Before we get into the crux of SAP Extended Warehouse Management, this introductory chapter spends some time explaining what SAP is, what SAP Supply Chain Management is, and how SAP Extended Warehouse Management fits into the overall scheme.

1 Introduction to SAP Extended Warehouse Management

Instead of just another configuration guide, we want this book to be a one-stop reference for customers exploring SAP Extended Warehouse Management (SAP EWM) as their warehouse management software, for consultants practicing SAP EWM, for consultants aspiring to learn SAP EWM, and for end users getting ready to use SAP EWM. To that end, spending some time understanding how SAP EWM fits into the SAP scheme of things is worthwhile.

1.1 The SAP Product Pyramid

SAP has created hundreds of enterprise application software applications, which are mostly related to each other in one way or the other. Although volumes have been written on each of them, we'll use a simple pyramid to explain the concepts relevant to the scope of this book.

Caution

The SAP product pyramid concept has been created by authors of this book for readers to understand the SAP product portfolio in a simpler way. It's not the standard way SAP represents its product portfolio.

The pyramid shown in Figure 1.1 shows how SAP products relate to one another. As you can see, the pyramid is divided into four parts, called tiers. The bottom-most layer of the pyramid (Tier 1) has the largest base and area without which the tiers above it would have no platform to be based on. Tier 2 sits on top of Tier 1,

Tier 3 sits on top of Tier 2, and so on. Also, as we progress from Tier 1 through Tier 4, the base and the area of the tier decrease proportionally.

Now let's relate this pyramid to the SAP software portfolio. The bottommost layer relates to SAP Enterprise Core Component (ECC), better known as SAP ERP and historically as SAP R/3. Similar to the largest base of Tier 1 of our product pyramid, SAP ERP has the largest adoption within the SAP market. In other words, most of the customers who use SAP software have SAP ERP in their landscape and most SAP consultants around the globe are SAP ERP consultants. SAP ERP consists of various modules, including Sales and Distribution (SD), Materials Management (MM), Production Planning (PP), Warehouse Management (WM), Financials (FI), Controlling (CO), Logistics Execution (LE), and Human Capital Management (HCM). SAP ERP is self-sustained from an enterprise point of view, which means that its modules are generally sufficient to run the functions an enterprise wants from an SAP ERP package.

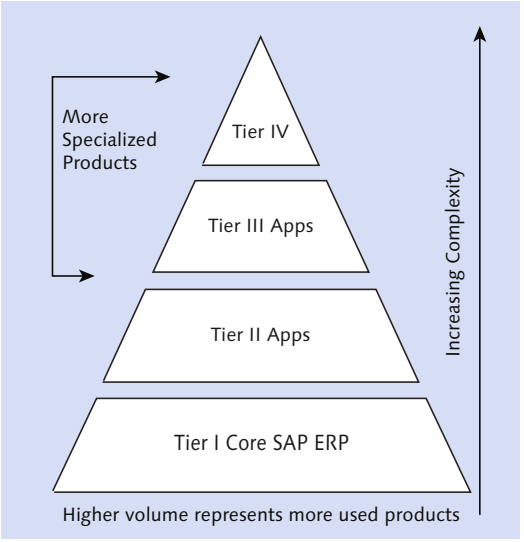

Figure 1.1 SAP Product Pyramid

So if Tier 1 SAP ERP can do pretty much everything that an enterprise needs, you may be wondering what the other tiers are for? Well, the logic is similar to that of upgrading a car after a few years. Although the customer can still buy new accessories and upgrade his old car with them, most people generally tend to buy a new car with those same features. Similarly, after customers use a specific module

of SAP ERP for some time and become stable with it, they start looking for newer features to cater to the business processes that they think need more advanced features than SAP ERP offers. This is where Tier 2 in our SAP product pyramid comes into picture.

For instance, a customer using the MM module within SAP ERP for 10 years may realize the need to have advanced contract management functionalities that aren't contained within SAP ERP. Such customers opt for advanced solutions that fall under our Tier 2 and importantly are related to one or more SAP ERP modules contained in Tier 1. For example, the customers using the MM module within SAP ERP and looking for a legal contract management solution may opt for SAP Contract Lifecycle Management (SAP CLM) as a top up to MM, and the ones looking for advanced auctioning functionalities may opt for SAP Supplier Relationship Management (SAP SRM). Similarly, most SAP ERP modules under Tier 1 have a Tier 2 counterpart that can augment their features when implemented in conjunction with each other. It's also important to note that one SAP ERP module may have more than one Tier 2 counterpart, and a Tier 2 solution may be a counterpart to more than one SAP ERP module. Just as Tier 2 of our pyramid sits on top of Tier 1, Tier 2 solutions work in conjunction with a module. It's important to note that, while many Tier 2 solutions can run independently of a module, their full potential is realized only when the corresponding module is implemented as well.

Example

The Tier 2 solutions SAP SRM, SAP CLM, SAP Sourcing, and SAP Supplier Lifecycle Management (SLC) each can run independently of the MM module and of course independent of one another. However, their full functionality is realized when they run in conjunction with MM.

Two or more Tier 2 solutions can also work in conjunction with each other. We've deliberately given an example outside of SAP EWM to drive home the point that a Tier 1 SAP ERP module can have multiple Tier 2 solutions.

Although we could write an entire book detailing this concept, in the context of this book, we'll limit it to stating that MM, SD, LE, and WM are the SAP ERP modules for which the Tier 2 solution is SAP EWM. This implies the following:

- If you are a consultant for one or more of MM, SD, LE, or WM, SAP EWM is a logical progression for you.

- A consultant running any of these four SAP ERP modules may start looking at SAP EWM as a Tier 2 solution for respective business processes.
- You can still learn SAP EWM without being an expert on these SAP ERP modules, but it's wise to have an overview of them.
- SAP EWM isn't a replacement of any of these modules; instead, it's meant to augment what they do within SAP ERP.

In the context of the pyramid, we define Tier 3 solutions as SAP industry solutions, such as SAP for Retail, SAP for Oil & Gas, and so on. SAP industry solutions are derived from various Tier 1 and Tier 2 applications with some additions to make them specific to a particular industry.

Tier 4 solutions are visibility solutions such as SAP Spend Performance Management (SAP SPM). Although Tier 3 solutions have a bit of Tier 1 and Tier 2 as relevant for that specific industry, Tier 4 solutions are specifically meant to run on Tier 1 through Tier 3 solutions and generate reports for top-level executives. The scope of this book will revolve around Tier 1 and Tier 2 solutions.

Now that you have an understanding of the concept of structuring SAP solutions by tiers, let's take a slightly closer look at the SAP solutions relevant for the scope of this book and see where they fit into the product pyramid.

1.2 Introducing SAP Business Suite

SAP bundles a set of fast-moving products together in a package called the SAP Business Suite, which includes the following:

- SAP ERP
- SAP Product Lifecycle Management (SAP PLM)
- SAP Customer Relationship Management (SAP CRM)
- SAP Supply Chain Management (SAP SCM)
- SAP Supplier Relationship Management (SAP SRM)

Other than SAP ERP, which is our Tier 1 solution, the rest of them fall into the Tier 2 of our product pyramid. They, along with the modules they are comprised of, are meant to perform specific business processes in conjunction with their

respective SAP ERP counterpart module, for example, MM and SAP SRM. We'll focus this section on SAP SCM because that is where SAP EWM resides.

The Association for Operations Management (APICS) defines supply chain management as the following:

> *... the design, planning, execution, control, and monitoring of supply chain activities with the objective of creating net value, building a competitive infrastructure, leveraging worldwide logistics, synchronizing supply with demand, and measuring performance globally.*

It goes on to state that interconnected or interlinked networks, channels, and node businesses are involved in the provision of products and services required by end customers in a supply chain.

SAP SCM builds upon this and provides a set of software that brings this definition to work in an enterprise. SAP SCM is made up of a set of modules (when you buy SAP SCM, you technically buy all the applications and then choose to implement one or more of them):

- SAP Event Management (SAP EM)
- SAP Supply Network Collaboration (SAP SNC)
- SAP Demand Planning (SAP APO-DP)
- SAP Supply Network Planning (SAP APO-SNP)
- SAP Production Planning and Detailed Scheduling (SAP APO-PP/DS)
- SAP Service Parts Planning (SAP SPP)
- SAP Transportation Management (SAP TM)
- SAP Auto ID Enterprise (SAP AIE)
- SAP Extended Warehouse Management (SAP EWM)

Hint

DP, SNP, and PP/DS are a part of SAP Advanced Planning and Optimization (SAP APO), which is a constituent of SAP SCM.

By now, you may have realized that you could really spend your life trying to master SAP SCM. In fact, we haven't come across a single SAP SCM subject matter expert!

Hint

Each of these Tier 2 solutions run in conjunction with a Tier 1 SAP ERP module; for example, PP/DS runs in conjunction with PP!

Figure 1.2 shows various components of the SAP SCM system. Let's quickly discuss what each one does before we move on to SAP EWM.

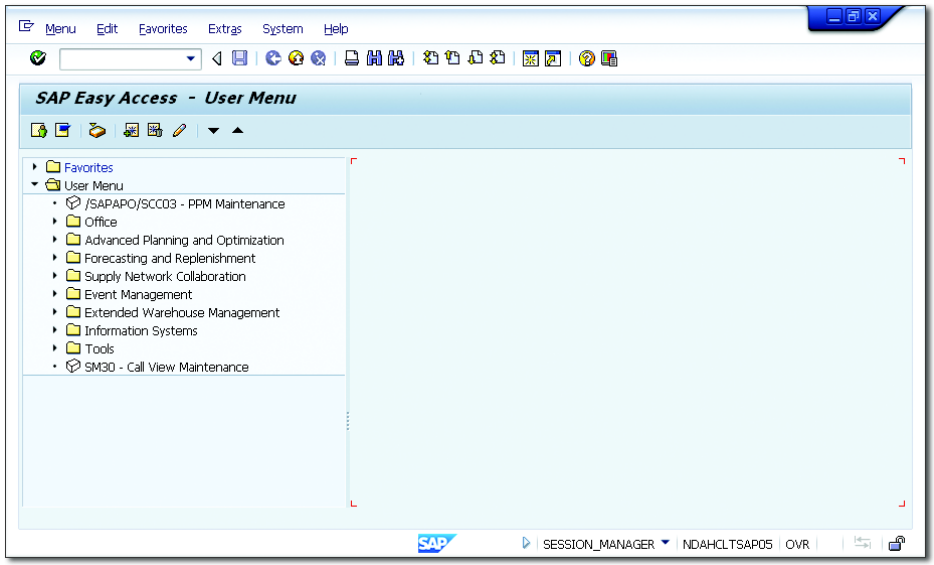

Figure 1.2 Typical SAP SCM Login Screen

1.2.1 SAP Event Management

SAP Event Management (EM) is the central application for tracking and controlling all kinds of business processes. Although designed and developed over many years to monitor logistical processes in the supply chain, EM can provide visibility of any kind of business process due to its generic design. EM provides a wide range of functions to monitor milestones (known as expected events), log unexpected events, and trigger alerts, notifications, and any kind of automated follow-up activities. It's designed to monitor a given business process across applications, systems, and business organizations, both internally and externally. EM can integrate with any SAP and non-SAP system and has preconfigured interfaces to other applications. It also has related preconfigured visibility processes for SAP ERP, TM, SAP SCM server, SAP Auto-ID Infrastructure (AII), and others.

1.2.2 SAP Supply Network Collaboration

SAP Supply Network Collaboration (SNC), which was previously known as SAP Inventory Collaboration Hub, is meant to connect and collaborate with suppliers, outsourced manufacturers, and customers. SNC improves visibility into supply and demand to reduce inventory buffers, accelerate the movement of materials through the pipeline, improve customer service, and increase revenues. The following are SNC's key objectives:

- Streamline collaboration with suppliers, contract manufacturers, and customers.
- Decrease procurement, sales, and inventory costs.
- Enhance supply chain visibility and increase overall speed, accuracy, and adaptability of the supply network.
- Reduce inventory levels while managing variations in supply and demand.
- Improve communications, and reduce errors and processing costs.

Caution

Consultants commonly refer to SNC as Supplier Network Collaboration, even though it's actually Supply Network Collaboration.

1.2.3 SAP Transportation Management

SAP Transportation Management (TM) supports you in all activities connected with the physical transportation of goods from one location to another. You can use TM to perform the following activities, for example:

- Create forwarding orders for your ordering parties.
- Transfer orders and deliveries from an SAP ERP system.
- Create freight bookings.
- Plan the transportation and select carriers.
- Tender transportation services.
- Dispatch and monitor the transportation.
- Calculate the transportation charges for both the ordering party and the supplier side.
- Consider foreign trade and dangerous goods regulations.

You can use TM to create and monitor an efficient transportation plan that fulfills the relevant constraints (e.g., service level, costs, and resource availability). You can determine options to save costs and to optimize the use of available resources, and you can react to transportation events and find solutions to possible deviations from the original transportation plan. TM is a Tier 2 solution for SD, LE, and so on.

1.2.4 SAP Demand Planning

Demand Planning (DP) in SAP APO is used to create a forecast of market demand for your company's products. This component allows you to take into consideration the many different causal factors that affect demand. The result of DP in APO is the demand plan.

DP is a powerful and flexible tool that supports the demand planning process in your company. User-specific planning layouts and interactive planning books enable you to integrate people from different departments and even different companies into the forecasting process. Using the DP library of statistical forecasting and advanced macro techniques, you can create forecasts based on demand history as well as any number of causal factors, carry out predefined and self-defined tests on forecast models and forecast results, and adopt a consensus-based approach to reconcile the demand plans of different departments. To add marketing intelligence and make management adjustments, you use promotions and forecast overrides. The seamless integration with SNP in SAP APO supports an efficient sales and operations planning (S&OP) process.

1.2.5 SAP Supply Network Planning

SAP Supply Network Planning (SNP) is a set of functionalities around distribution requirement planning, deployment, demand and supply matching, and optimization. Along with DP, it's an integral part of any organization's S&OP process.

1.2.6 SAP Production Planning and Detailed Scheduling

You use the SAP APO Production Planning and Detailed Scheduling (PP/DS) component, which is a Tier 2 solution corresponding to the PP module of SAP ERP to do the following:

- Create procurement proposals for in-house production or external procurement to cover product requirements.
- Optimize and plan the resource schedule and the order dates/times in detail.
- Reduce lead times.
- Increase on-time delivery performance.
- Increase the throughput of products and reduce the stock costs through better coordination of resources, production, and procurement.

You can take the resource and component availability into account here. Above all, PP/DS is used to plan critical products, such as products with long replenishment lead times or products that are produced on bottleneck resources. You can use PP/DS to create executable production plans and schedule them for manufacturing.

1.2.7 SAP Service Parts Planning

SAP Service Parts Planning (SPP) provides planning functions specific to service parts and transparency throughout the supply chain, right from the moment demand occurs through to the delivery of the product. Planning for your service parts takes place in distribution structures (i.e., the bill of distribution [BOD]), which contain all of your locations. Locations can be, for example, distribution centers, contract packagers, or your customers and dealers. Alongside the current BOD, you can also work with future BODs. This means that you can define a specific time in the future when a BOD will replace a different BOD. The system takes this future BOD into account, for example, as part of forecasting and distribution requirements planning (DRP).

1.2.8 SAP Auto ID Enterprise

SAP Auto ID Enterprise (AIE) helps enterprises in managing inventory and shipping of goods from inventories as well as goods receipt on the recipient's side using radio-frequency identification (RFID) devices together with the backend functionality of enterprise software applications such as SAP SCM and SAP ERP. Basically, AIE is RFID-based software, which, in conjunction with EM, automatically reads and posts the status of goods within a supply chain. This is a Tier 4 solution within our pyramid.

1.2.9 SAP Extended Warehouse Management

Finally, we reach SAP Extended Warehouse Management (SAP EWM). We'll explain the various introductory facets of this solution from SAP in this chapter. Before we get into explaining what SAP EWM is, let's spend some time understanding what warehouse management is in general and the various warehouse management solutions that SAP offers.

1.3 Warehouse Management in General

A warehouse management system (WMS) is a key part of the supply chain and primarily aims to control the movement and storage of materials within a warehouse and process the associated transactions, including shipping, receiving, put away, and picking. The systems also direct and optimize stock putaway based on real-time information about the status of bin utilization. A WMS monitors the progress of products through the warehouse. It involves the physical warehouse infrastructure, tracking systems, and communication between product stations.

Note

The objective of a warehouse management system is to provide a set of computerized procedures for management of warehouse inventory, space, equipment, and people with the goal of minimizing cost and fulfillment times.

More precisely, warehouse management involves the receipt, storage, and movement of goods—normally finished goods—to intermediate storage locations or to a final customer. In the multi-echelon model for distribution, there may be multiple levels of warehouses, including a central warehouse, a regional warehouse (serviced by the central warehouse), and potentially retail warehouses (serviced by the regional warehouses).

Warehouse management systems often use automatic identification and data capture technology, such as barcode scanners, mobile computers, wireless LANs, and potentially RFID to efficiently monitor the flow of products. After data collection, there is either a batch synchronization with the data or a real-time wireless transmission to a central database. The database can then provide useful reports about the status of goods in the warehouse.

Warehouse design and process design within the warehouse (e.g., wave picking) are also part of warehouse management. Warehouse management is an aspect of logistics and supply chain management.

1.4 Warehouse Management Solutions from SAP

If we look back two generations of SAP solutions, even SAP R/2 had warehouse logistics functions, which were partly integrated into the next generation SAP R/3. This came to be known as SAP R/3 WM, and then as SAP ERP WM, which is how it's known today.

With the release of R/3 2.0 in 1993, SAP introduced storage unit management and parallel processing in the solution and coined the term SAP Warehouse Management (WM). Here onward, SAP kept on adding capabilities per contemporary business needs of customers.

Within the SAP solutions portfolio, if we refer to Tier 1 of our product pyramid, SAP ERP contains a module called Warehouse Management (WM), which forms the base level of warehousing solutions within the SAP solutions portfolio. This works closely in conjunction with related SAP ERP modules such as SD, MM, and so on to perform the activities that a WMS solution should offer. Over time, customer warehousing requirements have transformed and so have the SAP warehouse offerings. Thus, like any other Tier 2 solution, the Tier 2 solution for warehouse management has also evolved within the SAP solutions portfolio. To be precise, SAP EWM is the logical evolution or the Tier 2 solution related to WM.

With the launch of SAP EWM in 2006, SAP delivered a generational shift in the way a WMS supports the core and cross processes of a warehouse. SAP EWM offers unmatched capability to fit into the warehousing requirements of business. Figure 1.3 illustrates this journey and lists the functionalities added over the years.

SAP's flagship solution, WM, is among the reputed WMSs available in the market and remains a fitting option for many customers using small- to medium-size warehouses, with lower volume warehouse operations and less complex process automation requirements. WM is focused on supporting enterprise-centric processes.

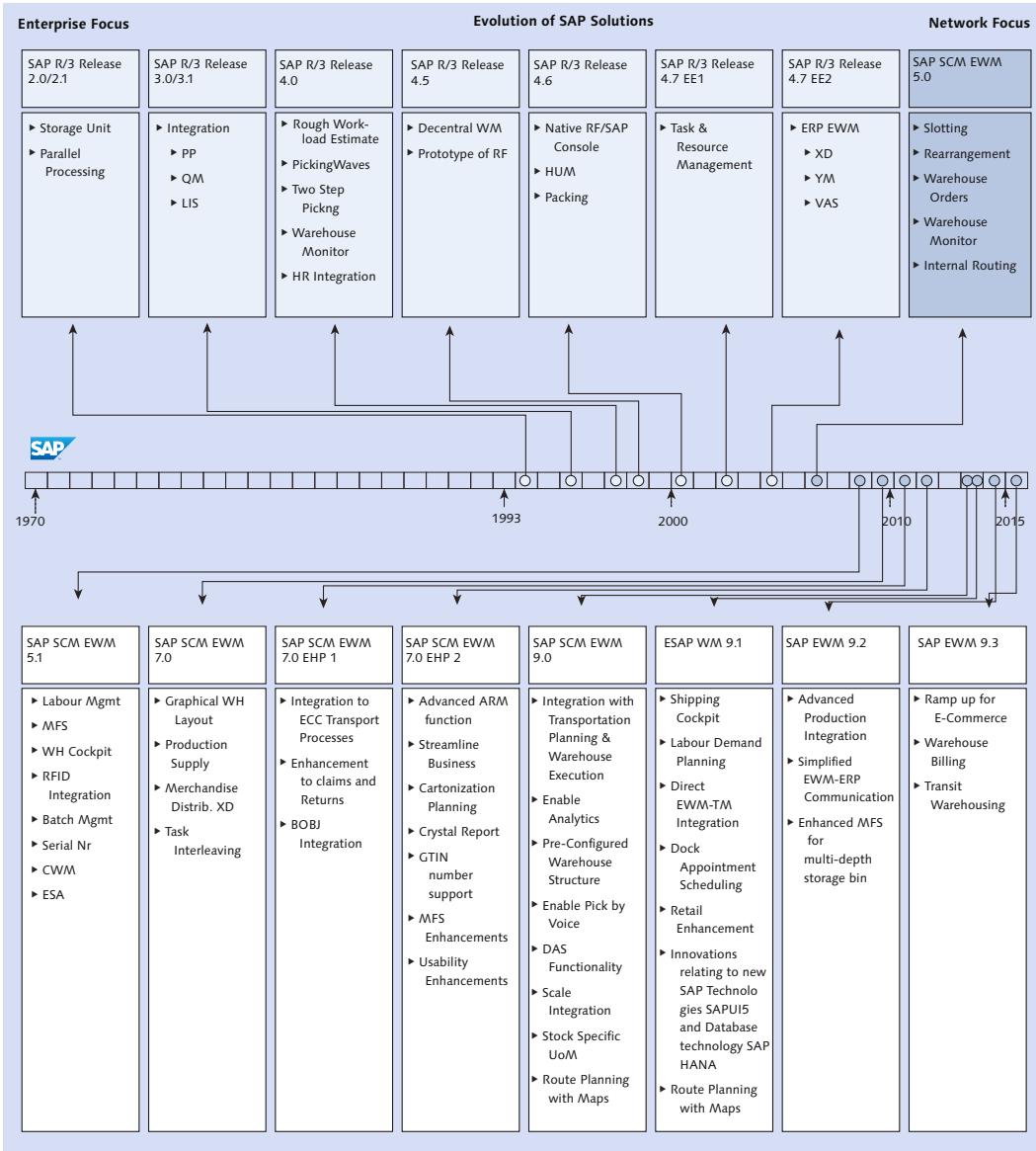

Figure 1.3 Evolution of SAP's Warehouse Management Solutions

SAP EWM represents a new-generation WMS based on supply chain management. With an architectural shift in design, SAP EWM is targeted to handle complex

processes with high-volume warehouse operations in medium- to large-size warehouses. SAP EWM provides connections to external processes such as TM as well.

Hint

SAP has built new capabilities into recent versions of SAP EWM that are based on innovative technologies such as SAPUI5 and SAP HANA, and it's all set to achieve even greater heights.

1.5 Comparing SAP Extended Warehouse Management and SAP ERP Warehouse Management

The following subsections provide a brief comparison of what WM can do and what SAP EWM can do in the following key areas:

- Mapping a warehouse complex in a WMS
- Functionalities
- Planning capabilities
- Monitoring capabilities
- Reporting and analytics
- Output management capabilities
- Supporting warehouse technologies
- User interaction

1.5.1 Mapping a Warehouse Complex in a Warehouse Management System

Mapping an accurate warehouse complex in any WMS is the key to accurate modeling of its warehouse processes. One of the key abilities of SAP EWM is that it replicates the warehouse complex with meticulous details.

While both SAP EWM and WM structure the warehouse using storage types, storage sections, and storage bins, SAP EWM further categorizes storage types with the roles they play in the warehouse, such as work center, staging area group, door, identification point, and so on. The work center role maps a physical unit of

the warehouse in SAP EWM, which is used to perform activities such as packing, deconsolidation, performing value-added services, weighing, counting, quality inspections, and so on.

SAP EWM also maps users and equipment (e.g., forklifts) as resources in the system. In SAP EWM, traceability of stock goes beyond final bins and stock lying in intermediate storage bins at work centers. Resources can also be tracked and analyzed.

SAP EWM groups the bins with respect to activities in an activity area to optimize the warehouse operations, and then it creates warehouse orders (WOs), which are work execution lists assigned to a resource per activity area.

Storage types, role classifications, resources, and activity areas are differentiators in SAP EWM.

1.5.2 Functionalities

SAP EWM functionalities provide greater automation support for both simple and complex business processes, as shown in Table 1.1. Whereas WM works with one-step and two-step movements, SAP EWM is capable of supporting n-step movements. It's important to note that while *warehouse movement type* controls the movement of product from source to destination bin, *warehouse process type* maintains parameters for both single- and multistep movements.

SAP EWM uses a concept called *storage control* for multistep movements. A parameter called *storage process* groups the steps to facilitate these movements through one or more *interim storage types* wherein activities such as deconsolidation, counting, and so on can be performed. These movements and activities can take place before final *putaway* in the inbound process and after *picking* in the outbound process. Storage control is further categorized into Process-Oriented Storage Control (POSC) and Layout-Oriented Storage Control (LOSC). SAP EWM is also capable of mixing POSC and LOSC for movements.

The *built-in slotting and rearrangement* optimization feature within SAP EWM calculates optimal parameters such as the *putaway control indicator*, *stock removal control indicator,* and *bin type* for a product. These planning values are stored in the product master and needs to be activated. Based on slotting, rearrangement optimizes space in the warehouse by moving stocks to optimal locations.

The *expected goods receipt* functionality enables users to create inbound deliveries from purchase orders (not all vendors send advanced shipping notices [ASNs]) and production orders and plan further activities based on these inbound deliveries.

Labor management is another built-in functionality in SAP EWM, whereas WM needs *Task and Resource Management (TRM)* as an add-on to provide similar functionalities.

The *Catch Weight Management* functionality of SAP EWM enables you to record weight while performing activities. This functionality is useful when there are weight variations in a product.

The *Yard Management* functionality of SAP EWM allows you to load/unload a transportation unit in the warehouse; this functionality isn't available in WM.

The *Task Interleaving* functionality of SAP EWM reduces deadheading (movement of resources without product/handling unit) in the warehouse and brings efficiency in the warehouse.

Functionality	SAP ERP WM	SAP EWM
Stock and bin management	Yes	Yes
Storage unit management	Yes	Yes
Placement and removal strategies	Yes	Yes
Replenishment	Yes	Yes
Pick logic	Yes	Yes
HU management	Yes	Yes
Yard management	Yes	Yes
Expected goods receipt	No	Yes
Value added services	No	Yes
Opportunistic cross docking	No	Yes
Dynamic cycle counting	No	Yes
Loading/unloading of TU	No	Yes
Deconsolidation	No	Yes
Slotting and rearrangement	No	Yes
Labor management	No	Yes

Table 1.1 Comparison of SAP EWM and SAP ERP WM Functionalities

Functionality	SAP ERP WM	SAP EWM
Task interleaving	No	Yes
Task and resource management	No	Yes

Table 1.1 Comparison of SAP EWM and SAP ERP WM Functionalities (Cont.)

1.5.3 Planning Capabilities

The *Wave functionality* in WM helps in planning and execution of picking activities. WM's planning capability depends on SAP ERP LE-SHP (Logistics Execution—Shipping) and SAP ERP LE-TRA (Logistics Execution—Transportation) to create and plan for deliveries and shipments.

The Wave functionality in SAP EWM is much broader and capable of automatically releasing waves per predesigned *wave templates*, which leads to creation of tasks in the warehouse. The *warehouse order* (WO), mentioned earlier, further bundles these *warehouse tasks* (WTs) based on rules and filters that suit warehouse operations. Also, shipment can be created and deliveries can be assigned to them within SAP EWM.

As a differentiator, SAP EWM's planning view of the shipping cockpit enables user to view and plan for deliveries and shipment in one screen. It has both planning and execution functionalities. Additionally, *Labor Demand Planning* can forecast workload and help plan for resources to avoid workforce shortages. *Dock Appointment Scheduling* is a collaborative planning tool for loading/unloading appointments at a warehouse between the warehouse operator and its carriers.

1.5.4 Monitoring Capabilities

Both WM and SAP EWM contain a *warehouse monitor* that helps supervisors monitor warehouse activities and maximize efficiency. The warehouse monitor has the capability to monitor *open deliveries*, *unconfirmed transfer orders,* and *stock situations* in the final and intermediate bins. WM also has separate monitors for *cross-dock* and *wave pick*.

The SAP EWM warehouse monitor is a comprehensive tool that lets users view documents, processes, and alerts. In SAP EWM, the Warehouse Management Monitor screen is well structured and is divided into three parts as shown in Figure 1.4:

- Hierarchical tree structures and navigation nodes in the left side of the screen
- Parent data (per selected node) in the right top of the screen
- Child data details per parent node in the right bottom of the screen

It's important to note that in SAP EWM, a supervisor can assign work through the warehouse monitor to a resource. The SAP EWM warehouse monitor is capable of performing some warehouse activities as well.

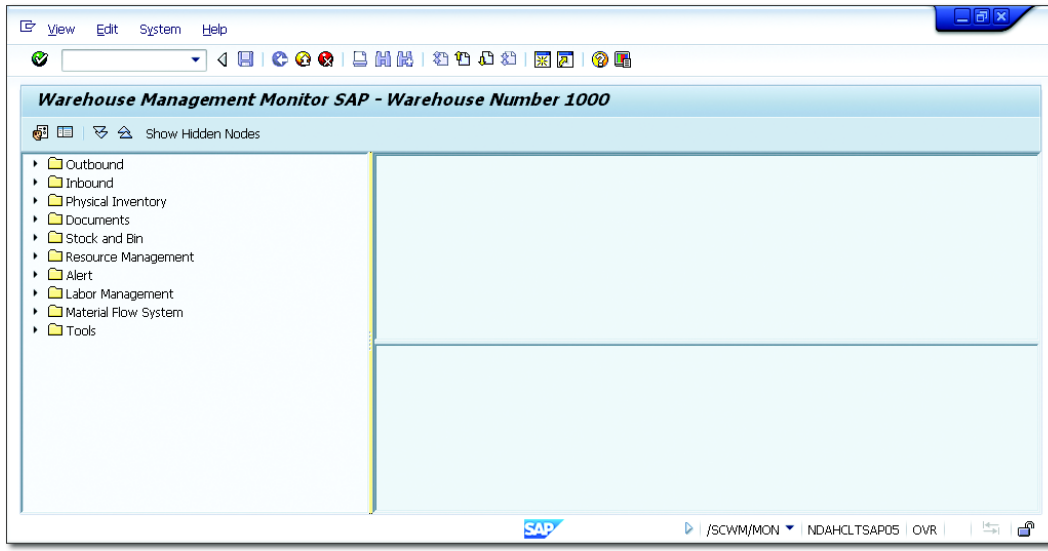

Figure 1.4 SAP EWM Warehouse Management Monitor

Although it's not possible to personalize the monitor in WM, which can be accessed only through SAP Easy Access, the SAP EWM warehouse monitor can be personalized per the need. The SAP EWM warehouse monitor provides system access options from both the GUI as well as the browser-based SAP NetWeaver Business Client (NWBC).

The SAP EWM shipping cockpit's execution view allows you to check the progress in activities such as picking, packing, and staging for transportation units.

Additionally, SAP EWM's warehouse cockpit and graphical warehouse layout (GWL) also provide monitoring capabilities through visualization of key warehouse figures and two-dimensional graphics of the warehouse complex.

1.5.5 Reporting and Analytics

WM provides several transaction codes (Transaction LX**) that can be run to fetch predefined standard reports. You need to customize the programs behind the transaction codes and design the report per the requirements. The WM warehouse monitor also holds reporting capabilities and assists in decision making.

In SAP EWM, a well-designed monitor provides wide reporting functionality through a single screen equipped with SAP List Viewer (ALV) features and functionalities. The SAP EWM warehouse monitor provides selection screens and detailed criterion for report generation as well.

Easy Graphics Framework (EGF) and *graphical warehouse layout* (GWL) tools available with SAP EWM also have reporting and analytical capabilities. EGF is used to develop the warehouse cockpit. The warehouse cockpit can display key figures, for example, pending picks in an activity area of the warehouse, in an easy to understand graphical format. Predefined chart types such as pie charts, Gantt charts, traffic lights, and so on can be used to display the key figures.

The GWL displays the warehouse as a two-dimensional graphic that provides a visual overview of the warehouse to verify location configurations. Conveyer segments, walls, offices, and so on can be defined as GWL objects. This allows monitoring of conveyer systems in the warehouse as well.

SAP EWM also includes predefined content integrated with SAP BusinessObjects BI for analytical reporting.

1.5.6 Output Management Capabilities

WM's *print control functionality* provides flexible control printing activities for the warehouse. Using print control, chosen documents can be printed for goods movement. Selection of form and number of copies can also be automated. Print control also provides automatic printer selection.

The *Post Processing Framework* (PPF) in SAP EWM provides an interface for actions such as printing delivery notes, mailing, faxing, creating subsequent documents, triggering workflow processes, and so on based on conditions. PPF tools are used for scheduling, starting, and monitoring actions. Determination and processing of actions can take place both automatically and with user interaction.

1.5.7 Connect with Supporting Warehouse Technologies

Although WM has standard RF technology, SAP EWM has enhanced and configurable RF technology. SAP EWM also has standard *Material Flow System* (MFS) and *voice picking integration*.

1.5.8 User Interfaces

User interaction with the WMS is the key to the warehouse's productivity.

Both WM and SAP EWM provide interactive support though graphical user interfaces (GUIs) and radio frequency (RF) devices. Additionally, SAP EWM provides user-friendly and easy-to-personalize tools such as *warehouse monitor*, *shipping cockpit,* and *labor demand planning,* which can be accessed using browsers and are based on NWBC. The labor demand planning application can also be accessed by mobile devices and uses SAPUI5.

Caution

WM remains a viable option for many customers, and SAP will continue to support it. However, developments of new functionalities may not be seen very often.

1.6 Business Benefits of SAP EWM

With fierce competition globally in the warehouse management space to minimize the inventory holding costs, procure inventory just in time, increase operating efficiency, decrease operating cost, deliver products on time in full, and react faster to demanding situations, organizations are constantly looking for innovations to augment their warehouse operations. Along with focusing on the primary businesses, robust warehouse management solutions are becoming essential for changing business needs. Because SAP has always provided cutting-edge solutions in the warehouse management space—from its initial WM solutions with SAP R/2 to its subsequent evolution to SAP EWM—it is often the first choice for customers looking at deploying a WMS solution.

In line with organizations looking at sustainability as a major business driver, SAP EWM aids warehouses to become fully paperless environments and to be driven by system-guided RF functionality. Seamless integration of automation using RF, RFID, pick-by-voice, interface to external systems (warehouse control units), and

automation further help organizations meet changing business needs. Dock appointment scheduling for carriers via user interface (UI) allows the carriers to maintain the appointments, plan and manage the vehicle arrivals effectively, and help being on time. This helps you balance the workload throughout the day effectively and plan based on resource availability within the warehouse.

Quality Management (QM) enables you to control the movement of products within the warehouse based on the quality inspection criteria, and the Quality Inspection Engine (QIE) is used to map the QM processes.

A robust and comprehensive monitoring tool is provided to keep the warehouse supervisors updated on the warehouse activities. This, unlike any other tool, is a one-stop shop for critical information on warehouse activity progress. In addition, the easy graphic framework provides the warehouse key figures in a graphical manner. Analytics for SAP EWM include BI Content, BI Content Extensions, and BI Content Extractors, which help to measure and evaluate business performance. The BI Content and BI Content Extensions contains data such as executed workload, exceptions, measurement services, WOs, WTs, volume analysis, and so on. Value-added services (VAS) in SAP EWM aid in designing complex warehouse scenarios and execution. VAS is an important feature in SAP EWM and provides an edge over other customary warehouse management solutions.

Labor Management (LM) in SAP EWM helps in handling resources optimally and effectively. You can use LM for evaluating performance against labor standards, operational planning, and calculating labor incentives. Labor Demand Planning (LDP) helps in forecasting the future workload and workload aggregation. The cross-docking functionality helps reduce storage costs, transportation costs, and material movements costs. It also reduces the unnecessary activities of product movements and augments potential elimination of stock holding costs. SAP EWM cross-docking helps with planned cross-docking and opportunistic cross-docking methods.

The shipping and receiving functionality in SAP EWM helps manage the inbound and outbound transports using vehicles and transportation units, specifically, check-in, check-out, loading, unloading, printing, goods issue, managing the yard, dock appointment scheduling, and so on. Yard Management (YM) is an integral part of shipping and receiving functionality wherein you manage the yard movements within the warehouse. YM is used to supervise the movements of

vehicles and transportation units within the premises, provide real-time visibility on the yard, and perform effective handling from check in till check out.

Resource Management (RM) supports effective use, monitoring, and governing of warehouse resources. RM prohibits manual allocation of work and instead operates via queue managed with RF and non-RF environments to effectively monitor resources.

SAP EWM for the retail rapid-deployment solution (RDS) offers a flexible preconfigured solution for critical fixed-scope warehousing processes. This solution can be delivered within a fixed time frame for predefined processes. It caters to the following business processes: simple inbound, complex inbound, simple outbound, complex outbound, physical inventory, cycle count, automatic replenishment, simple scrapping, and customer returns.

Wave Management in SAP EWM helps control items within and across deliveries, helps group delivery items or split items based on the required criteria, helps execute delivery in a timely manner, and helps improve the productivity in outbound processes. SAP EWM facilitates advanced integration of production processes from production supplies up to the production receipt. Production processes are integrated with in-process inspections to enable sample checks. Slotting and rearrangement help arrange the products in the warehouse based on the movement history and product categorization (A, B, and C) so they are stored for optimal movement within the warehouse.

SAP EWM supports and integrates with the RF framework and supports a wide variety of devices. The RF framework supports GUI-based, character-based, and browser-based devices. Character-based devices are connected via SAP Console, and browser-based devices are connected via ITSmobile. SAP EWM allows you to use RFID technology by integrating with AII as well. RFID technology allows you to automate the control of goods movement in real time and improves both operational efficiency and warehouse productivity.

The Material Flow System (MFS) in SAP EWM facilitates setting up an automatic warehouse, and the warehouse processes are processed automatically. MFS is integrated with SAP EWM and is connected via programmable logic controllers (PLCs) to retrieve the information on warehouse processes. SAP EWM supports environmental health and safety functions, helps in handling the hazardous substances safely, and assists in complying with environmental statutory regulations

when these goods are transported. Cartonization planning can be used to ship less-than-truckload quantities of different products to several customers using a single route and grouping multiple small deliveries to provide optimum usage of truck space.

SAP EWM provides an opportunity to handle the exception situations in the nick of the time through exception handling. This process is necessitated when the actual situation differs, and it allows you to execute freely definable follow-up actions based on the exceptional situation in the warehouse. SAP HANA enables analysis of very large, nonaggregated data at unprecedented speeds in local memory. SAP HANA Live for SAP EWM provides SAP-delivered content for real-time operational reporting and analytics without any latency in reporting. The deployment options are fairly easy to get the most out of your return on investment (ROI).

1.7 Deployment Options of SAP EWM

Decision on deployment of SAP EWM plays a crucial judgment on how you've decided to install SAP EWM for your organization. Various IT infrastructure and application elements within the organization are involved in assessing, evaluating, and deciding on deployment options. Influencing decision factors include transaction volume, integrity and compatibility of other WMS-related applications, criticality of the system landscape, hardware resources, and so on. Figure 1.5 illustrates the deployment options for SAP EWM.

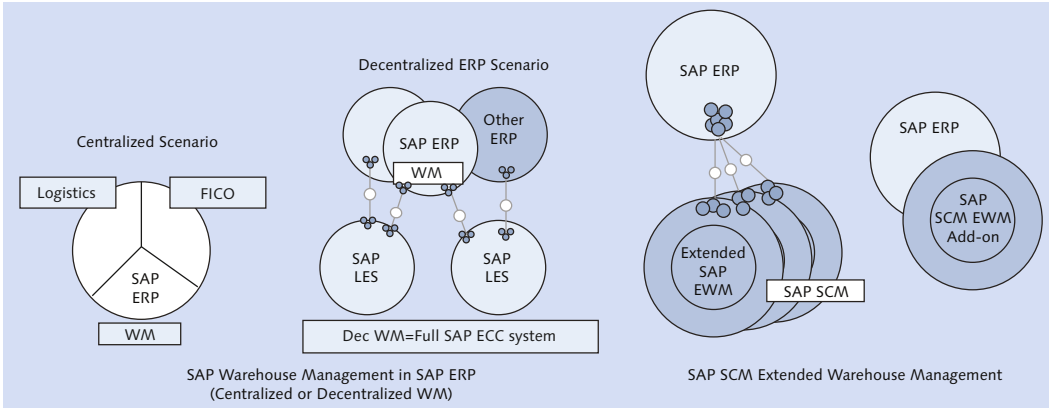

Figure 1.5 SAP EWM Deployment Options

1.7.1 Deploying SAP EWM on SAP ERP

SAP introduced the capability of implementing SAP EWM as an add-on to SAP ERP in 2007 to address the needs of customers who were already on SAP ERP and were looking at SAP EWM as a close-fitting integration across SAP ERP functionalities on the same server. This integration opportunity allowed many customers to move on from their custom WMSs into one single platform.

The two deployment options for SAP EWM on an SAP ERP system are listed here:

- **Centralized**
  The SAP EWM add-on is installed on a server on which SAP ERP runs.
- **Decentralized**
  The SAP EWM add-on is installed in SAP ERP, which positions itself as decentralized warehouse management even though it's a full SAP ERP system.

1.7.2 Deploying SAP EWM on SAP Supply Chain Management

The most widely used option of deploying SAP EWM is alongside SAP SCM. There are varied options within SAP SCM deployment based on keeping or not keeping other SAP SCM applications such as SAP APO, SPP, SNC, and SAP Global Available-to-Promise (GATP). SAP's general recommendation is to deploy SAP EWM on a separate instance from other SAP SCM applications. This option enables you to decouple warehousing business from the rest of the businesses, which allows the entity to stay focused on the core businesses while being flexible at the same time. Newer technologies such as cloud computing give the flexibility to run SAP EWM on one box along with other applications.

A dedicated system in a large-scale environment can continually provide better performance, and flexibility and dependability are compelling reasons to build SAP EWM on a separate instance. Sizing is also key to a successful SAP EWM implementation and has to be taken care of in detail. Factors that influence the sizing of an SAP EWM system include transaction volume, number of users, applications, interfaces, and traffic across applications.

1.8 ASAP 8 Implementation Methodology and SAP EWM

The ASAP methodology provides a comprehensive way to streamline the implementation, upgrade, and enhancement of SAP software via the following benefits:

- Reduced total cost of implementation by embedding the principles of SAP Advanced Delivery Management (ADM) into a streamlined and modular implementation road map for ASAP
- Choice of Agile or Standard ASAP implementation approach of your SAP solution (see Figure 1.6)
- Content-rich implementation accelerators, templates, and guides for implementation projects from strategy to operations
- Transparent value delivery through consistent reflection of the business case
- Efficient project governance, QM, and guidance for Agile implementation projects, SAP Business Process Management (BPM), and traditional implementation projects
- Approach that combines user-centric design, business processes, and IT architecture
- Coverage of the entire project lifecycle from evaluation through delivery to post-project solution management and operations

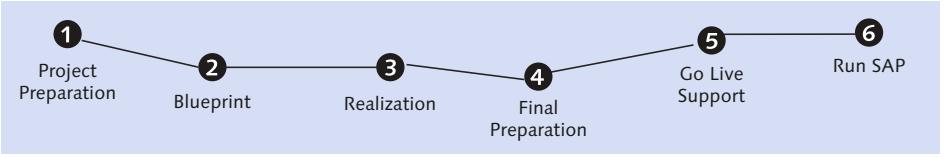

Figure 1.6 ASAP Implementation Methodology

It's important to understand how an ASAP methodology is relevant to an SAP EWM project. In the following subsections, we'll describe the most commonly used standard ASAP 8 methodology and explain some key aspects relevant to carry out a successful SAP EWM project.

1.8.1 Project Preparation

During this phase, the team goes through initial planning and preparation for the SAP project. Some of the activities that you'll undertake during an SAP EWM implementation include the following:

- **Project initiation**
  The purpose of the project initiation deliverable is to formally recognize that a new project exists. It supports the decision to accept the project, align stakeholders around a project and its scope, provide updated information for planning, and obtain a commitment to proceed. In an SAP EWM project, it's of utmost importance to ensure alignment between the IT teams and the end users of the warehouse at the user level. It's thus critical to have SAP EWM end user representation on the project team.
- **Project charter**
  The purpose of this deliverable is to clearly and explicitly define the objectives of the proposed project, analyze all possible benefits, and quantify benefits in financial terms. This information and supporting documents align key stakeholders around the strategic intent of the project. The SAP EWM project charter should essentially define the outcomes that will result from the project.
- **Kick-off workshop**
  The purpose of this deliverable is to kick off the project/phase and ensure that all needed information is shared with the resources for a successful project execution. You need to ensure that everyone who impacts the outcome of the project is a part of the workshop. The idea is to avoid situations in which the system is built per IT requirements, but the warehouse users shy away from using it. It's very important to have a representative from the warehouse management group in these workshops.
- **Project schedule and budget**
  The purpose of the project schedule deliverable is to define the work schedule to be followed, the resources and associated time commitments required for the project, and the phases of the project. The work breakdown structure (WBS) serves as the foundation for the schedule, the deliverables to be produced, and tasks to be performed as part of the project. The project budget, including monitoring and control, outlines all costs associated with the project, such as labor, hardware, software, contracting fees, and facilities. Along with

SAP EWM scope considerations, firming up a deployment option plays a critical role in defining this precisely.

- **Project and operational standards**
  The purpose of the project and operational standards deliverable is to provide consistent means of executing and governing project work in an efficient and effective manner. The key objective of project standards is to identify, define, approve, and communicate standards related to project execution. In an SAP EWM project, where and when applicable, the current customer processes and procedures related to the warehousing standards should be taken into account when defining the most suitable standards for the project.
- **Execution, monitoring, and controlling results**
  The purpose of this deliverable is to execute the project management plan and control and monitor the work defined in the project scope statement. It's very important that someone responsible for the warehousing division of the business is involved in this activity as well.
- **Business scenario design**
  While most of the project managers would put this under the business blueprint phase, we recommend that the SAP EWM project team explains and documents the essential processes at the scenario level (process level 1–2) during the project preparation phase itself. It builds the foundation for the business blueprint phase where process levels 3–5 are defined in detail.
- **Data migration approach and strategy**
  The purpose of the data migration approach and strategy deliverable is to capture and communicate the approach and strategy for the legacy data migration. In addition, the scope and requirement for warehouse management data migration should also be determined during this activity. SAP EWM offers standard master data upload transaction and migration tools from LE–WM, such as warehouse product migration, storage bin migration, stock migration, physical inventory completeness migration, and so on. You can access these transactions via the menu path, Extended Warehouse Management • Interfaces • Data Upload or via Transactions /SCWM/ISU, /SCWM/IPU, /SCWM/SBUP, /SCWM/SRTUP, /SCWM/MIG_PRODUCT, /SCWM/MIG_BIN, /SCWM/MIG_STOCK, /SCWM/MIG_PI_COMPL, /SCWM/MIG_MAP_SUT, and /SCWM/MIG_MAP_ALTUOM.

- **Technical requirements and design and solution landscape deployment plan**
  The purpose of the technical requirements and design deliverable is to provide the project with a specification of the target solution from a software component standpoint. This document is intended to serve as a reference for the rest of the project team during the business blueprint phase. Included in this deliverable is the solution landscape deployment plan, which is a high-level description of the overall system landscape approach to be used for the implementation project.
- **Interface inventory**
  The purpose of the interface inventory deliverable is to primarily identify the external systems, applications, and business objects or transactions that must be integrated with the SAP EWM solution to realize the objectives of the project.
- **Initial hardware sizing proposal**
  The purpose of the initial hardware sizing proposal is to begin the process of assessing the hardware infrastructure requirements. The hardware sizing proposal includes assessing and deriving the right hardware infrastructure requirement. From an SAP EWM perspective, key factors to be considered are the legacy landscape, SAP EWM deployment options, number of facilities (e.g., warehouse facility, production facility, distribution center, cross-docking facility, etc.), square footage of the facility, and SAP EWM interface with other applications/technologies (RF framework, MFS, PLC, etc.).

1.8.2 Business Blueprint

The purpose of this phase is to create/update the business blueprint, which is a detailed process-oriented and technical documentation of the results gathered during the requirements and design workshops or based on validation of a predefined solution or service description. The business blueprint includes the following deliverables:

- **Change impact analysis**
  The purpose of the change impact analysis deliverable is to ensure that the organizational and technical changes in business processes have been identified and documented by comparing the as-is and the to-be business processes.

- **Communication plan**
  The purpose of the communication plan deliverable is to summarize all planned communication measures and identify the dependencies among various activities. The communication plan is aligned to the overall organizational change management (OCM) road map and addresses mainly external communication to stakeholders, key users, SAP EWM end users, and suppliers.
- **End user training content**
  The purpose of the end user training content deliverable is to create a curriculum plan that covers the skills that end users will need to possess to use the SAP EWM system. This document will be refined throughout the project.
- **Scope validation/fit-gap analysis**
  The purpose of the scope validation/fit-gap analysis deliverable is to validate the predefined scenarios, processes, and enhancements; and identify potential gaps between delivered products and customer requirements. The deliverable only captures requirements for gaps. It follows an iterative approach. With respect to an SAP EWM project, we identify the organizational structure, warehouse structure, warehouse management pertinent master data, user authorization concepts, data integration across the application and solution, and business objects within SAP EWM for cross-process integration.
- **Defining roles and authorization (R&A)**
  R&A is used to offer access to SAP transactions based on job functions. Access required to perform certain functions are grouped based on job roles. The task for this phase is to identify and document the authorization requirement for the business process at the employee category level. SAP EWM delivers a standard set of roles in particular for each warehouse cadre, and these need to be identified during this phase. Following are a few examples of role names:
  - EWM: Warehouse Manager
  - EWM: Warehouse Expert
  - EWM: Warehouse Specialist for Goods Receipt
  - EWM: Warehouse Specialist for Goods Issue
  - EWM: Warehouse Specialist for Yard Management
  - EWM: Warehouse Worker
  - EWM: Physical Inventory Planner
  - EWM: Physical Inventory Counter

- EWM: Displaying Warehouse Information
- EWM: Labor Planner
- EWM: Warehouse Analyst
- EWM: Warehouse Specialist for Labor Management

- **Detailed design: business process #1–n**
  The purpose of this deliverable is to design, in detail, the to-be business process down to activity level (PL 3–5) and to describe gaps where the standard solution doesn't cover all required functionalities.
- **Detailed design: configuration and enhancements**
  The purpose of this deliverable is to specify and detail how to realize the solution, both core configuration and identified gaps, and core enhancements needed to complement standard functionality to fulfill business requirements. These RICEFW objects (reports, interface, conversion, enhancements, forms, and workflow) are based on process requirements and are specified in business process and solution design documents.
- **Legacy data migration**
  The purpose of the legacy data migration deliverables is to develop the designs, plans, and procedures to support the migration of legacy data during the implementation of the SAP EWM applications.
- **Legacy data archive**
  The purpose of the legacy data archive is to make legacy master data not considered currently active available for reference in a format compatible with the master data formats of the SAP EWM solution.
- **Technical solution design**
  The purpose of the technical solution design deliverable is to provide a detailed technical and integrated design of the solution to be implemented, accounting for all decisions made during the business blueprint phase, including business process definitions, integration with external systems, and physical server deployment.
- **User access and security**
  The purpose of this deliverable is to ensure proper set up of a R&A procedure and approach for the project.
- **Development environment (DEV)**
  The purpose of the development environment deliverable is to install a viable,

correctly configured technical development environment that is available for use by the project team to begin the realization phase.

- **Testing strategy**
  The purpose of this deliverable is to create a project-related test framework that gets content input from the existing test policy to build a central foundation around the taken approach (e.g., test approach and methodology, test standards and guidelines, test case development, defect management, reporting and analysis, roles and responsibilities) on functional testing (unit testing, string testing, integration testing, scenario testing, user acceptance testing, regression testing, etc.) and performance testing. The actual test strategy documentation for functional testing and performance testing has to be separated.

1.8.3 Realization

Realization is the longest phase in the ASAP methodology consuming around 75% of the budgeted project time in a typical SAP EWM project. The purpose of this phase is to implement all the business process requirements based on the business blueprint. The system configuration in standard ASAP is done in two work packages: baseline configuration (major scope) and final configuration (remaining scope). In an Agile ASAP project, the team splits the realization phase into multiple releases with a number of time-boxed iterations focused on building up the functionality. We'll focus on the Standard ASAP methodology and relate an SAP EWM implementation with the intent of meeting the following objectives in this phase:

- Establishment of the solution landscape
- Implementation of the final solution in the development environment
- Overall testing of the solution within the quality environment
- Release of the solution for production (live) operations
- Delivery of training materials
- Preparation for data migration and data archiving
- Identification of value delivery concepts
- Performance testing

The following deliverables are part of the realization phase:

- **Knowledge transfer**
  The purpose of the knowledge transfer deliverable is to ensure that key SAP EWM users get a good understanding of the solution being implemented.
- **Configured general settings and organizational structure**
  The purpose of the configured general settings and organizational structure deliverable is to complete and document the initial SAP EWM configuration of the system on the basis of the decisions made in the business blueprint phase.
- **Configured master data objects #1–n**
  The purpose of the configured master data objects 1–n deliverable is to configure the SAP EWM master data in the SAP software system according to the business process requirements specified in the business blueprint phase.
- **Core configuration and documentation: process #1–n**
  The purpose of the core configuration and documentation deliverable is to ensure that the SAP EWM configuration is implemented, tested, and documented.
- **Delta configuration: process #1–n**
  The purpose of the delta configuration deliverable is to ensure that the additional SAP EWM configurations are implemented, tested, and documented.
- **Enhancement development: RICEFW object #1–n**
  The purpose of this deliverable is to develop and test the SAP EWM RICEFW objects.
- **Business process procedures**
  The purpose of the business process procedures deliverable is to provide the basis for end-user training, end-user training documentation, and test case creation for SAP EWM. The procedures may also be used by security to develop roles and authorizations.
- **Value audits**
  The purpose of the value audit deliverable during the realization phase is to monitor and control the implementation of key process changes and value enablers, as well as to ensure the design and implementation of the value dashboard for key performance indicator (KPI) tracking purposes.

- **Scenario test #1–n**
  The purpose of this deliverable is to provide evidence that the scenarios designed can be supported by the solution implemented.
- **Quality assurance environment (QAS)**
  The purpose of the quality assurance infrastructure and environment design and setup deliverable is to install a viable, correctly configured technical SAP EWM QAS environment that is available for use by the project team to perform QA testing in the subsequent phases.
- **Preliminary cutover plan**
  The purpose of the preliminary cutover plan deliverable is to document the strategy, scope, and time lines for moving from the as-is solution to the to-be solution and the hyper care period immediately following go-live.
- **Legacy data migration**
  The purpose of the legacy data migration deliverable is to develop, implement, and test the data migration programs and processes defined in the business blueprint phase. This activity consists of iterative development and testing cycles focused on analysis of data, refinement of business rules, and deployment of migration programs and processes designed to move, cleanse, transform, and enrich legacy data required to support the various test cycles and ultimately the production cutover. The test cycles enable the migration team to improve data quality to an acceptable production level, develop a detailed cutover sequencing plan, and exercise data reconciliation and validation processes required to support the production cutover.
- **Approved user acceptance test**
  The purpose of this deliverable is to execute the user acceptance test (UAT). This is the last test cycle of an SAP EWM solution implementation and is an essential part of gaining end-user acceptance of the software system.
- **Warehouse data archiving**
  The purpose of the SAP EWM data archiving deliverable is to provide a method to check, remove, and store data that has completed its lifecycle within the solution. Data that meet the check criteria of data retention rules and are no longer actively used in the system can be archived and deleted. Storage of the data is a secondary process to enable data that has been archived and deleted to still be viewed and reported on even though the data are no longer stored on the transactional system.

- **Production environment (PRD)**
  The purpose of the production infrastructure and environment design and setup deliverable is to install a viable, correctly configured technical production environment to support productive operations of the delivered solution.
- **Failover environment**
  The purpose of this deliverable is to execute the setup of Availability and Continuity Management (ACM).
- **System and performance test**
  The purpose of the planned performance and system test is to check the entire system consisting of databases, application servers, frontends, printers, and so on. The performance test measures the throughput and response times of the system.
- **System user roles and authorization administration**
  The purpose of the system user roles and authorization administration deliverable is to establish effective operation processes for security.
- **Technical operations and handover plan**
  The purpose of the technical operations and handover strategy deliverable is to update and refine two prior deliverables from the business blueprint phase, and prepare a strategy to hand off operations of the solution landscape to the post-production support organization.
- **Technical integration check**
  The primary goal of the SAP EWM technical integration check is to identify technical integration issues related to the core business processes, the solution landscape, and the interfaces to SAP and non-SAP software systems.

1.8.4 Final Preparation

The purpose of the final preparation phase is to finalize readiness of the SAP EWM solution and its supporting tools and processes for production go-live. This includes, but isn't limited to, system tests, end-user training, system management, and cutover activities (including data migration). The phase deliverables also serve to enable the resolution of all crucial open issues. On successful completion of this phase, the business is ready to run the live SAP EWM system.

1.8.5 Go-Live and Support

The purpose of this phase is to provide support for the solution during the period immediately following production cutover. Exceptional items such as additional production support, exceptional business monitoring processes, and extraordinary technical support are planned and executed in this phase. At the end of the designated extra-care period, sustaining production support processes planned in final preparation and executed as part of go-live support become the core support for continuous improvement in the ongoing SAP EWM solution.

1.8.6 Run SAP EWM

Solution operations are initially set up during the implementation project. The primary goal of this phase is to further optimize and automate the operability of the SAP EWM solution. Operability is the ability to maintain SAP EWM systems in a functioning and operating condition, guaranteeing systems availability and required performance levels to support the execution of the enterprise's business operations.

1.9 Key Reference Points

Before we move on to the crux of this book, it's important to have a quick check of the must-know references that subsequent sections will refer to:

- **SAP Service Marketplace**
  SAP Service Marketplace provides support for business applications, analytics solutions and platform support, including software download, license key requests, customer messages, SAP Notes database, and so on. SAP Service Marketplace at *http://service.sap.com* is the master site that leads to the following subsites.
- **Release Notes**
  SAP release notes (*https://service.sap.com/releasenotes*) describe the new functions and changes in each SAP release. It's important for you to know what each release has to offer and whether a solution changed with a new release. For instance, if you're working on SAP EWM 9.2, and your organization intends to upgrade to SAP EWM 9.3, SAP release notes for SAP EWM will explain what's new.

- **Product Availability Matrix**
  Through the Product Availability Matrix (PAM) at *https://support.sap.com/release-upgrade-maintenance/pam.html*, SAP regularly publishes the following information about SAP software releases:
  - Release type (e.g., standard release, early adoption release, or custom development project release)
  - Planned availability
  - Maintenance durations
  - Upgrade paths
  - Platform availability, including database platforms and operating systems
- **Master Guides**
  This is probably the most important document for a consultant. The links to all the standard solution documentation provided by SAP are available at *https://service.sap.com/instguides*.
- **SAP Solution Explorer**
  The one-stop shop to explore SAP solutions by industry, line of business, or technology is available at *https://solutionexplorer.sap.com*.

1.10 SAP EWM on SAP HANA

SAP EWM is now released to run on an SAP HANA database. To run on SAP HANA, SAP EWM must be upgraded to at least version 9.1, and for database migration to SAP HANA, SAP advises that SAP EWM should be upgraded to 9.2. It's important to understand, however, that the release on the SAP HANA database doesn't imply any functional changes or functional enhancement to SAP EWM. All scenarios and all functions in SAP EWM can be used on SAP HANA in the same way as on any other supported database.

1.11 Summary

In this chapter we explained to you the SAP product pyramid, specifically designed for our readers. You should now be able to understand how SAP ERP is linked to other SAP solutions. You should also be able to understand the SAP SCM solution and its components and their first-level SAP ERP modules.