

7.5.1 Shipping groups (tours)

In logOS, it is possible to combine different orders into one shipping group at the logOS control station. This is useful if different orders are to be placed on the same loading car (truck, rail car).

It is also possible to specify a loading sequence of the orders.

If a loading sequence has been selected, logOS monitors the transports to the shipping lanes/shipping zones for the correct sequence.

7.5.2 Assignment of the shipping lanes (zones)

The standard in logOS offers several possibilities to assign a shipping lane/shipping zone to a shipping group.

- Manually at the control station
At the logOS control station, it is possible to see which shipping lanes have which occupancy status.
Thus, a shipping group can be assigned to a free lane/zone. It is also possible to attach a shipping group to an occupied lane; the transports to the shipping lane/zone are only activated when a corresponding lane/zone becomes free.
- Manually on site at mobile terminal
Assignment by an employee via a mobile terminal (condition: shipping zone must be logically free). Only the first shipping unit may be freely assigned. The shipping zone is then known for the other carriers in the same shipping group and the system directs them to it.

It is also possible that the logOS assigns the shipping zone automatically or that the information is assigned via a ramp management tool (Yard Management).

However, this is not included in the standard and must be adapted to the customer's needs.

7.5.3 Display of the shipping group data on the screen

It is possible to show information on a screen per loading zone, so that employees can get the necessary shipping data based on this information during loading.

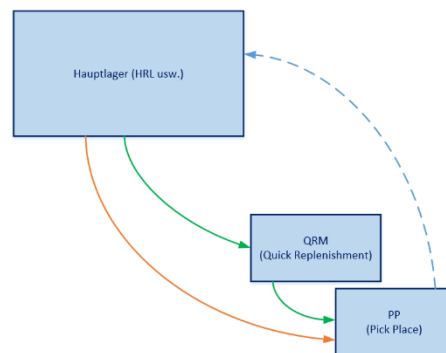
7.5.4 Loading monitoring with mobile terminal

Loading into a loading car can be monitored in various embodiments.

- A carrier in the shipping zone is scanned. The logOS checks if the carrier is intended for loading, if it is in the correct order and if a gate is already provided for it. If the check is valid, logOS displays the loading gate on the mobile terminal.
- During loading, the loading gate can be scanned as a security measure to confirm that the carrier has been loaded into the correct loading gate.

8 Replenishment Management

A replenishment is needed in most cases to automatically replenish goods from one warehouse to another. In most cases, the destination warehouse is a picking warehouse from which partial quantities are obtained.



In logOS, the following types of storage carriers can be parameterized to trigger a replenishment:

- **PP (Pick Place):**
This is a picking station for part pickings. A PP can be configured with various parameters to control replenishment
- **QRM (Quick Replenishment):**
This is a temporary storage area near the picking station so that replenishment can be done quickly.

The logOS offers the following parameterization options by default:

- **Fixed allocation of an article to one or more PP locations:**
The article is always moved to its fixed allocated location(s).
- **Dynamic allocation of an article to a group of PP locations:**
If no fixed allocation of an article has been parameterized in the picking warehouse, logOS moves the required article to any free location (the picking zone in which a free location may be searched for can be restricted).
- **Quantity threshold for replenishment:**
The time at which replenishment can be triggered can be set.
Example 1 →
Threshold = 0: Only when the withdrawal carrier has reached the quantity 0, another one is retrieved.
Example 2 →
Threshold = norm quantity of a carrier. Here are usually two source carriers at the same place ready. If one of them becomes empty, the next one will be added.
- **Order-related replenishment:**
Only the quantity required by current picking lists is replenished. Otherwise, order-independent replenishment is performed based on the quantity threshold.
- **With/without QRM:**
To ensure fast replenishment, the item can first be replenished to the QRM location before it is then replenished from the QRM to the PP

9 Inventory counting

The logOS keeps an inventory counting date per stock (normally quantity on a handling unit). This is reset for certain sub-processes.

9.1 Ongoing inventory counting

The logOS WMS offers the following running inventory options by default.

9.1.1 Goods receipt

At goods receipt, the inventory date is set to the current day for each stock on a handling unit.

9.1.2 0-Inventory counting

The system automatically checks whether a carrier should theoretically become empty during partial picking. If this is the case, the system prompts the employee at the screen to confirm this.

When an inventory difference is detected, an inventory correction is reported.

9.1.3 Near-0 inventory counting (option)

For a near-0-inventory counting it can be defined per article in the article master from when an inventory count should be performed during the picking process.

If the value falls below this value, an employee at the picking workstation must carry out the inventory.

The system sets the inventory date to the current day.

9.2 Planned inventory counting

9.2.1 Sources of inventory audits

The stocks to be checked can either be specified by the ERP via the interface or prepared in the WMS itself.

For the preparation in the WMS, the upcoming inventory counts can be found via filter (e.g. inventory date, warehouse, client, etc.) and an inventory list can be compiled for it.

Manage inventory stocked items

Search Criteria

Article code: From inventory date: Warehouse number:

Owner code: To inventory date: Location address:

Lot code: From expiration date: Carrier code:

Article description: To expiration date: Inventory requested:

Stocked items: (15236)

Article code	Owner code	Lot code	Article description	Stocked item code	Blocking code	Quantity	Reserved quantity	Incoming quantity	Expiration date	Carrier code	Warehouse number	Location address	Selected
A203	CC		Palettennotzbl...	18227	USABLE	5	5	0		BC0001	BL01	00.000.00.000	<input type="checkbox"/>
A203	CC		Palettennotzbl...	18228	USABLE	5	5	0		BC0002	BL01	00.000.00.000	<input type="checkbox"/>
A203	CC		Palettennotzbl...	18229	USABLE	5	0	0		BC0003	BL01	00.000.00.000	<input type="checkbox"/>
A204	CC		Doppelmeter	18230	USABLE	5	5	0		BC0004	BL01	00.000.00.000	<input type="checkbox"/>
A204	CC		Doppelmeter	18231	USABLE	5	5	0		BC0005	BL01	00.000.00.000	<input type="checkbox"/>
A204	CC		Doppelmeter	18232	USABLE	5	5	0		BC0006	BL01	00.000.00.000	<input type="checkbox"/>

9.2.2 Implementation of the planned inventories

The inventory lists created in logOS WMS can be processed in 2 ways:

By Paper:

In logOS WMS, an inventory list is printed out on paper, which contains the storage bins to be checked with their articles. The target quantities are not displayed, these must be counted and entered in the list.

Another employee enters the recorded quantities into the logOS WMS on a screen. The system then lists the differences. In the event of large differences, any necessary checks can be requested.

Paperless (only at the "goods to person" workstations):

An automated warehouse is always inventoried paperless, as an employee does not have manual access to the inventory.

It activates an existing inventory list at the workstation. The automatic warehouse thus triggers transports to the workstation. At the workstation, the employee performs the counts and enters the result.

9.3 Inventory reconciliation

The logOS has interface instruments to perform inventory reconciliation with a leading HOST system.

However, customer requirements vary greatly among themselves and therefore a solution is always implemented on a customer-specific basis.

The following events can result in an inventory reconciliation:

- For each inventory correction quantity, this inventory correction is sent to the HOST
- Once a day the total stock is reported to the HOST
- The total inventory is reported to the HOST at their request

10 Additional functions

10.1 Batches/ LOT

The logOS manages batches.

The system offers the following options in handling batches:

- Manage batches as an addition to the article
- Manage article selection with consideration of the batches specified by the host
- Manage the article selection without taking into account the batches if there is no default from the HOST (Batches field Empty)
- Filtering of all screen overviews on batches

10.2 Article supplement number

The logOS manages an article supplement number. In addition to the batch management, the article supplement number is another criteria field which behaves similarly to the batch.

For example, an article supplement can be useful in the following cases:

- Under an article number there are further distinctions, which must be controlled separately (e.g. color codes).
- Production steps: An article knows different production steps, but always under the same article number.
- Generally known material, but which has been stored for a specific purpose (e.g. a housing with the customer's individual lettering)

10.3 Cross-docking

The logOS offers a simple form of a crossdock in the standard.

The basis for this is provided by the missing list of ordered goods, which automatically generates, when goods are not available for an order.

As soon as incoming goods are received at the goods receiving, the system automatically checks this list to see if there are any orders waiting for these goods and displays this on the screen.

An employee now posts the missing quantity, which is displayed, to a "cross dock transfer place" and the system thus automatically generates pick lists to process the orders further.

10.4 Hazardous substances

The hazard classes/storage classes are kept in the master data.

Behind it, alternative information can be stored, which may be necessary for a later printout of labels.

An article can be assigned one of the hazard classes/storage classes in the article master.

At goods receipt, the hazard class/storage class is assigned to a new stock. If there are several stocks on one carrier, the highest hazard class/storage class that the different stocks have is used.

The areas where which hazard classes/storage classes may be stored are defined with the [storage zones](#).

10.5 Weight control

In logOS WMS, the weight is required for any inventory control.

In the master data, the standard weights can be stored both for the packaging unit and for a load carrier. Thus, the quantities on a load carrier can be calculated.

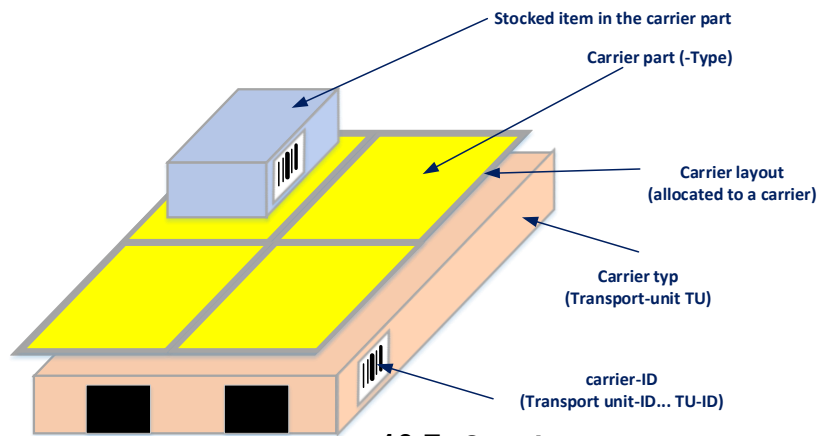
For a storage load monitoring based on the weights our module logOS MFS is responsible and described there.

10.6 Handling Unit Management

The logOS knows the following hierarchies in handling units.

Thus, the logOS can manage a simple nesting (charge carrier, charge), where a spatial arrangement of different charges can be managed.

More detailed description of the handling units and their hierarchies is described in logOS MFS.



10.7 Consignment

In consignment, the material is in the customer's warehouse after receiving, but the owner of the material is still the supplier.

In logOS it is possible to transfer article stocks from one owner (client) to another owner. In this special case, the supplier is also managed as a client in logOS.

A change of ownership (client change) can happen via the following steps:

- The ERP gives a "pick order" to the WMS.
The WMS either directly reposts the goods in the warehouse if the reposting stock matches a carrier quantity.
If the carrier quantity does not fit, a picking order is started to physically transfer the goods.

It should be noted that the article must be created 2x in the master data, because an article is always assigned to exactly one owner in the master data.

10.8 Empties and loading unit

Each loading unit is uniquely identified. If no legible identification is available, logOS generates a virtual identification for each carrier.

Empty stored loading unit are specially managed by logOS. Thus, an automatic replenishment of empties can be generated if required.

10.9 Multi-client capability

The multi-client capability in logOS means that warehouse stocks in logOS can be assigned to an owner.

The system offers the following options when dealing with clients:

- Creating clients in logOS
- Manage clients per inventory
- Assigning the stocks to a client according to the HOST order or via manual assignment
- Filtering of all screen overviews on clients
- Internal client transfers possible (see also consignment)

10.10 Multi-storage capability

Different warehouses can be created and managed in logOS.

The system offers the following options when dealing with multiple storages:

- Assign preferred warehouse per item
- Picking an order from several warehouses (automatic and manual warehouses)

10.11 Best before dates (Expire Dates)

In logOS the best before date can be managed. The logOS offers the following possibilities in its standard:

- Retrieval strategy adjustable per article (FIFO, FEFO)
- Receiving the best before date about the order
- Post-recording of the best-before date at goods receipt
- Checking the minimum remaining time during the material search based on the value in the article master
- Default remaining time via the order item (overrides the remaining time in the article master)

10.12 Package optimization

The logOS supports a package optimization with an external tool, which is integrated in the logOS via an interface.

This tool calculates an optimal allocation of a customer load carrier depending on the weights and dimensions. Furthermore, the tool has a 3D visualization, with which the tool can also provide support in manual packing.

The requirements for a project must be considered individually.

10.13 Material Returns

A return may be specially handled in logOS as follows:

- In the notification of the HOST system or during the manual entry of a goods receipt, an info text can be included that specifies what is to be done with the return. (e.g. in-depth inspection, special storage).
- The retrieval logic can be set to LIFO (Last in, First out). Thus, the return is first used again for an order

10.14 Serial numbers

The logOS system supports the assignment of a serial number during picking.

If several numbers of pieces with different serial numbers should be recorded, the logOS splits the withdrawal items in such a way that it results in a withdrawal item for each piece, which can be processed individually at the workstation and the serial number can be recorded for each piece.

10.15 Slotting and warehouse reorganization

These are processes to find the most optimal storage location based on article and packaging data, respectively to continuously check if a stored carrier is still stored at the optimal location and to reorganize them if necessary.

The logOS has slotting and storage reorganizations, but these are assigned to the MFS module and are described in detail there.

10.16 Fast mover analysis

Fast-moving items are those that are accessed most frequently. These are stored in the warehouses in such a way that these article stocks can be accessed quickly.

Normally, a fast-moving analysis is calculated or fixedly assigned in an ERP and transferred to the WMS.

The logOS can also perform the fast-moving analysis independently, should this be necessary. It can perform the following analysis by default:

- Frequency of material movements within the managed warehouses in a past time period (e.g. last 60 days).

If the logOS detects a change in the fast-moving item assignment on the basis of the analysis, this is automatically adjusted in the item master.

The new fast-moving item assignment is taken into account during the next stock placements, stock transfers or reorganizations.

10.17 Compaction of carrier locations

This function detects packs that have empty pack locations. This allows a compaction process to be started, which can be executed at a picking station. Empty carriers can thus be created as a result.

VPT_CompactionPanel

Search Criteria

Occupancy Rate
 Carrier code

Occupancy Rate:
Carrier code:

Warehouse:

Carrier: (100)

Carrier code	Carrier type code	Description of type	Occupancy Rate	Warehouse code	Location address	Target location address	Layout code	Layout-Description
C0100102101	E1H1	EURO1 MAX 1000	75.00%	HL01	01.001.02.101		E1H1-2x2	Layout E1H1 2x2
C0100102201	E1H1	EURO1 MAX 1000	75.00%	HL01	01.001.02.201		E1H1-2x2	Layout E1H1 2x2
C0100402101	E1H1	EURO1 MAX 1000	75.00%	HL01	01.004.02.101		E1H1-2x2	Layout E1H1 2x2

Stocked items: (3)

Lot code	Stocked item code	Article code	Owner code	Article description	Quantity	Reserved quantity	Incoming quantity	Quantity unit	Arrival time	Expiration date	Inventory time	Last moved	Variant code	Blocking code	Inventory blockingcod	Inventory requested	Carrier code
	18421	511918	SLD	VERSCHL...	1	0	0	STK						USABLE (...)	USABLE (...)	N (No)	C0100102
	18422	512239	SLD	MAGNET ...	11	0	0	STK						USABLE (...)	USABLE (...)	N (No)	C0100102

10.18 Value Added Services

The Value Added Services (VAS) is an additional function to determine the costs for storage and services in a warehouse.

10.18.1 Determination

The determination is based on 3 acquisition types:

1. Stock Accounting
Each stored carrier is automatically recorded once a day and assigned to an owner/client with tax points based on various parameters (carrier dimensions, required storage environment such as deep-freeze).
2. Automatic activities
Services such as storage, partial picking, packing, etc. are automatically recorded per event and assigned to an owner with tax points.
3. Unscheduled activities
The user of the WMS can manually predefine activities and assign tax points to them. Thus, an employee can later select one of these activities and assign it to an owner/client. Additionally, it is possible to add a text to each entry to justify this activity. (Example: At goods receipt, unscheduled under-palletizing had to be carried out because the pallet was defective on arrival.)

10.18.2 Analysis

Stöcklin provides a simple Excel file for analysis and report generation.

In it, the analysis period and the client can be selected with filter settings in order to access the VAS data records from the logOS database.

Of course, it is also possible to export to an external billing tool via this interface.

The Excel file has parameterization options for entering separate allocation values for each client (e.g. markup factors, etc.).

Furthermore, a report can be generated from the filtered, and if necessary manually adjusted, data, which shows the amount settlement for the selected time period.

The Excel tool can be extended by the customer independently, report design can be customized etc.

10.18.3 Parameterization

The module can be fully parameterized by the customer.

A so-called tax point can be stored for the individual storage fees and activities. This is client-independent and represents the actual service costs.

In the analysis tool, surcharge factors can then be stored per client and thus a final amount can be calculated.

In the case of unplanned activities, freely definable expenses and materials can be listed and evaluated.

11 Expansion modules

11.1 PickByVoice

A PickByVoice system is mostly used in manual picking. Instead of display devices (MDT), voice output and voice feedback are used to carry out the picking processes.

By default, the WMS provides an interface to Vocollect, a leading provider of PickbyVoice systems.

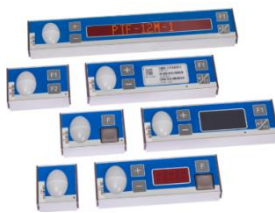


11.2 PickByLight

A PickByLight supports the picking at GoodsToPerson as well as at PersonToGoods. It can show from which location what can be picked, as well as into which carrier or carrier location what should be picked. Thus the picking quality as well as the picking performance is increased.

The solutions in this regard are diverse and require precise specification.

As standard, the WMS provides an interface to KBS, a leading supplier of PickbyLight systems.

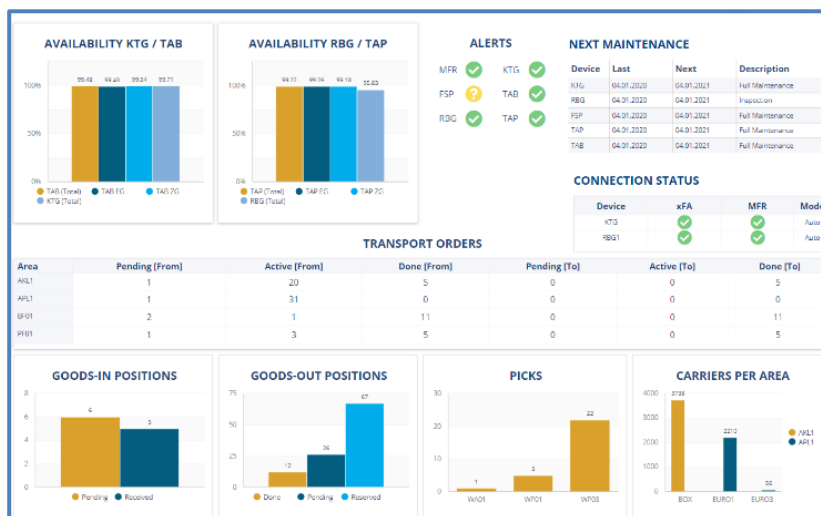


11.3 Statistics module logOS DMA

As Stöcklin's own module, the logOS DMA offers a web platform to evaluate important characteristic data from the warehouse.

For example, it is possible to view the history of inventory movements, display asset performance, etc.

A more detailed description can be found in the separate product info of the logOS DMA.



12 Storage bin Management

The storage bin management includes the management of all the storage bins present in the managed warehouses, the carriers as well as their interconnection.

Note for automatic storage systems

The storage location management of fully automated warehouses is mapped in our module logOS MFS. Further information can be found in the document "Product Information_logOS MFS_EN".



12.1 Storage definition

A warehouse can be divided into different substructures in logOS, which influence the strategies for putaway and stock transfer

12.1.1 Storage

The warehouse is a logical unit for storing carriers. The next lower-level physical management unit is represented by storage bins (storage locations).

12.1.2 Storage types

The logOS WMS can manage the following manual storage types:

- Block storage area
for several carriers, which is not managed within the area (maximum number of carriers of the area adjustable or unlimited)
- Shelf storage warehouse
with fixed physical coordinates, in which one (or more) carriers can be stored and managed per storage location.
- Shelf floor
On a shelf floor, goods can be booked directly to the place without a storage carrier.

12.1.3 Storage zones

Different logical zones can be distinguished in a warehouse. They are used to store items in certain zones. When placing an article in storage and searching for the storage place, the storage zone assigned to the item is decisive.

Fast-moving zones:

If the articles can be classified according to fast-moving zones (ABC), the warehouse is logically divided so that the storage locations in the A zone can be reached quickly. The B and C zones, on the other hand, contain the locations that are associated with longer travel times for storage and retrieval. The access frequency to the articles can be used to classify articles accordingly. This allows the storage and retrieval performance to be significantly increased.

At best, the fast-moving items classification (ABC) comes from the ERP via the master data. The ERP can best determine seasonal fluctuations in access frequencies.

As an additional function, the logOS WMS offers its own analysis based on the access frequency.

Storage class zone

If an article has further characteristics, which should limit a storage place search, then so-called storage classes can be created.

Thus, a storage class can be assigned to each article (or carrier). The storage classes then point to one or more storage zones.

It is also possible to assign several zones to a storage class in a sequence to be prioritized.

Example:

- Chocolate may only be stored in the climate zone +15°C (strict zone selection "+15°C")
- Wafers are preferably stored in the normal warehouse, but may also be stored in the climate zone +15°C if no more suitable space is available in the normal warehouse. (prioritized zone "normal storage", alternative zone "+15°C")

Examples of storage class usage:

- Divide climate zones
- Divide hazardous material zones

Picking zone

A picking zone is required exclusively for the manual picking area. This can be used to delimit areas in order to control the target bin allocation, especially in the case of automatic allocation of source bins to picking bins.

Thus it can be achieved, for example, that a replenishment of heavy articles can be initiated dynamically to picking locations, but a picking location is only searched for within the picking zone parameterized in the article master.

12.1.4 Storage location type

So-called storage location types can be created. These combine properties such as location dimensions and the permissible weight of the locations. Each location must be assigned a location type.

12.1.5 Storage location

The storage locations designate the physical locations for the carriers, which are given a unique address.

The following configuration is given to a storage location:

- Assignment of a storage location type
- Assignment of a fast-moving zone
- Assignment of a storage class zone
- Assignment of a picker zone
- Assignment of a storage function (description see below)
- Assignment of the routing sequence during manual picking (description see below).

Storage function:

A storage function means what function the storage bin takes:

- LP: Normal storage bin
- QRM: Replenishment bin for fast replenishment to the picking station (see also chapter "Replenishment")
- PP: Picking station for direct removal of articles

Walkway order:

With this parameter it is possible to define a running order how a picking employee should be guided through the shelves for the person to goods picking.

Printout of place designations (barcodes):

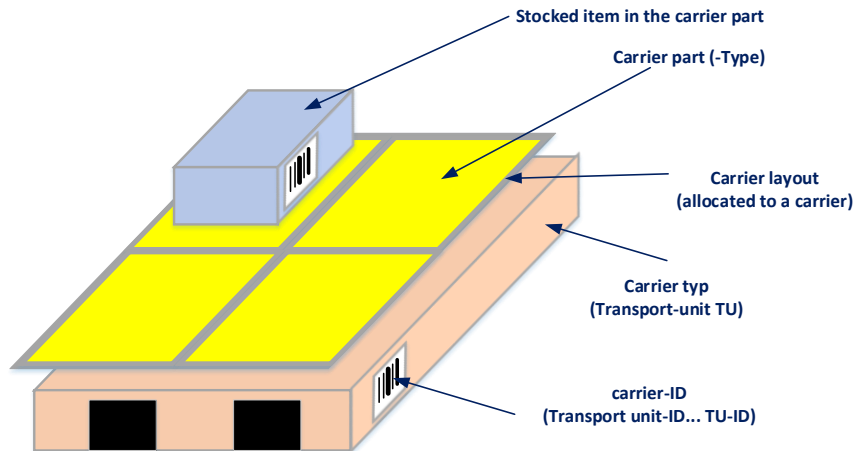
To designate the shelves with coordinates, a report can be created in logOS or the data can be exported to a CSV file.

The printing of the shelf coordinates on suitable labels can then be arranged independently by the customer.

12.2 Handling unit definitions

A carrier defines a load carrier onto which goods can be booked and stored in a warehouse. With a division of a carrier into several parts, different goods per carrier can be managed on one carrier in logOS.

The following structure is used to form a carrier.



12.2.1 Carrier type

The carrier type designates a storable physical carrier.

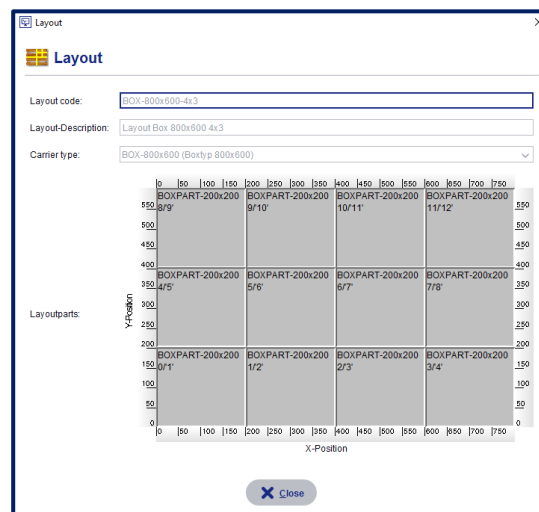
The carrier dimensions and the carrier weight (without payload) can be stored in this.

12.2.2 Carrier location type

The carrier location type designates a logical dimension, which can then be used to create a carrier layout.

12.2.3 Carrier layout

The carrier layout can be created from one or more carrier location types. The basic dimension of the carrier layout corresponds to a carrier type, which can be equipped with different carrier part types.



The picture shows a pack layout for a carrier 400x600mm, equipped with 4 pack locations 300x200mm.

12.3 Storage strategies

12.3.1 Storage orders

Certain parameters can be stored for each article in the article master, which influence the putaway strategy.

This for example the preferred storage, hazardous material class, etc.

The logOS WMS consults these parameters during a putaway order to find the best possible storage location.

12.3.2 Storage location search

Storage strategies are used to find the most suitable aisle or storage location. For each putaway, the system determines and assigns the best storage location at the current time.

Conditions in the warehouse, such as the permissible weights in the different zones or the inclusion of the access speed to the stored carriers, are taken into account.

Overview standard storage location search

Strategy	Description
Binding dimension	First priority is given to finding the most suitable storage location for the carrier dimension. If no optimum storage location is found, the next largest storage location is searched for.
Load reduction	In many cases, the storage rack is not designed for full load. This means, for example, that storage locations that are stacked one above the other must not be completely filled with full-weight carriers. This function influences the bin search.
Fast-moving zones	Description see chapter Storage zones
Storage class zones	Description see chapter Storage zones

The priorities and combination of emplacement strategies to be used will be determined in the project during the specification phase.

12.4 outbound strategies

12.4.1 Stock removal orders

Stock removal orders are usually transmitted by the superordinate ERP system. However, the logOS WMS also provides an input mask for stock removal orders.

The orders need all data relevant for execution (in minimum article, quantity).

12.4.2 Material search

The material search for an order can be influenced by default with the following strategies

12.4.2.1 FIFO

The oldest stock in storage is used for an order. It can also be selected whether the FIFO is to be strictly adhered to or whether a "soft" FIFO can be permitted. With a soft FIFO, a stock can also be used which is not yet the oldest stored stock, but which allows more possibilities with other influencing parameters.

The strategy can be selected per item.

12.4.2.2 FEFO

The stored stock for an order is used, which has the shortest best before date (expire date).

For this purpose, a limit can also be set up to which day of the BBD the goods may still be used for orders.

The strategy can be selected per article.

12.4.2.3 Other factors

- aisle distribution
- Storage depth of the handling unit
- Batches/LOT

12.5 Manual restoring

The employee has the possibility to transfer a carrier manually without having an order from the system.

To do this, he scans a carrier that he wants to transfer.

If there are reservations on this carrier, the system will refuse a transfer.

Otherwise, the employee can transfer the carrier to the desired location and post it there, if allowed by the system.

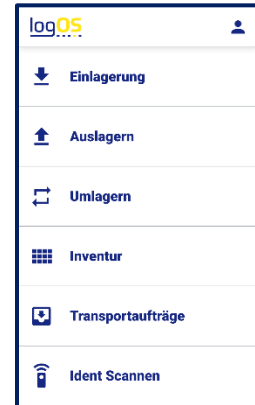
13 Material flow control

13.1 Automatic conveyors and warehouse

The material flow control for automatic systems are controlled by the module logOS MFS. Further information can be found in the document "Product Information_logOS MFS_EN".

13.2 Manual transports

For manual transports, for example with a lift truck, transfer orders are created in the system.



To have these processed by an employee, there are the following options:

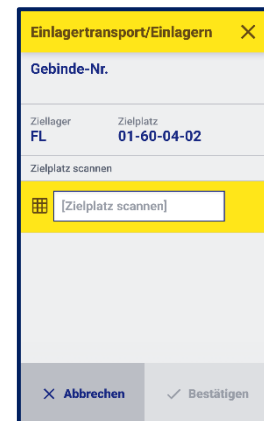
13.2.1 Overview on a mobile data device

An employee can pull up open transport orders on a mobile data device to see what jobs need to be completed.

13.2.2 Direct scanning of a pallet

An employee can scan a carrier on a mobile data device.

If a transport order is pending for this carrier, it indicates this to the employee and he can carry out the transport.



14 Master data management

14.1 Manage users and permissions

The two-level user administration consists of users and user groups.

The users can be assigned to a user group. The user administration also contains the login names and passwords without which access to logOS can be denied. The access permissions to logOS are defined on the user group level. This makes it easy to handle the access permissions even with a large number of users.

The user administration can also be linked to Active Directory of Windows Server. The authorizations for logOS can be taken over directly from there. A separate login at logOS is no longer necessary.

The screenshot shows the 'VPT_PermissionManagementPanel' interface. At the top, there is a search criteria section with 'User group' set to 'Administrator (System Administrator)' and a 'Filter' field. Below this, a table lists 146 user command permissions. The table has two columns: 'Description' and 'Allow'. All entries in the 'Allow' column have a green checkmark, indicating that all listed permissions are granted to the Administrator group.

Description	Allow
WMS messages	✓
WMS Carrier edit	✓
Warehouse optimization management	✓
View zone information	✓
View Transports TC	✓
View Transports MAN	✓
View Transport Requests	✓
View Transport Orders	✓
View Transport Overview	✓
View Reservations	✓
View Reports	✓
View replenishment information	✓
View rack visualization	✓
View journal entries	✓
Viewing plant properties	✓
Viewing incoming orders	✓
View information about warehouses	✓
View hostcommunication data	✓
View events	✓

14.2 Manage articles

The screenshot shows the 'Edit Article' interface. On the left, there is a form for 'Article Details' with various fields for article information. On the right, there is a section for 'Additional info' with a tab for 'Article Picture' showing an image of a blue and white USB stick in its protective case.

Article Details:

- Article code: A102
- Owner code: WMS
- Article description: USB Stick
- Additional code 1:
- Additional code 2:
- Volume unit:
- Volume per unit: 0.000
- Quantity unit: STK
- Quantity weight: 0.000
- Preferred Logistic Unit Quantity: 20
- Minimum stock level: 0
- Replenish Quantity: 0
- Strategy Article:
- BlockingCode: USABLE (Available)
- Preferred warehouse unit: PND1 (Paternoster)
- Zone match strategy:
- Preferred Carrier Type: E1H0 (EURO1 GEMESSEN)
- Preferred Carrier Part Type: BOXPART-300x200 (Box-Fachtp 300x200)
- Preferred speed code: A
- Expiration precursor days: 0
- Handle serial numbers:

Article Picture: A photograph of a blue and white USB stick in its white protective case. The USB stick has the 'Stöcklin' logo on it.

The item master data can be created, edited and deleted depending on the definition in the system.

Usually, the master data is managed by a higher-level system (ERP) and the necessary master data is sent to the WMS. In the WMS, further master data can be defined per article, which, for example, is not available in the ERP or is only necessary for the internal logistics process.

14.3 Manage carriers

The carrier types and their dependencies can be created and modified in the system. See also the chapter [Definitions](#)

Carrier Type Management

Search Criteria
Carrier type code: *

Carrier types (13)

Carrier type code	Description of type	Length	Width	Tare weight	Height	Profile control value	Height check	Minimum height	Maximum height	gap
BOX-400x300	Boxtp 400x300		400	300	0	-1	16	0	0	0
BOX-600x400	Boxtp 600x400		600	400	0	-1	8	0	0	0
BOX-800x600	Boxtp 800x600		800	600	0	-1	4	0	0	0
E1H0	EURO1 GEMESSEN	1200	800	0	150	1	1	0	0	0
E1H1	EURO1 MAX 1000	1200	800	0	150	1	1	0	1000	0
E1H2	EURO1 MAX 1500	1200	800	0	150	1	1	0	1500	0
E1H3	EURO1 MAX 1800	1200	800	0	150	1	1	0	1800	0
E2H0	EURO2 GEMESSEN	1200	1000	0	150	2	1	0	0	0
E2H1	EURO2 MAX 1000	1200	1000	0	150	2	1	0	1000	0
E2H2	EURO2 MAX 1500	1200	1000	0	150	2	1	1001	1500	0
E2H3	EURO2 MAX 1800	1200	1000	0	150	2	1	1501	1800	0
EUR8	Euro8ISO Palette	800	600	0	150	0	1	0	0	0
USGMA	US GMA Palette 48x40 Inch	1219	1016	0	0	0	1	0	0	0

Buttons: Delete carrier type..., Edit carrier type..., View carrier type..., New carrier type...

14.4 Manage warehouse

The storage types and their dependencies can be changed in the system. See also chapter [Storage definition](#)

14.5 Manage storage location

The storage types and their dependencies can be changed in the system. See also chapter [Storage location](#)

14.6 Manage storage zones

Storage zones can be created via the master data (see also chapter [Storage zones](#)). These are freely definable. One configured storage zone can then be assigned to each storage location. Furthermore, a storage zone strategy can also be configured, which defines in which zones and in which priority an item may be stored (in addition to the other storage parameters). A storage zone strategy can then be assigned to each article in the article master.

VPT_ZonePropertyManagementPanel

Search Criteria
Code: *

Warehousezone (3)

Code	Description
L	Lower Zone
M	Medium Zone
H	Higher Zone

VPT_ZoneMatchStrategyManagementPanel

Search Criteria
Zone-strategy code: *

Zone strategies (2)

Zone-strategy code	Description
LHM	LHM Zone Str
HML	HML Zone Str

Zone match strategy members (3)

Warehousezone	Priority
L (Lower Zone)	
M (Medium Zone)	
H (Higher Zone)	

Edit zone match strategy members

Zone-strategy code: LHM Description: LHM Zone Strategy

Warehousezones

Not assigned:

Assigned:

- 7 L (Lower Zone)
- 8 M (Medium Zone)
- 9 H (Higher Zone)

Buttons: Assign, Remove, Close

Footer: Zone match strategy, Edit zone match strategy members...

14.7 Manage workgroups

Here, workgroups can be created and workstations can be assigned.
See also [Forming working groups](#).

14.8 Manage suppliers

Supplier data can be created and edited.

14.9 Manage customers

Customer data can be created and edited.

14.10 Manage hazardous materials

Hazard classes/storage classes are kept in the hazardous substance master data.
Behind it, alternative information can be stored, which may be necessary for a later printout of labels.

See also chapter [Hazardous substances](#)

14.11 Manage Value Added Services (VAS)

Stock money:

In the VAS master data you can configure billing data and their tax points.
A carrier is then placed in the stock money scheme and valued accordingly.

Automatic activities:

Tax points can be stored for fixed activities. These are then automatically evaluated accordingly during execution.

Unplanned activities:

Any other possible activities can be stored here and evaluated with tax points.
An employee can then unscheduled select the stored activities and charge them to a client.

See also chapter [Value Added Services](#)

15 Information Tools

15.1 Order overview

The order overview shows the current orders and their states, which were transmitted by the ERP or created in the WMS. Among other things, it shows the progress of the individual orders.

Order overview

Search Criteria

Order header | Order position

Order code: * Requested delivery time Start: * Order state code: Pending, Reserved, Activated

Order group: * Requested delivery time to: * Order type code: *

Customer order code: * Staging area: *

Order headers: (56)

Order code	Order group	Shipping group	Order type code	Priority	Creation mode	Requested delivery time	Order state code	State time	Selected
AA39	G2		NORMAL (Normal)		2 MANUAL	Apr 14, 2014 12:00:00 AM	PENDING (Pending)	Jan 29, 2021 15:41:26.785	<input type="checkbox"/>
AA40	G2		NORMAL (Normal)		3 MANUAL	Apr 14, 2014 12:00:00 AM	PENDING (Pending)	Jan 29, 2021 15:41:26.785	<input type="checkbox"/>
AA44			NORMAL (Normal)		1 MANUAL	Apr 14, 2014 12:00:00 AM	PENDING (Pending)	Jan 29, 2021 15:41:26.785	<input type="checkbox"/>
CC35	G42		NORMAL (Normal)		1 MANUAL	Apr 16, 2014 12:00:00 AM	RESERVED (Reserved)	Feb 3, 2021 16:59:09.801	<input checked="" type="checkbox"/>

Order positions: (2)

Order position	Article code	Owner code	Article description	Requested quantity	Open Quantity	Picked quantity	Missing quantity	State code	State time
1	A:100	WMS	Regenschirm	33	0	0	0	0 RESERVED (Reserved)	Feb 3, 2021 16:59:09.785
2	A:103	WMS	Schoggischachtel Mutterhi...	33	0	0	0	27 RESERVED (Reserved)	Feb 3, 2021 16:59:09.958

Buttons: Navigate, Order, Reservation

15.2 Supply locations

This overview displays the configured picking locations. In addition to the current configurations, it shows the current stocks, the reservations and the replenishment transports to these locations.

VPT_ReplenishmentViewPanel

Search Criteria

Warehouse number: * Article assignment: * Replenishment: *

Location address: * Reservations enabled: * Expiration: *

Article code: * Owner code: * Article description: *

Replenishment locations: (25)

Warehouse code	Location address	Article code	Owner code	Article description	Shelf life days	Min. required expiration date	Number of carriers	Reservations enabled	Min. shelf life days	Max. shelf life days	Reserved quantity	Available quantity
RW01	RW.010							0 N (No)				
RW01	RW.011							0 N (No)				
RW01	RW.012							0 N (No)				
RW01	RW.013							0 N (No)				
RW01	RW.014							0 N (No)				
RW01	RW.015							0 N (No)				

Carriers/Stocked items: **No data found**

Lot code	Quantity	Reserved quantity	Quantity unit	Expiration date	Carrier code	Carrier type code	Category	Warehouse number	Location address
----------	----------	-------------------	---------------	-----------------	--------------	-------------------	----------	------------------	------------------

Buttons: Edit, Unassign article, To Carrier, To Article

15.3 Article information

It shows total item inventories, expected goods receipts, and expected goods issues at a glance.

It also shows which quantities are on which handling units.

Information about Articles

Search Criteria

Article code: Owner code: Article description:

Articles: (16)

Article code	Additional code 1	Additional code 2	Owner code	Article description	Total Quantity	Incoming	Outgoing	Quantity unit
A100			WMS	Regenschirm		1,550	75	100 STK
A101			WMS	First Aid Kit		1,380	45	11 STK
A102			WMS	USB Sticks		930	510	3211 STK
A103			WMS	Schoggischachtel Mafferhi, 1/2mli		690	500	1,116 STK

Stocked items: (30)

Lot code	Quantity	Reserved quantity	Incoming quantity	Quantity unit	Carrier code	Warehouse number	Location address	Position on carrier	Blocking code	Inventory blockingcode	Arrival time	Inventory time	Last moved date	Stocked item code
	1	1	0	STK	C1103802201	PF01	SC11	1	USABLE (Available)	USABLE (Available)				19330
	1	1	0	STK	C1100409101	PF01	SC11	1	USABLE (Available)	USABLE (Available)				20246
	1	1	0	STK	C9204004202	HL92	92.040.04.202	1	USABLE (Available)	USABLE (Available)				21295
	141	141	0	STK	C1201402201	PF01	SC12	15	USABLE (Available)	USABLE (Available)				21570
	1	1	0	STK	C0100409101	HL01	01.004.09.101	1	USABLE (Available)	USABLE (Available)				20290
	141	141	0	STK	C0201402201	PF01	PL01	15	USABLE (Available)	USABLE (Available)				21699
	1	1	0	STK	C0103802201	HL01	01.038.02.201	1	USABLE (Available)	USABLE (Available)				19324

15.4 Carrier Information

The carrier information shows the configuration of the carriers, the current storage location and their occupancy.

Information about Carriers

Search Criteria

Carrier code: Warehouse code: Location address: Carrier type code: On shelf: Target location address: Layout code: Carrier role code: Info code:

Carrier: **Output limited to 1,000 rows**

Carrier code	Speed code	Zone-strategy code	Carrier type code	Description of type	Carrier role code	Description of role	Warehouse code	Location address	Target location address	Layout code	Layout-Description	Last moved date	Text field 0
B0000101001	A		BOX-800x600	Bortyp 800x600			RL01	00.001.01.001		BOX-800x600-2x2	Layout Box 800x60...		
B0000102001	A		BOX-600x400	Bortyp 600x400			RL01	00.001.02.001		BOX-600x400-2x2	Layout Box 600x40...		
B0000103001	A		BOX-400x300	Bortyp 400x300			RL01	00.001.03.001		BOX-400x300-1x1	Layout Box 400x30...		
B0000104001	A		BOX-400x300	Bortyp 400x300			RL01	00.001.04.001		BOX-400x300-1x1	Layout Box 400x30...		
B0000201001	A		BOX-800x600	Bortyp 800x600			RL01	00.002.01.001		BOX-800x600-2x3	Layout Box 800x60...		

Stocked items: (4)

Lot code	Stocked item code	Article code	Owner code	Article description	Quantity	Reserved quantity	Incoming quantity	Quantity unit	Arrival time	Expiration date	Inventory time	Last moved date	Variant code	Blocking code	Inventory blockingcode	Inventory requested	Carrier code	Carrier type code	Warehouse number	Location address	Position on carrier
	18333	394610	SLD	JOYSTICK...	100	0	0	STK						USABLE (A...	USABLE (A... N (No)	B00001020...	BOX-6...	RL01	00.001.02.0...	1	
	18334	394653	SLD	AUFNAHM...	1,100	0	0	STK						USABLE (A...	USABLE (A... N (No)	B00001020...	BOX-6...	RL01	00.001.02.0...	2	
	18335	395390	SLD	AUFNAHM...	2,100	0	0	STK						USABLE (A...	USABLE (A... N (No)	B00001020...	BOX-6...	RL01	00.001.02.0...	3	
	18336	397547	SLD	DEICHSEL...	3,100	0	0	STK						USABLE (A...	USABLE (A... N (No)	B00001020...	BOX-6...	RL01	00.001.02.0...	4	

15.5 Inventory information

Here the stocks can be displayed, how they are divided per handling unit in the warehouse. The filters allow a narrower search limitation such as search restrictions for client, batch, blocking code, etc.

Information about Stocked Items

Search Criteria

Article code: * Stocked item code: * Warehouse number: *

Owner code: * Blocking code: * Location address: *

Lot code: * Inventory blockingcode: * From expiration date:

Article description: * Carrier code: * To expiration date:

Stocked items: **Output limited to 1,000 rows**

Article code	Owner code	Lot code	Article description	Stocked item code	Blocking code	Quantity	Reserved quantity	Incoming quantity	Expiration date	Carrier code	Warehouse number	Location address	Selected
529593	SLD		STUEKKADEL TH...	18923	USABLE	11	0	0		C1102202101	HL11	11.022.02.101	<input type="checkbox"/>
529614	SLD		SERVO-LENK (ANS...	18924	USABLE	21	0	0		C1102202101	HL11	11.022.02.101	<input type="checkbox"/>
529615	SLD		DEICHSELL (ANS...	18925	USABLE	1	0	0		C1102202201	HL11	11.022.02.201	<input type="checkbox"/>
529635	SLD		DEICHSELH (ANSC...	18926	USABLE	11	0	0		C1102202201	HL11	11.022.02.201	<input type="checkbox"/>
529651	SLD		DEICHSELH (ANS...	18928	USABLE	21	0	0		C1102202201	HL11	11.022.02.201	<input type="checkbox"/>
529676	SLD		BUNDBUECHSE D...	18934	USABLE	1	0	0		C1102302101	HL11	11.023.02.101	<input type="checkbox"/>
529714	SLD		LAGERUNG ZU ME...	18935	USABLE	11	0	0		C1102302101	HL11	11.023.02.101	<input type="checkbox"/>
529743	SLD		HALTER BOEENL...	18936	USABLE	21	0	0		C1102302101	HL11	11.023.02.101	<input type="checkbox"/>
529781	SLD		LADEGERUET UB...	18937	USABLE	31	0	0		C1102302101	HL11	11.023.02.101	<input type="checkbox"/>
529917	SLD		STUEKKADEL X1...	18938	USABLE	41	0	0		C1102302101	HL11	11.023.02.101	<input type="checkbox"/>
529978	SLD		HALTER ZU SCHL...	18939	USABLE	51	0	0		C1102302101	HL11	11.023.02.101	<input type="checkbox"/>
600886	SLD		KABELSET HAAR...	18940	USABLE	61	0	0		C1102302101	HL11	11.023.02.101	<input type="checkbox"/>

15.6 Material reservations

Here you can see which stocks of which handling units have been pre-reserved for which orders.

VPT_ReservationViewPanel

Search Criteria

Search type:

Order code: * Order position:

Article code: * Owner code: * Article description: *

Carrier code: * Stocked item code: *

Pick positions: (301)

Order code	Order position	Order group	Order type code	Article code	Owner code	Article description	Lot code	Reserved quantity	Warehouse number
AA43		2	NORMAL (Normal)	A104	WMS	Sackmesser			69 HL11
AA43		2	NORMAL (Normal)	A104	WMS	Sackmesser			1 KL01
AA43		2	NORMAL (Normal)	A104	WMS	Sackmesser		101	HL11
AA43		2	NORMAL (Normal)	A104	WMS	Sackmesser			61 KL01
AA43		2	NORMAL (Normal)	A104	WMS	Sackmesser			1 HL11
AA43		2	NORMAL (Normal)	A104	WMS	Sackmesser			11 KL01
AA43		2	NORMAL (Normal)	A104	WMS	Sackmesser			89 KL01

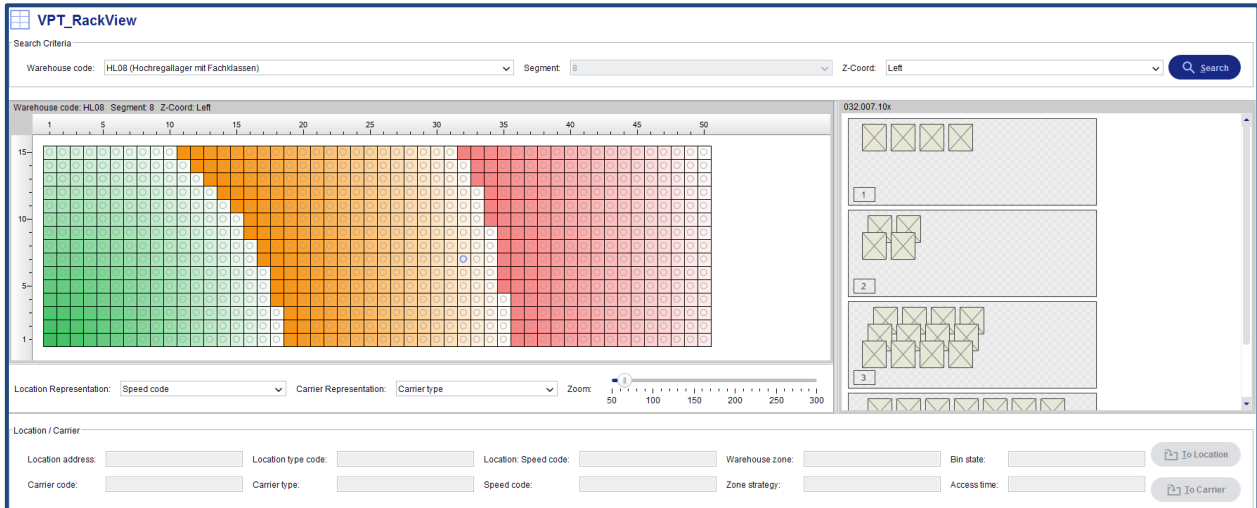
Stocked items: (1)

ID	Stocked item code	Quantity	Reserved quantity	Incoming quantity	Quantity unit	Arrival time	Carrier code	Carrier type code	Warehouse number	Location address
	28329 28329		101	101	0 STK		C1404702201	E1H1	HL11	14.047.02.201

15.7 Warehouse visualization

The warehouse visualization provides a quick overview of the occupancy of individual shelves in the warehouse. Each individual storage location is displayed visually and can be queried with a mouse click. The query result contains information such as the storage location type, carrier type, the ABC zone and the access time. If there is a carrier in the storage location, you can switch to it to display the corresponding data in detail. Among other things, it is immediately apparent which article quantities are in the carrier.

The filling level of the relevant rack is displayed at a glance with a level indicator.

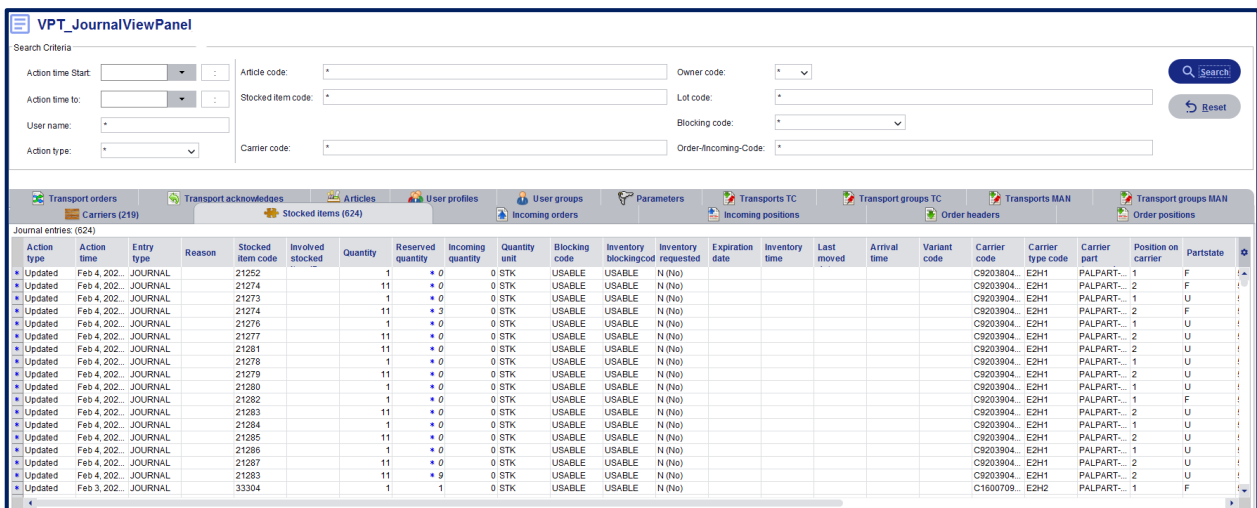


15.8 Storage locations with incorrect occupancy

Here, all storage locations are displayed which have been marked by an incorrect allocation and thus blocked. These storage locations must then be checked in a timely manner and, if necessary, corrected.

15.9 Journal information

Important information is collected and archived in the journal. Different journal views can be displayed.



15.10 Audit trail (option)

An audit trail records all GMP-relevant changes and deletions. All changes must be provided with a reason for change. Normally, such changes are made by authorized users, who in these cases receive a screen display where they can enter the reason for the change. In addition, it is ensured, among other things, that the audit trail data cannot be changed or deleted subsequently.

Data acquisition

What constitutes GMP-relevant changes in the respective customer environment may vary from customer to customer. If necessary, the customer requirements must be expanded.

The following changes (create, change, delete) are logged in the logOS audit trail:

- basic WMS parameters
- User configuration changes
- Item master data changes

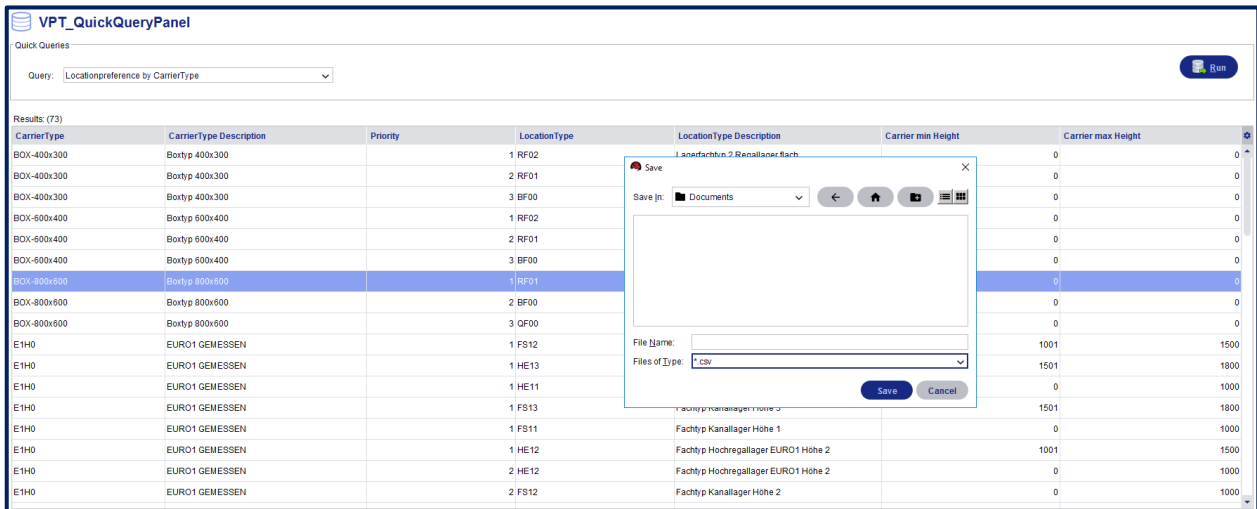
For these changes, the corresponding authorized user must enter a reason for change in an input field. The audit trail logs this change including user information and reason for change.

Journaling /Archiving

Normally, data is not kept longer than one year in the logOS journal database. A recurring automatic job in logOS thus archives the audit trail journal data into an export format (csv) so that it can be archived by the customer into a secure system.

15.11 Quick Query Reports

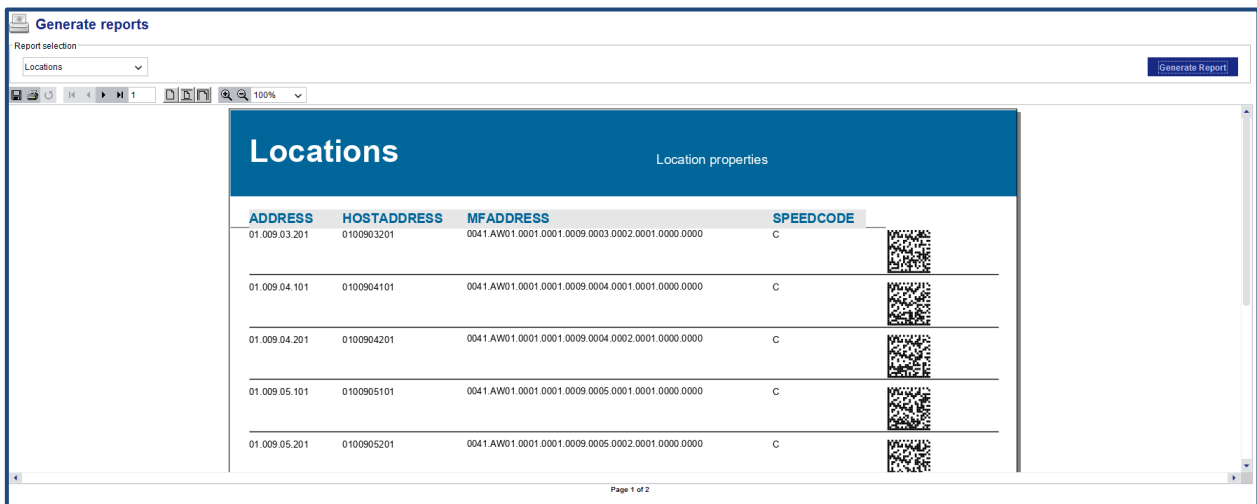
With Quick Query, queries can be defined directly in logOS to any extent and stored under a name in the system. A query can contain any valid SQL statement which refers to the tables and table fields of logOS.



The queries can be provided with query parameters, which limit the query result like filters. The list with the query result produced in this way can be sorted by columns and optionally exported to a file. The exported data can be further processed with MS-Excel.

15.12 Reporting

A reporting system is available as a component of logOS. Arbitrary reports can be designed with it. They can be filtered according to various criteria, displayed on the system, printed, saved under a name and reused later. To filter the results of a report, parameters are available as in the query system.



16 Analysis tools

16.1 Event displays

The event displays inform about the current and connected error information (WMS Internal as well as external messages from connected systems).

Path	Message	Lowest level	Creation date	Activator	Acknowledged	Acknowledge date	Acknowledged by
PLC.HOFA.PL01.1520.9002	Request power group warm start	INFO (Information)	Feb 5, 2021 10:20:26.715		✓		
PLC.HOFA.PL01.1520.9001	Request power group cold start	INFO (Information)	Feb 5, 2021 10:20:26.606		✓		
PLC.HOFA.PL01.1520.9000	Request power group stop	INFO (Information)	Feb 5, 2021 10:20:21.324		✓		
MFCORE.3301	Removed carrier "43" from plant.	INFO (Information)	Feb 5, 2021 10:20:21.309		✓		
MF.CORE.1203	Occupation mismatch on power grou...	ERROR (Error)	Feb 5, 2021 10:19:29.855		✓	Feb 5, 2021 10:20:26.621	
PLC.HOFA.PL01.1520.9000	Request power group stop	INFO (Information)	Feb 5, 2021 10:19:29.855		✓		
PLC.HOFA.PL01.1520.9001	Request power group cold start	INFO (Information)	Feb 5, 2021 10:19:29.730		✓		
PLC.RBG.CC01.CC01.9005	Request power group state	INFO (Information)	Feb 5, 2021 10:15:48.872		✓		
PLC.BFA.PL03.3700.9002	Request power group warm start	INFO (Information)	Feb 5, 2021 10:15:48.481		✓		
PLC.BFA.PL03.3700.9001	Request power group cold start	INFO (Information)	Feb 5, 2021 10:15:48.357		✓		
PLC.RBG.SC03.S030.9004	Request power group stop	INFO (Information)	Feb 5, 2021 10:15:47.857		✓		
PLC.BFA.PL03.3820.9002	Request power group warm start	INFO (Information)	Feb 5, 2021 10:15:47.419		✓		
PLC.BFA.PL03.3820.9001	Request power group cold start	INFO (Information)	Feb 5, 2021 10:15:47.357		✓		
PLC.RBG.SC11.S110.9004	Request power group stop	INFO (Information)	Feb 5, 2021 10:15:46.841		✓		
PLC.RBG.SC23.S230.9004	Request power group stop	INFO (Information)	Feb 5, 2021 10:15:46.326		✓		

16.2 Data exchange various levels

The data transfer logs of the connected systems (warehouse management system and PLC systems) can be viewed.

- From HOST to HOSTComm module
- From the HOSTComm module to the WMS module
- From the WMS module to the MFS module
- From the MFS module to the PLC controllers

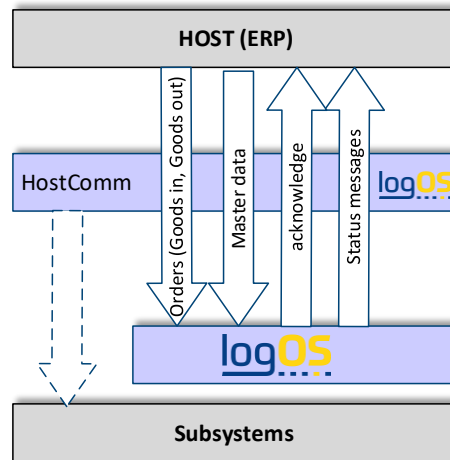
Date / Time	Telegram
2021-03-05 09:52:59,364	AAD4**SC12MF01*****00012301*1100000000*****

16.3 LogViewer

As a more in-depth analysis, the data logs of the various internal system records can be considered.

17 System integration and host communication

The HostComm is the configurable interface module for communication between the logOS WMS and any higher-level warehouse management system.



The transmission of storage and retrieval orders from the higher-level warehouse management system to logOS is based on the carrier ID or on article quantities to be stored or retrieved. The warehouse management system is the leading system for the article master and the stock levels in the carriers. Confirmation of executed orders is sent back to the warehouse management system.

17.1 Possible forms of communication

Host communication (HostComm) offers the following interface types by default:

17.1.1 SAP Link

- Exchange of host data via tRFC IDOC link or web services
- Exchange data: Storage and retrieval orders based on the carrier ID, reconfirmation of completed orders.

17.1.2 DB-DB Link

- Exchange of host data via direct database link
- Host database Oracle / SQL Server / ODBC
- Exchange data: Storage and retrieval orders based on carrier ID, reconfirmation of completed orders, warehouse info, order statuses, confirmations.

17.1.3 File transfer

- Exchange of host data via files
- Files in fix / csv / xml format
- Exchange data: Storage and retrieval orders based on carrier ID, reconfirmation of completed orders, warehouse info, order statuses, confirmations.

17.1.4 TCPIP

- Exchange of host data and subsystem communication via telegrams
- Exchange data: Storage and retrieval orders based on carrier ID, reconfirmation of completed orders, warehouse info, order statuses, confirmations.

17.1.5 Web services

- Exchange of host data via web services
- Format with xml / html / json
- Exchange data: Storage and retrieval orders based on carrier ID, reconfirmation of completed orders, warehouse info, order statuses, confirmations.

18 IT environment

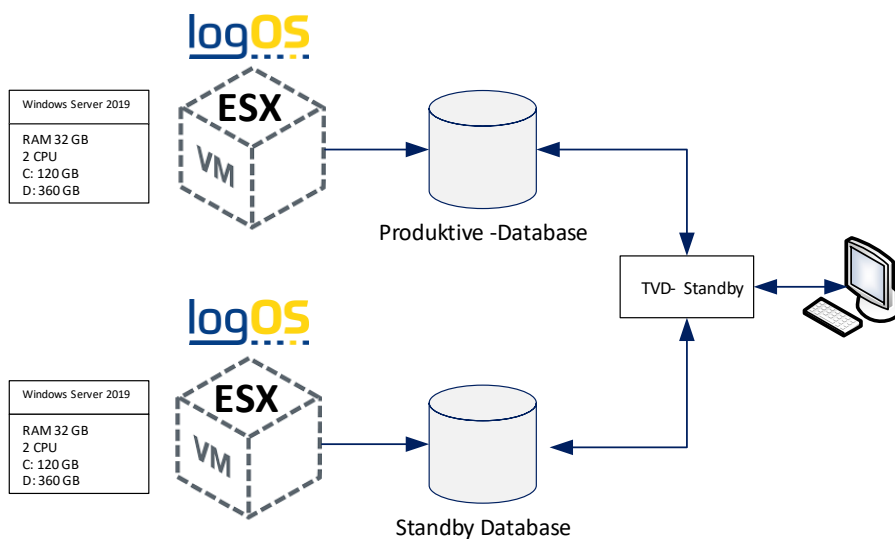
The logOS WMS (server and control station) is integrated into a customer-supplied data network. This is to guarantee the connection to a higher-level warehouse management system.

The subsystems are also connected via a data network. Since this network requires high performance and stability, it may make sense to set up a separate technical network for it.

18.1 System installation in virtual environment

The logOS WMS can be installed and operated in a virtual environment. Please note that Stöcklin requires a minimum configuration of the partition. Basically, Stöcklin also recommends a productive standby environment in the virtual environment.

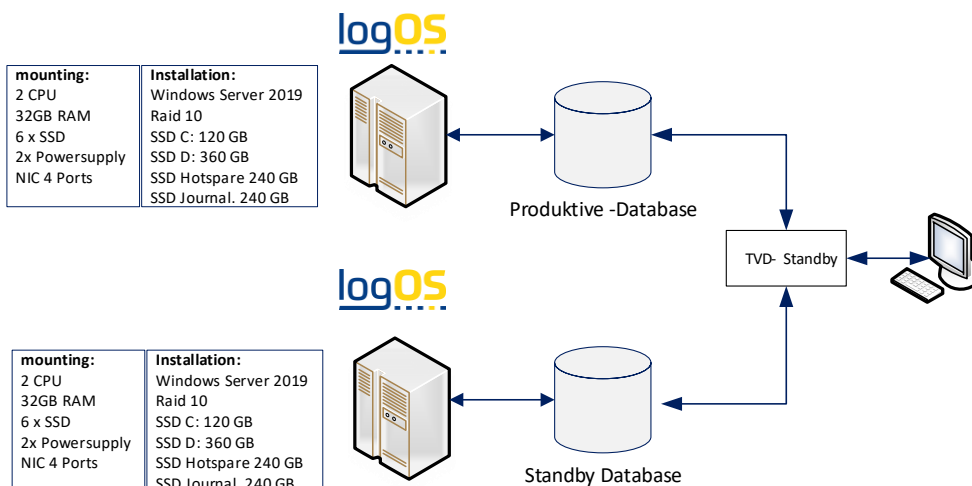
Standard solution from Stöcklin:



18.2 System installation on physical server

The logOS WMS can be installed and operated on physical servers. It should be noted that Stöcklin requires a minimum configuration of the servers. Basically, Stöcklin recommends a productive standby environment.

Standard solution from Stöcklin:



18.3 Standby solution

In a highly available warehouse, the system's reliability is of great importance. Stöcklin therefore offers a standardized standby server environment.

On two identically set up servers under the Windows operating system, a database is operated productively on one server (productive). On the other server (standby), the database runs as a standby database in recovery mode.

The standby tool ensures that with a short delay the standby database is continuously updated with the changed data of the productive system. It can be activated if necessary and takes over the productive function. The original productive computer can be made the new standby computer at a later time and is then ready again, after activation, to take over the function as productive computer.

18.4 Backup solution

Stöcklin offers a backup solution with a professional tool.

Backups are created on demand thanks to intelligent control, based on defined policies in the central repository. Based on the policies and the current situation on the database server, the scheduler decides which actions are to be executed decentrally by the agent. When restoring a database, the interactive tool provides support through simple handling.

18.5 Workstations

18.5.1 PC Client

Ideally, computers of the latest generation should be used for the workstations. No special requirements are placed on the client computers.

A Windows operating system is required as a basic prerequisite.

Data is stored exclusively on the server.

18.5.2 Mobile data devices

The operating screens of logOS are operated via a web server. This means that logOS works hardware independent for the mobile terminals.

However, the following dimensioning should be observed:

Browser types (always latest versions):

- Edge with Chromium
- Firefox, Chrome
- Safari
- Mobile Safari
- Mobile Chrome

(IE 11 only conditionally suitable)

Screen requirement:

- Mobile data devices (minimum 800 x 480)
- Tablet (minimum 800 x 480) only upright



19 Licensing

The logOS MFS is subject to a one-time license for unlimited use.

The following modules determine these license costs:

- Installation main license
- Additional functions subject to license
- Standby Server
- Test server
- User license

The license costs are calculated in the course of a project quotation.