

SAP Functions in Detail
mySAP Supply Chain Management



WAREHOUSE **MANAGEMENT WITH** **mySAP™ SUPPLY CHAIN** **MANAGEMENT**

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WAREHOUSE MANAGEMENT WITH mySAP™ SUPPLY CHAIN MANAGEMENT

WAREHOUSE MANAGEMENT TODAY: BALANCING FINANCIAL PRESSURES AND GROWING DEMANDS

mySAP™ Supply Chain Management (mySAP SCM) is an integrated supply chain management solution for planning, execution, coordination, and collaboration of all supply chain activities. And to keep supply chains running smoothly, companies need to efficiently manage their warehouses. Optimized planning can avoid excess stock, but there is also a need for execution and coordination to improve the processes within warehouses. Companies are looking to warehouse management systems to help them manage their warehouses and improve their management processes.

The demands on warehouse management are becoming more and more complex. The number of customers who place their orders directly with the manufacturer is increasing. The result? An increase in pick orders, a decrease in the number of items in each order, and an increase in the number of articles that need to be managed. Outsourcing requires logistics service providers to be more closely involved, either managing an entire warehouse or executing subprocesses. At the same time, warehouse management costs have to be minimized, while processes, flexibility, and customer service must be improved.

The warehouse management capability of mySAP SCM helps you meet these diverse demands and support the central function of the warehouse within the supply chain. It offers you many concrete advantages:

- All of the processes in the warehouse are covered, from goods receipt through goods issue.
- You achieve complete stock transparency and always know what is in the warehouse.
- For each individual article, you can trace the history of the warehouse processes in detail.
- The error rate in warehouse processes is reduced significantly.

- The accuracy of deliveries is improved, thus increasing customer satisfaction.
- Processes are simplified, which reduces the cost per transaction.
- By using mobile data entry, you can work in a paper-free environment.
- You work consistently within a mature system and therefore avoid any interface problems.
- Particular functions enable close collaboration with your partners.

SUPPLY CHAIN EXECUTION WITH mySAP SCM – A SOLUTION FOR EVERY WAREHOUSE

Whether you are dealing with a distribution center or a production warehouse, you can use mySAP SCM to manage any warehouse. You can map any warehouse structure according to your specific requirements, which increases the speed and efficiency of distribution processes and optimizes internal goods movements.

Warehouse Structure and Master Data

Every warehouse has its own structure, which is a challenge for any warehouse management system. However, the flexible architecture of mySAP SCM lets you map any warehouse structure. You can define and manage all types of storage areas, such as rack storage, bulk storage, picking areas with fixed storage bins for each material, and ground-level shelving.

Master data plays a decisive role in warehouse processes. Such data can include material characteristics, for example, ABC indicators or hazardous materials handling; load carrier characteristics such as measurements; and specific characteristics of storage bins, such as measurements or capacity. After all, you can only achieve optimal storage bin occupancy if you can clearly define the warehouse structure and master data.

Distribution Center Processes

Picking, assembly, packing, and shipping goods to customers are the key activities carried out in a distribution center. Goods are either produced independently or procured from suppliers. Efficient cooperation between all of the partners involved (suppliers, carriers, customers, express delivery companies, and other service providers) plays an important role. Intensive communication and timely exchange of information ensure that distribution center processes run as efficiently as possible.

FROM GOODS ISSUE TO SHIPPING

In the shipping process, sales orders can be combined, large orders split, and single or collective orders optimized for outbound delivery according to availability. Picking can be organized efficiently in wave picks (comprising all orders within a time slot or all outbound deliveries from one or more shipments). The warehouse management capability of mySAP SCM also supports rational packing processes, such as pick and pack directly during picking, or packing at a packing station.

The necessary shipping documents – delivery notes, bills of lading, and invoices – can be printed directly from the system at the touch of a button, or forwarded to customers and partners electronically as a delivery notification.

SAP's transportation solution can support the actual shipment. The system calculates the freight costs and triggers the settlement with the partners involved, such as carriers. The close connection between the transportation solution and the warehouse management system ensures efficient and error-free data transfer.

Processes in Raw Material Warehouses and Production Supply

Production has to run without hindrance, and this includes having the necessary materials available to production at the right time and in the correct quantity. This means that the production supply process must be highly flexible and reliable, since standard materials and bulk goods require different replenishment strategies to highly specific components. mySAP SCM supports both permanent replenishment strategies to assembly lines, and staging of individual components for a particular production order.

GOODS RECEIPT OF RAW MATERIALS AND TRADING GOODS

This generally applies to parts procured externally. Ideally, the vendor sends notification of the inbound delivery so that the goods receipt process can be based on this planned data.

GOODS RECEIPT AND PUTAWAY

For goods produced in-house, you can use data from production and process orders to plan the goods receipt ahead of time. For materials procured externally, vendors can use delivery notes to notify you of the goods receipt at an early stage, thus simplifying the putaway process.

If you have active quality management, the system supports quality assurance measures such as inspection lots, sampling, and inspection instructions during goods receipt.

mySAP SCM uses transfer orders to determine suitable storage bins for putting away goods in the warehouse or transferring goods directly from the goods receipt area to the shipping area (cross-docking). A number of putaway strategies are available to determine the optimum putaway bin. You can choose different types of associated documents or labels to support the physical putaway process.

If the putaway is executed in an automatic warehouse, information is transferred to a warehouse control unit. If you use mobile terminals or forklift terminals, you can map the putaway directly in the SAP® system.

REPLENISHMENT IN THE PICKING AREA

If you always ship full pallet quantities, there is no need to replenish stocks into special picking areas. But if you ship mixed pallets or partial quantities and want to optimize picking, you set up a special picking area where you break down pallet quantities and organize the replenishment of stock into this area. Often, materials are stored in fixed storage bins. When stocks fall below a certain level, replenishment has to be triggered. The warehouse management capability of mySAP SCM offers a number of variants (for example, manual, planned, and automatic replenishment) that offer optimum support to the replenishment process.

PRODUCTION SUPPLY

mySAP SCM offers tools and processes that support material staging to production as flexibly as possible. A range of staging types allows you to adapt production supply according to your specific requirements.

If the component required at a workstation is a pick part, then the exact requirements quantity from the production or process order (order-related) is staged. For release order parts, the relevant material is staged for a group of orders, for example, the quantity of material required for all of the orders in one day. For crate parts or staging using Kanban production control, staging is triggered whenever a crate becomes empty.

If you wish, you can enter goods consumption (goods issue) at the time of goods withdrawal or during the final confirmation of a production order. The stock is booked out from the corresponding production bin. In this case, a close link between planning and execution is very important. The close connection between the warehouse management capability of mySAP SCM and the planning capability of mySAP SCM – or other advanced planning systems – ensures that all planning data is taken into account in logistics execution in the warehouse.

Inventory

You can also manage stocks from various locations (plants) or companies in one warehouse, which means that you can always access current reports on stocks and stock changes. mySAP SCM supports all of the common inventory procedures, including sample-based physical inventory, cycle counting, and zero stock check.

Evaluation and Planning

By evaluating and analyzing the individual areas within the warehouse, you can identify opportunities for savings. The warehouse management capability provides a number of monitors that enable you to do this. You can identify the current workload and resource capacity and plan future workload.

WAREHOUSE ACTIVITY MONITOR

The warehouse activity monitor makes it easy for you to monitor operations in the warehouse. When delays or errors occur, those responsible are notified immediately. The monitor also enables you to analyze and solve problems more easily by visualizing critical processes, for example, when a warehouse movement is not posted within a predefined period.

ROUGH WORKLOAD ESTIMATE

The rough workload estimate allows the warehouse manager to estimate the workload for a specified number of days in the future and get an overview of the upcoming workload. The workload can be displayed at different levels (day, shift, warehouse, or material) and according to different activities (goods receipt, goods issue, or total). The calculations are based on quantities, weight, volumes, and durations. The results of the rough workload estimate can be used for employee resource planning and for statistical evaluations.

RADIO FREQUENCY (RF) MONITOR

The RF monitor enables you to efficiently control work in the warehouse by displaying the current workload and capacity of the resources that are being used. You can assign an individual work list to each employee. Flexible access means that a warehouse manager can intervene in the workflow – by redistributing work between work groups or by changing the priority of activities within a group.

TASK AND RESOURCE MANAGEMENT (TRM) MONITOR

The TRM monitor allows you to manage and control resources and tasks in one location. You can use the monitor to control the assignment of tasks to various resources and to execute various activities. In comparison to the RF monitor, the TRM monitor offers a detailed view of tasks such as stock removal, picking, and weighing.

DELIVERY MONITOR

The delivery monitor provides an overview of the upcoming deliveries in various areas, for example, picking, shipping, transportation, and billing. You can quickly get an overview of the impending work in the various areas, display individual documents, and trigger subsequent activities.

INCREASING EFFICIENCY IN THE WAREHOUSE

Mobile Data Entry

It's hard to imagine inventory management without mobile data entry: it helps you organize your warehouse management system efficiently, economically, and flexibly; and offers warehouse workers direct and simple support in their daily activities. The precise entry of all goods movements minimizes inaccuracies in inventory management.

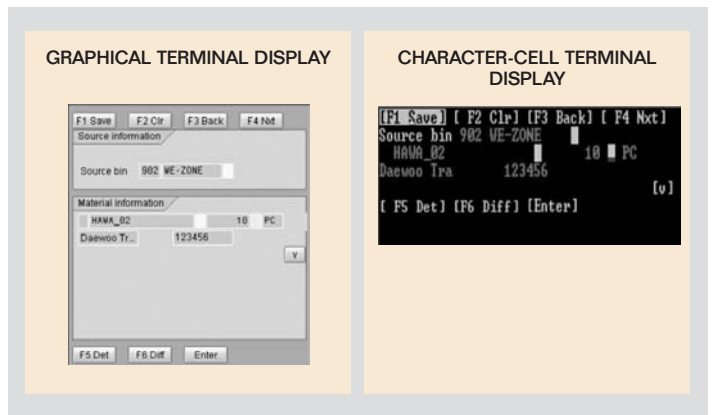


Figure 1: Mobile Data Entry

THE SAP SOLUTION – DIRECT, SIMPLE, AND STANDARDIZED

SAP delivers an integrated radio frequency (RF) solution as part of mySAP SCM. By using mobile RF devices with scanners, you can achieve real-time, accurate data transfer, enabling you to maintain high data quality standards. RF terminals (portable hand-held devices or stationary devices for forklifts) are linked to the SAP system, which means that warehouse workers can send and receive data directly and instantaneously.

You can scan required information (storage bin coordinates, EAN article numbers, and so on) using a combined bar code (based on UCC or EAN 128), and use this information for identification or verification purposes.

If you work with character-cell terminals (see Figure 1), SAPConsole offers a solution that converts SAP standard transactions to character-based ASCII user interfaces online. On graphical terminals based on Windows CE, you can display scanner information using SAPConsole in a Web browser. The SAPConsole Web enhancement also allows you to connect technologies such as speech recognition tools and RF identification (RFID) readers. On graphical screens, information is displayed using the standard SAP GUI or a browser (when using Windows CE devices). Individual functions can be displayed using push buttons on a touch screen or function keys on a terminal.

mySAP SCM supports all relevant warehouse processes. For goods receipt, this includes unloading, goods receipt entry, packing, and putaway; for goods issue, there are standard functions for stock removal, picking, pick and pack, packing, loading control, and goods issue creation. Internal warehouse movements, such as replenishment, and functions such as task interleaving are also supported. Inventory count control and inventory queries complete the range of supported functions.

RF SYSTEM INTEGRATION

In the RF solution, mobile data entry terminals or bar code scanners are connected directly to the SAP system. You do not need any middleware, and once the terminals or scanners are attached, you can access the data in the system immediately – a real plug-and-play solution.

Within the SAP standard system, dialog functions can be run directly on the RF terminal, that is, without an additional subsystem. You can set up the menu for the warehouse processes and transactions that meet your requirements. You can add just the user interface easily and flexibly without any code modifications.

MONITORING FUNCTIONS

You can use the RF monitor, as shown in Figure 2, to efficiently monitor and control work in the warehouse. The RF monitor displays the current workload and capacity of each resource. By providing visibility on the sequence and type of activities, it helps you monitor the progress of work in your warehouse. Should the situation demand it, you can redistribute work and reassign employees between queues of transfer orders.

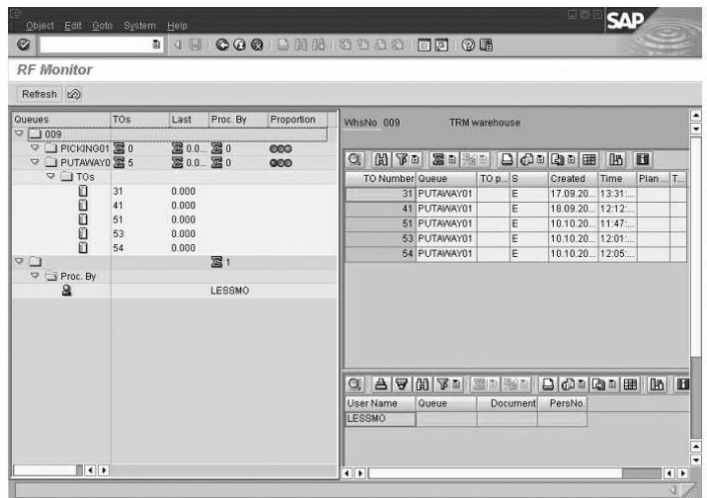


Figure 2: Radio Frequency Monitor

Handling Unit Management (HUM)

WHAT IS A HANDLING UNIT?

A handling unit (HU) is a physical unit that groups together the packaged goods and the packaging material, such as the load carrier. Each handling unit has a unique ID (see Figure 3) that can be created according to standards such as EAN 128 or SSCC.

Handling units can be nested, and it is possible to create a new handling unit out of several existing handling units.



Figure 3: Handling Unit with Identification

You can access all of the information contained in the material items (batches and serial numbers) from the handling unit. Handling units contain all of the inventory management information from the materials packed in them. You can get a continuous overview that tells you if a handling unit is planned, a notification has been sent for it, it is in the warehouse, or a goods issue has already been posted for it. The integrated history capability allows you to register any business event in the life cycle of a handling unit, which means that you can track the path and development of a unit at all times.

SUPPORT FOR ALL PROCESSES

You can use handling units to support all of the relevant processes in the supply chain. For internal processes, a handling unit can be planned in production planning based on a production order. At the handover from production, the HU ID is scanned and the unit is received into the warehouse.

Handling unit management also supports external processes: for example, you can send a shipping notification to the goods recipient for goods that were ordered from the vendor and which are already in the vendor's warehouse. The receipt of the goods or the putaway of the logistic units at the recipient can also be executed efficiently using lean processes with the help of handling units.

After the shipping activities have been completed, you can notify customers that handling units formed during picking (as a result of pick and pack) or as a result of customer-specific packing (at a packing station) have been shipped.

INTEGRATION

You can achieve leaner and more cost-efficient processes in your warehouse by integrating handling units in all internal and external processes, and in all of the components involved (production, quality management, warehouse management, inventory management, and shipping and transportation).

TRANSPARENCY

The document flow for a handling unit allows you to trace when and how a handling unit was created, for example, receipt from production or a packing activity. You can also tell if it has been repacked and with which outbound delivery it was sent to the customer.

The history data for each handling unit makes the logistics processes transparent, which is particularly useful when you need to trace particular activities. The tracking function enables you to improve customer service and strengthen customer relationships.

Task and Resource Management (TRM)

Warehouse processes and their corresponding subtasks are becoming more and more complex, making the optimization of activities and the efficient use of existing resources within a warehouse increasingly important. To achieve this optimization of internal warehouse processes, SAP has developed task and resource management (TRM) capabilities.

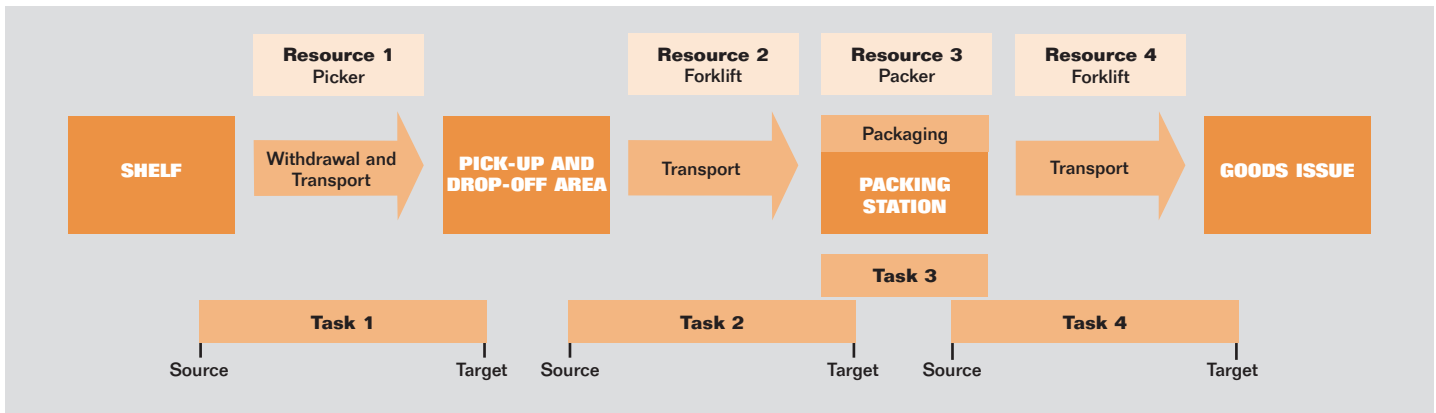


Figure 4: Task and Resource Management

TASKS AND RESOURCES

As shown in Figure 4, we make a distinction between tasks and resources. Tasks are all of the steps that form a complete process. Resources, such as a picker, forklift, or material flow system, are required to realize the individual tasks. You define the resources within the system and provide them with properties and characteristics.

For example, you can define a forklift as a resource that can (or may) transport only certain types of load carriers, or you can assign a resource to a particular working area. Removing a pallet from a narrow rack storage area is split into two tasks: the removal of the pallet (including placement in a transfer bin) and the actual transfer of the pallet from the transfer bin to the shipping area. A narrow-aisle forklift that works only in that particular area executes the first task. The second transfer is carried out by a forklift that can move around freely in the warehouse.

WAREHOUSE PLAN

The warehouse structure (with storage bins, storage types, and so on) that already exists in mySAP SCM is refined further in TRM. This means that you can map additional warehouse structure elements, such as transfer areas (pick-up and drop-off points) or work centers. A detailed 3-D layout is stored in the warehouse plan, with geographical coordinates defined for each element. When you create individual tasks, the detailed plan, together with other constraints, helps the system determine an exact routing and calculate a planned execution time.

COST REDUCTION

TRM controls task processing and optimizes the sequence in which the tasks are processed. Each task in the warehouse is processed at the right time and by the best resource for the job. The system takes into account the current workload and geographical position of the resources. By minimizing the number

of routes in the warehouse and optimizing warehouse movements, you can achieve considerable cost reductions in the material flow process.

Rapid Turnover of Materials in the Warehouse

There is increasing pressure to achieve a rapid turnover of goods in warehouses and distribution centers. The potential of guiding goods quickly through the warehouse is becoming clearer all the time: the storage period of goods in the warehouse is becoming shorter and the number of goods movements in the warehouse (putaway, picking, stock transfer) can be reduced. The result is a distinct reduction in stock across the supply chain.

To tap the full potential of rapid turnover, mySAP SCM supports you with functions for yard management, cross-docking, and value-added services.

Yard Management

With yard management, warehouse management stretches beyond the four walls of the warehouse. It forms an interface for the transfer of goods to and from transportation. The flow of goods in the warehouse can be optimized by effectively managing all inbound and outbound trucks, trains, trailers, and containers. The yard management process begins when the goods arrive at the location, and ends when they leave the location. This process also supports you in scheduling staging areas, doors, and loading ramps, and in managing trucks, trailers, and containers at the loading site.

Yard management ensures transparency of the stock on the site and of the planned deliveries, which means that you can plan warehouse activities and forward information to external partners. An alert monitor supports the controller by issuing warnings as soon as planned deadlines are exceeded.

In the delivery process, for example, a truck is first registered at a checkpoint and then directed either to a door for unloading or to a parking space on the site to wait. At the correct time, the truck is then directed from the parking space to a door, where unloading and loading take place. It is then directed to a waiting area on the site, to another gate, or to the checkpoint to be checked out.

Cross-Docking

With cross-docking, inbound goods can be directed straight from goods receipt to goods issue without being put away into storage. By using cross-docking, you can avoid duplicate goods movements within the warehouse, optimize the goods flow from inbound to outbound, and shorten routes within the warehouse. This accelerates the flow of goods and avoids unnecessary storage of goods in the warehouse. mySAP SCM supports two types of cross-docking: planned and opportunistic.

For planned cross-docking, planning occurs simultaneously for several inbound deliveries, transfer requirements, or shipments, which are filtered according to criteria such as time period and document attribute. Planning can take place automatically, whereby mySAP SCM processes cross-docking possibilities and matches inbound and outbound goods. Alternatively, you can plan cross-docking activities manually, where the warehouse planner defines the connection between inbound and outbound goods. Automatic planning is based on a particular cross-docking strategy, which sets the rules for the comparison. The system determines the best option for carrying out the cross-docking process and creates the link between inbound and outbound goods. Based on the data for the

inbound stock and the outbound requirements, the system creates a cross-docking decision. The resulting cross-docking plan is displayed graphically in the yard management door and dock schedule.

In addition to cross-docking plans, cross-docking opportunities can be determined dynamically on the arrival of the goods. You can use opportunistic cross-docking if the defined business process allows other rules of execution, such as “first in first out” (FIFO), to be cancelled. For opportunistic cross-docking, existing transfer orders have to be cancelled and new ones created so that newly arriving stock is assigned to the transfer order in place of other available stock. This is possible as long as execution of the original transfer order has not started. Opportunistic cross-docking can be triggered in various situations; for example, when putaway transfer orders are created for inbound goods or during creation of picking transfer orders.

Value-Added Services

Value-added services (VAS) carried out in the warehouse include services such as price labeling, customer-specific packaging, and postponement services. VAS provides functions for instructing, performing, and monitoring additional services in the warehouse, as well as extracting key activity figures that provide the basis for calculating the achieved value.

VAS supports you in the creation of value-added services by identifying the VAS-relevant goods and determining workstations for carrying out the services. The corresponding goods are then directed to the workstations where an employee receives instructions according to the attributes maintained. The VAS monitor provides transparency across the stocks at all VAS workstations. Once the service has been provided, VAS sends the registered and confirmed activity data to the business information warehouse where it is used for further cost and price calculations. This ensures that the value-added service can be calculated and billed according to the negotiated calculation basis in the customer’s contract.

Goods that are directed through the warehouse using the cross-docking process often have to be repacked or are subject to another service. The close link between VAS and the functions for yard management and cross-docking means that value-added services can be provided in connection with cross-docking.

Cross-Company Scenarios

Collaboration with all of the partners involved in the supply network (vendors, carriers, customers, express delivery companies, and so on) is very important. By communicating with partners and exchanging information on time, you can achieve efficient processes and minimize costs.

The following scenarios provide examples of collaboration between partners. A number of additional scenarios are also possible.

CONNECTING EXPRESS DELIVERY COMPANIES

Smaller deliveries are often sent out as packages and are delivered by express delivery companies. An express delivery company normally gathers all of the packages for one region in a distribution center, and from there, it delivers them to the intended recipients. Express delivery companies allow their customers (senders and recipients) to access status information about the shipment of their packages, that is, the location and arrival time at certain check points. Partners can also use the function to make sure that a package has arrived on time. To enable this service, each package is given a tracking number, which contains characteristics such as service and product codes, or information on the route.

SAP provides a certified interface for express delivery company connections, enabling you to determine the data required for these types of services, assign the inbound or outbound delivery, and print special labels and a goods arrival list for the service provider. You can also display the tracking information from the express delivery company.

SHIPPING NOTIFICATION

A shipping notification is a message that can be sent from the goods supplier to the goods recipient. The notification can contain information about the expected or estimated delivery time, the materials being delivered, the quantities, and how the goods are packaged (for example, which load carriers are used and in which units). The shipping notification is a very important information channel because the goods recipient can use it to plan and prepare for the goods receipt. The advantage of a shipping notification is that all of the data is transferred electronically, which means that data no longer has to be entered manually. The data is either transferred by Electronic Data Interchange (EDI) or placed directly in the recipient's system by logging on to the Internet (see Figure 5).

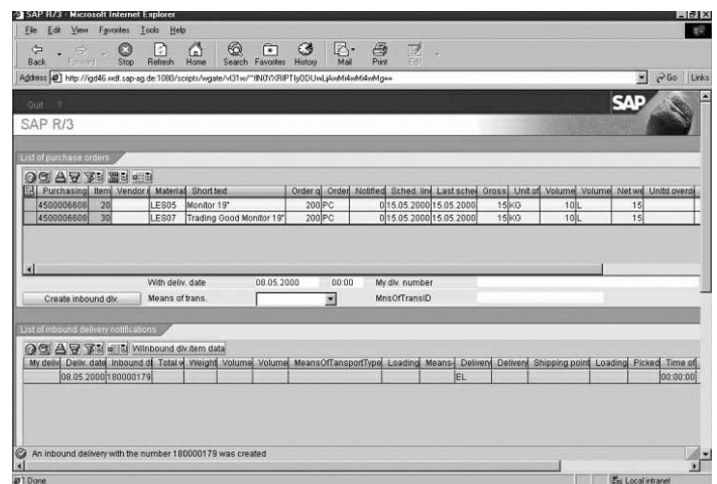


Figure 5: Using the Internet to Create Advanced Shipping Notification

PROOF OF DELIVERY

With a proof of delivery, the goods recipient informs the sender that the delivery has been completed as planned, that is, the right material has been delivered undamaged and in the correct quantity. The proof of delivery triggers an invoice to be sent from the sender to the recipient. In this case, the data is transferred electronically, with no manual data entry needed. As with shipping notifications, data can be sent using EDI or by logging on to the Internet. Using a PDA, mobile recipients can create a proof of delivery and send it to the vendor.

ARCHITECTURE AND TECHNOLOGY

Centralized vs. Decentralized

You can run mySAP SCM with an ERP system integrated on a central server, or you can run it decentrally, as shown in Figure 6. If you run the system decentrally, you transfer information on the goods receipt and goods issue processes from the central ERP system to the decentralized warehouse management system (mySAP SCM) where the warehouse activities are executed. The results of these activities are confirmed back to the ERP system.

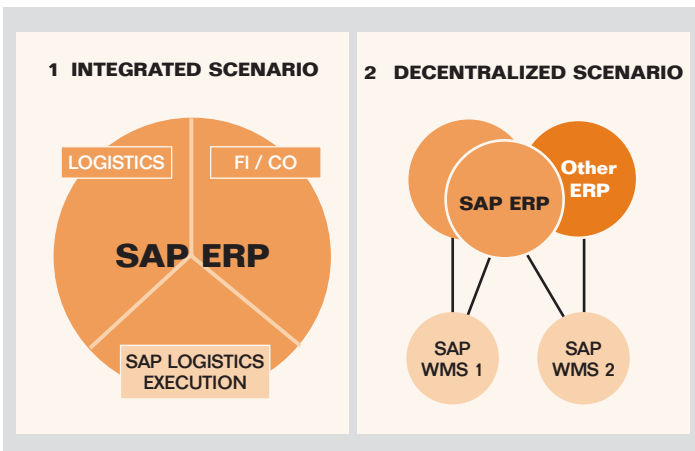


Figure 6: Centralized and Decentralized Warehouse Management

This choice of how to implement the warehouse management capability within mySAP SCM, coupled with the possibilities for configuration, makes the system very scalable. You can manage both small warehouses with simple processes and large warehouse locations with complex procedures and corresponding requirements.

By implementing the system decentrally, you can fulfill the requirements of the central ERP system without breaking the close connection between the warehouse management system and the ERP system. You can achieve round-the-clock operation in the warehouse, high system performance despite a large number of documents, short response times when using direct RF, and independence from the release status of your central software.

Furthermore, a decentralized warehouse management system can be connected to several centralized ERP systems. This means that you manage goods from various systems and from various owners physically and technically in one warehouse management system. mySAP SCM enables smooth warehouse management for several customers or business areas in one warehouse.

Warehouse Control Unit (WCU)

A warehouse control unit (WCU) is used to operate and manage warehouses that are partially or fully automated. Tasks are distributed between mySAP SCM and the WCU. mySAP SCM is responsible for planning, creating, and monitoring the warehouse movements. The WCU initializes and checks the control of the stock movements.

The WCU receives information, such as transfer orders to be executed, and then it confirms completion of the stock movement to mySAP SCM. A standard interface installed between the two systems exchanges information in both directions. The great advantage is that the warehouse activities are managed centrally in mySAP SCM.

With task and resource management, attachments for automating the material flow can be connected directly to mySAP SCM, which makes subsystems for material flow control superfluous.

Customizing

A warehouse management system has to support and map concrete physical processes in the warehouse. Therefore, the setup has to be flexible, and the system must be able to map a wide range of process variants.

mySAP SCM offers a large number of customizing opportunities. For example, for the goods receipt process you can choose an appropriate variant from a wide range of mapping possibilities. Using customizing, you can set up various process variants to suit your requirements. For example, you can specify that a transfer in the warehouse has to be confirmed explicitly.

Developers Toolbox

If certain process requirements are not mapped in the standard version of mySAP SCM, you can implement these requirements simply and quickly. SAP offers enhancement tools that you can use to develop additional functions without changing the SAP standard code.

To make these adjustments, you can place user exits at specific points in the standard process flow where you want to influence the process, for example, with your own putaway strategy. Other functions are available with which you can develop processes (transactions) and build your own front ends.

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