SAP EWM's organizational structure is set up in the master system, which is an SAP ERP system. We'll follow the sample organization structure illustrated in Figure 2.2 for explaining this concept.
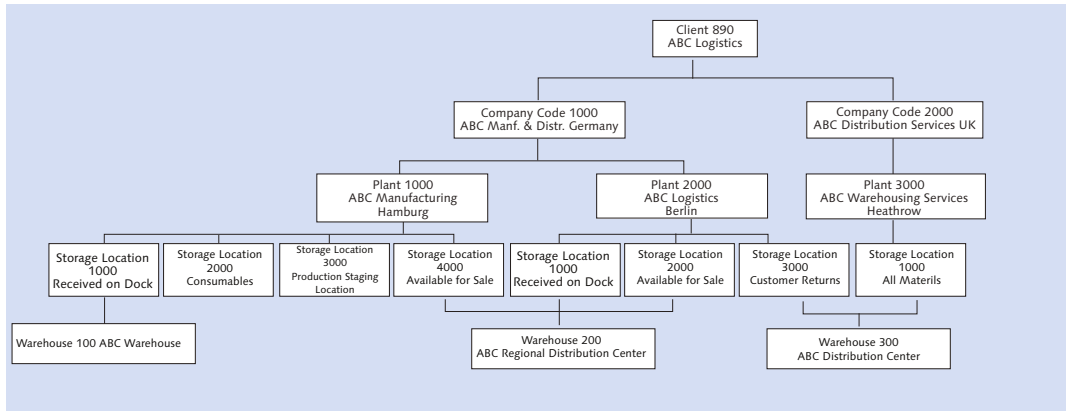

Figure 2.2 Organization of Enterprise in the SAP ERP System

The organization structure is in a pyramid shape, with the client at the top and the warehouse at the bottom of the hierarchy. Each organization has a varied composition of organizational elements in the structure.
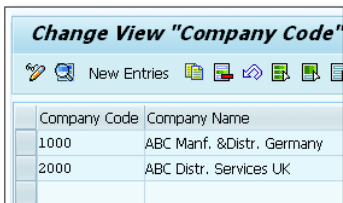
In the subsequent sections of this chapter, we'll explore elements of the organizational structure (for example: client, company code, etc.) which form the backbone of a functional SAP system.

2.1   Client

A client is a combination of legal, organizational, business, and administrative units that form a group for a common objective. In this example, a corporate group can be called the client, which groups the legal entities of an organization, business, or administrative unit within the group for a common objective defined by corporate. The client forms the basis for consolidation of financial reports representing the entire entity. Each client can have one or more company codes assigned to it. Figure 2.2 shows ABC Logistics as client (890).

2.2 Company Code

Next in the organizational structure hierarchy is the company code. A company code represents a subsidiary unit of the corporate; it's an independent accounting unit within a client that maintains a separate balance sheet and profit and loss statement for external reporting. There should be at least one company code for a client. Each business is obligated to prepare its financial statement in the pre-scribed format for its geographic location. This leads to a demarcation of the company code within an SAP organizational structure. In Figure 2.2, there are two company names—ABC Manufacturing & Distribution Co. in Germany and ABC Distribution Services in UK—representing company codes 1000 and 2000, respectively. Figure 2.3 illustrates the company code definition in an SAP system.

Figure 2.3 Company Code Definition in SAP ERP

The company code decision is made based on divisions within the business, loca-tions of business units, and various fiscal factors such as the financial calendar, currency, and so on. Company code data are generally set up in the system by SAP FI/CO consultants after detailed consultation and agreement with the finance department of the business. Company codes have a one-to-many relationship with plants.

To create a company code, you need to navigate via Transaction SPRO to the SAP ERP Implementation Guide (IMG). Use the menu path, ENTERPRISE STRUCTURE • DEFINITION • FINANCIAL ACCOUNTING • COPY, DELETE, CHECK & EDIT COMPANY CODE.
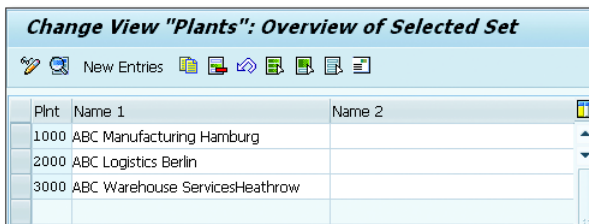
SAP provides the copy functionality to copy data from the default existing com-pany code. It facilitates copying all the tables and dependent entries to the new company code. This helps in speeding up the basic essential framework setup within the objects copied.

2.3   Plant

Next in the organizational structure is the plant. The plant is an operating unit within the company code where an entity further subdivides the enterprise based on the services it provides. The plant can be a manufacturing facility, distribution center, warehouse, co-pack (contract packer) facility, third-party facility, branch office, and so on. A company code can have multiple plants assigned to it. A single plant to multiple company codes relationship isn't practical. Various factors influence the decision on plant. The predominant factor is the plant used as an inventory valuation level. Stocks lying at each unit necessitate a separate plant code in SAP. These valuations roll up to the company code for financial reporting. Other influencing factors that dictate plant creation are the geographical presence of various units, type of business functions, third-party facility operated within the organization, representation of a logical plant, and so on. In Figure 2.2, shown earlier, there are two plants in SAP, 1000 ABC Manufacturing and 2000 ABC Logistics under company code 1000. Plant 3000 ABC Warehousing Services Heathrow appears under company code 2000.

To create a plant in an SAP ERP system, go to the IMG using Transaction SPRO. From there, navigate to the menu path, ENTERPRISE STRUCTURE • DEFINITION • LOGISTICS – GENERAL • DEFINE, COPY, DELETE, CHECK PLANT • DEFINE PLANT.

In an SAP system, plants are four-character alphanumeric texts as illustrated in Figure 2.4. The description can accommodate up to 25 characters.

Figure 2.4 Plant Definition in SAP ERP

To assign the plants to the relevant company codes, in the IMG, follow the menu path, ENTERPRISE STRUCTURE • ASSIGNMENT • LOGISTICS – GENERAL • ASSIGN PLANT TO COMPANY CODE.

In this process, you link a plant to a company code, which it needs to roll up the valuation for financial reporting.

2.4   Storage Location

The next organizational structure element under plant is the storage location, which is an organizational unit that allows for stock differentiation for the product stocks in the plant. Each plant represents at least one storage location in an organizational structure if the services provided are related to physical or logical inventory. Although the inventories are valued at the plant level, they are stored at the storage location level. The plant needs different storage locations for mapping the physical segregation accurately in the SAP ERP system. This segregation might be based on the type of stock, different buildings in the same compound, and so on. Figure 2.2, shown previously, represents four storage locations 1000, 2000, 3000, and 4000 under plant 1000; three storage locations 1000, 2000, and 3000 under plant 2000, and one storage location 1000 under plant 3000.

Business processes may enforce the need of having separate storage locations for each activity. For example, when a material is received from the vendor, there might be a mandatory inspection in a place as part of the business operating procedure. In this case, without a quality check and subsequent approval, stock can't be utilized for manufacturing. Therefore, stock needs to be posted to a location for quality inspection (QI). Once found satisfactory, material must be posted to the available-to-promise (ATP) location where stock can be promised as available.

Transfer of material between storage locations belonging to the same plant requires less documentation than when transferring material across plants. Transferring the material across plants requires a stock transfer order (STO) and valid statutory documentation per the governing law of the land.

To define storage locations in a plant as shown in Figure 2.5, navigate to ERP IMG • ENTERPRISE STRUCTURE • DEFINITION • MATERIALS MANAGEMENT • MAINTAIN STORAGE LOCATION.

In an SAP system, storage locations (SLoc) are 4-character-long alphanumeric texts. The storage location DESCRIPTION field can accommodate up to 16 characters.
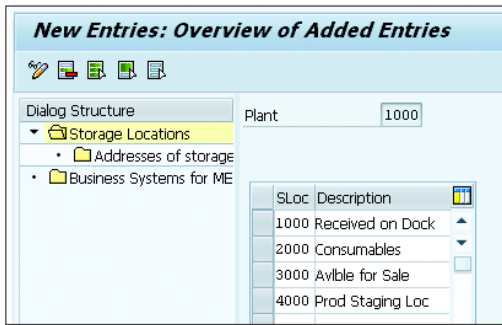
Figure 2.5 Storage Locations Definitions within the Plant

No separate step is required for assigning the storage location to the plant because the system forces you to input the plant number before the definition screen appears. A plant can have one or more storage locations, whereas the same storage location can't be shared among plants.

2.5 Warehouse

In this section, we will explain what it means for something to be a warehouse, how one is structured in an SAP system, and various configuration settings required to set up a functional warehouse.

2.5.1 Overview of Warehouse

A warehouse is a large commercial building where goods are stored before they are exported or distributed for sale. The process begins with the decision on which storage locations the customer wants to be warehouse managed. A business may want only a few storage locations to be warehouse managed and the rest of the storage locations to be inventory managed using MM.

Consider a business situation in which staging of raw materials is done at the inventory-managed level location, so that back flush can take place automatically at the time of goods receipt without any delay. In this situation, most likely, a business would not want to have a warehouse-managed location for raw material posting because this would become an arduous production process. Similarly, in certain industries, customer returns need to be scrapped, which doesn't obligate

the business to have a goods receipt in warehouse managed location. Thus, for simpler discarding of the product, returns can be received into an inventory-managed storage location.

It's important to understand the relationship between plant and storage location combinations with the warehouse and its benefits. Some key features to consider include the following:

- Multiple storage location of a plant can be assigned to a single warehouse.
- Multiple storage locations across various plants (plants belonging to one company code) can be assigned to a single warehouse.
- Multiple storage locations across various company codes can be assigned to a single warehouse.

A business might want to use a warehouse for multiple plants within the same company code or across company codes. When it's not obligatory to own an independent warehouse by plant, for better utilization of space and resource and other associated cost benefits, plants might share the same warehouse for its warehousing needs. This arrangement may lead to a better return on investment (ROI). A single high-volume warehouse helps achieve low storage costs per product, high inventory turnaround, and higher stock availability—all of which accrue huge benefits. Smaller shipments or less than a truckload can be tied together with other shipments on the same route to enable saving on transportation, as well.

When using WM as the WMS, we structure the warehouse within SAP ERP. So, we have the warehouse structure elements such as storage types, storage sections, and storage bins defined within the SAP ERP Customizing. Whereas in the decentralized SAP EWM scenario, the SAP ERP warehouse works as a replica and is linked to the SAP EWM warehouse, which is four-character warehouse existing in SAP EWM system. We'll discuss these settings later in Chapter 6. SAP EWM warehouses are structured in Customizing in the SAP EWM system, which we'll detail in Chapter 3.

2.5.2 Definition and Assignment of Warehouse-Specific Settings in SAP ERP

As a reader, you must be anticipating all along to start the warehouse management configuration, which initiates the integration between inventory management and warehouse management. We'll cover these in various sections of this chapter.

Let's start with the warehouse complex. A warehouse complex is represented in SAP ERP as a warehouse number, and all the warehouse processes such as picking and putaway are executed using this warehouse number. The warehouse number acts as a linking channel between SAP ERP and SAP EWM. The warehouse number doesn't have an address but a short descriptive text. This is unlike a storage location, which holds an address.

The warehouse number is a 3-character-long alphanumeric code in the SAP ERP system, and its description contains up to 25 characters.

> **Note**
>
> Plants belonging to different company codes may like to use the same warehouse for its storage and material flow needs. It's possible to map such a scenario in the SAP ERP/ SAP EWM.

To define a warehouse as illustrated in <u>Figure 2.6</u>, navigate to ERP IMG • Enterprise Structure • Definition • Logistics Execution • Define, Copy, Check Warehouse Number • Define Warehouse Number.
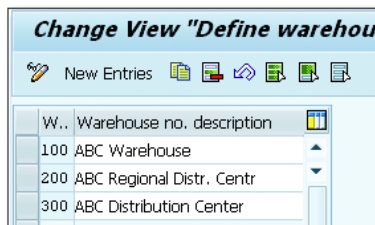
Figure 2.6 Warehouse Definition in SAP ERP

Within the system, assignment of warehouse number to plant and storage location combination in SAP ERP identifies which storage location is controlled by the WMS.

To assign the warehouse to the plant and storage location combination as shown in <u>Figure 2.7</u>, navigate to ERP IMG • Enterprise Structure • Assignment • Logistics Execution • Assign Warehouse Number to Plant/Storage Location.

Figure 2.7 Assignment of Warehouse to Plant and Storage Location Combinations

2.5.3   Maintaining SAP EWM Parameters in SAP ERP

Let's now discuss the SAP EWM parameters that need to be set for an SAP ERP warehouse. These parameters influence the way communication takes place between SAP ERP and SAP EWM systems. As illustrated in Figure 2.8, to set the parameters, navigate to ERP IMG • Logistics Execution • Extended Warehouse Management Integration • Basic Setup for EWM Connectivity • Maintain Extended WM-Specific Parameters.

Figure 2.8 Maintaining SAP EWM Parameters

After you assign the SAP ERP warehouse to a plant and storage location using the parameter Ext. WM, you can specify that the SAP ERP warehouse is actually SAP EWM managed. For this, you need to select ERP with EWM from the dropdown for this parameter. By this setting, you ensure that the system manages the warehouse stock with an SAP EWM system.

You can choose the communication method with which the SAP ERP system should converse with the SAP EWM system. In most cases, it's Queued and Serialized Asynchronous RFC (these recommendations are just that; situations vary for each individual organization).

Activating the distribution of unchecked deliveries (UD) to the SAP EWM managed warehouse would help in planning for the warehouse. Only SAP EWM can handle the unchecked deliveries.

Distribution mode (Dist. mode) helps you control the timing of distribution of transactional data or deliveries of documents to SAP EWM system. These deliveries are later processed in SAP EWM. You have the option of immediate distribution of documents to the SAP EWM system as soon as they are saved in SAP ERP. You also have the option of stopping the automatic distribution, in which case, distribution of deliveries will be taken care of separately.

The batch determination in SAP EWM indicator (BatchDetEW) helps in replication of batch search in SAP EWM because a batch search isn't optimal in SAP ERP. The GR fr. EWM Only indicator helps control whether the process of goods receipt from production or process order into an SAP EWM-managed warehouse can be started from both SAP ERP and SAP EWM or from SAP EWM only.

2.5.4   Distribution Model Generation

A distribution model facilitates the transfer of transactional data between central SAP ERP systems to one or more SAP EWM systems via queued remote function call (qRFC).

> **Note**
>
> The qRFC is an enhancement of the transactional RFC (tRFC) that also allows you to send and receive data in a fixed call order across systems.

Unless the model is created, no transactional data can flow through qRFC. Generating a distribution model is a one-time activity. The object/method combinations listed in Table 2.1 are generated between sender and receiver. These Business Application Programming Interfaces (BAPIs) are replicable business object types; they assist in copying the instance of an object type to one or more system.

Object	Method	Description
/SPE/LIKP	SAVEREPLICA	Duplication of deliveries
/SPE/LIKP	DELIVERYCHANGE	BAPI for change to outbound delivery

Table 2.1 Objects and Their Methods

Object	Method	Description
/SPE/LIKP	REQUESTCHANGES	Change request for delivery quantity reduction
BUS2015	SAVEREPLICA	Duplication of inbound deliveries
BUS2015	DELIVERYCHANGE	BAPI for change to inbound delivery

Table 2.1 Objects and Their Methods (Cont.)

☑ **Note**

Whenever the QA system is refreshed, you need to delete the distribution model and create a new one.

To generate a distribution model as shown in Figure 2.9, navigate to ERP IMG • Integration with Other SAP Components • Extended Warehouse Management • Basic Setting for EWM Linkage • Generate Distribution Model ERP => EWM.
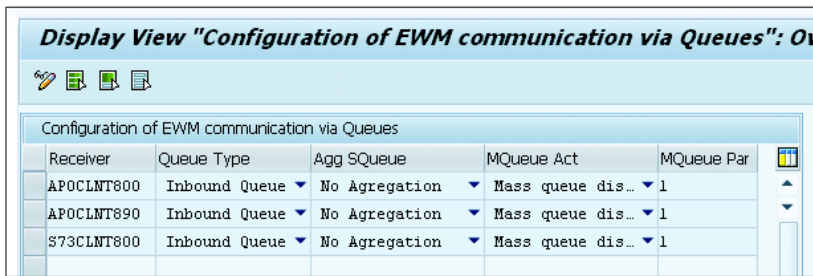
Figure 2.9 Distribution Model from SAP ERP to SAP EWM

Use the CREATE ENTRIES radio button to generate the distribution model. Use the CHECK ENTRIES radio button to check the existence of a distribution model that is already present.

2.5.5 Define Queue for Transfer to SAP EWM

Queues are used for temporary storage of data between the SAP ERP and SAP EWM systems. The queue type, inbound or outbound, determines whether queue processing is controlled by the sending or receiving system. Data transfer between SAP ERP and SAP EWM using qRFC necessitates this activity to be completed.

As shown in Figure 2.10, you can set the queue type for the specified target system by navigating to ERP IMG • Integration with Other SAP Components • Extended Warehouse Management • Basic Setting for EWM Linkage • Define Queue for Transfer to Extended WM.

Figure 2.10 SAP EWM Communication via Queues

2.5.6 Decentralized Warehouse Management System Integration

Decentralized WMS, as a standalone in SAP ERP system that is independent of a central SAP ERP system, is another option for decentralization. Multinational organizations that are spread across geographies with very high volume of data tend to opt for decentralized WMSs. When the transaction volume is phenomenally high, companies need to isolate the critical business functions via decentralized options to mitigate the risks associated with running on a single instance.

Decentralized WMS integration in the SAP ERP IMG is structured in such a way to configure and connect the decentralized WMS with the centralized SAP ERP system. These settings aren't required when you're setting up an SAP EWM warehouse.

As shown in Figure 2.11, decentralized WMS integration configurations can be performed in ECC IMG • Logistics Execution • Decentralized WMS Integration.
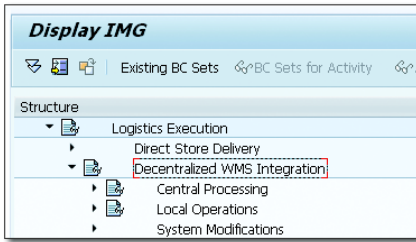
Figure 2.11 Decentralized WMS Integration Configuration

2.5.7   Assignment of a Decentralized SAP Supply Chain Management System

This important step shown in <u>Figure 2.12</u> shows how to link the warehouse numbers defined in the central SAP ERP system to the warehouse number of the decentralized SAP SCM system.

For assignment, navigate to ERP IMG • INTEGRATION WITH OTHER SAP COMPONENTS • EXTENDED WAREHOUSE MANAGEMENT • ASSIGN WAREHOUSE NUMBER TO WAREHOUSE NUMBER OF DECENTRALIZED SCM SYSTEM.
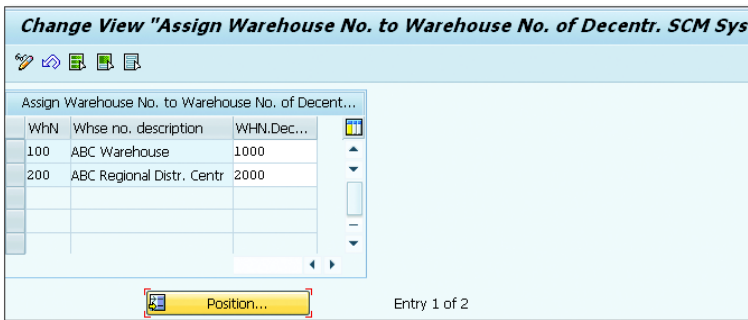
Figure 2.12 Assignment of SAP ERP Central System Warehouse Number to the Decentralized SAP SCM Warehouse Number
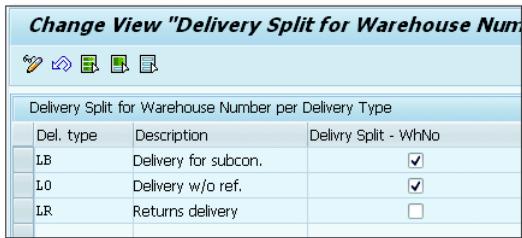
2.5.8   Delivery Split

Sometimes, a business needs to create deliveries in SAP ERP with more than one line item, for which goods issue should take place from warehouses on different systems. In such cases, it's critical that deliveries with appropriate line items reach their intended destination SAP EWM system. This is achieved by delivery split configurations.

The SAP ERP System allows delivery split at two levels:

▶ **Delivery split per delivery type**
To set the Delivery Split - WhNo indicator at the delivery type level as shown in Figure 2.13, navigate to ECC IMG • Logistic Execution • Shipping • Deliveries • Define Split Criteria for Deliveries • Delivery Split by Warehouse Number • Define Delivery Split per Delivery Type.

Figure 2.13 Delivery Split by Delivery Type

▶ **Delivery split per warehouse**
To set the Deliv.Split by Whse number indicator at warehouse number as shown in Figure 2.14, navigate to ECC IMG Logistic Execution • Shipping • Deliveries • Define Split Criteria for Deliveries • Delivery Split by Warehouse Number.

Figure 2.14 Delivery Split by Warehouse Number

When SAP EWM warehouses are on the same central instance of your SAP ERP system, you must ensure that no deliveries are created containing centrally managed items and SAP EWM-managed items in the same document. It's not recommended to do so. In the eventuality of such deliveries, they are neither distributed to SAP EWM nor completed in SAP ERP.

When delivery is split by warehouse number, deliveries within one warehouse are created automatically for specific warehouse numbers and delivery types. In the case of a delivery within one warehouse, either all storage locations of the delivery items must belong to one warehouse number, or they should have no warehouse number assigned to them. If this doesn't apply to the items of an order, then several deliveries are created automatically.

2.5.9 Warehouse Number Customizing

When customizing warehouse numbering, it's advisable to copy the warehouse numbering, especially because all the dependent table entries will be copied automatically. For certain objects, SAP provides copy functionality, and in such instances, it's wise to use it.

To copy the warehouse numbering as shown in Figure 2.15, navigate to the SAP EWM IMG menu path, Extended Warehouse Management • Cross-Process Settings • Copy Warehouse Number Customizing.
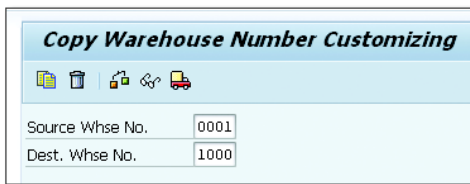

Figure 2.15 Copying Warehouse Number Customizing

2.5.10 Define and Assign the SAP EWM Warehouse Number

A warehouse complex is mapped as a warehouse number in SAP EWM. This is similar to the definition of a warehouse number in SAP ERP. In SAP EWM, the number of characters for the warehouse number is four, unlike in SAP ERP where it's three. A warehouse number in SAP EWM encapsulates the warehouse structure and executes all operations (e.g., stock removal and putaway) referencing the warehouse number.

You define and assign the SAP EWM warehouse number in the SAP EWM Customizing menu, Extended Warehouse Management • Master Data • Define Warehouse Numbers and Assign Warehouse Numbers (see Figure 2.16).

Figure 2.16 Define the Warehouse Number

2.5.11 SAP ERP and SAP EWM Warehouse Integration

For any two SAP logical systems to interact with each other and be able to communicate seamlessly, certain settings are required on both sides. This section explains the key settings required for an SAP ERP and an SAP EWM system to communicate with each other.

Mapping a Warehouse Number from SAP ERP to SAP EWM

After you've set up the SAP ERP warehouse and maintained the SAP EWM parameters, the next step is to link the SAP ERP warehouse code to the SAP EWM warehouse code. For this setting, navigate to EWM IMG • Extended Warehouse Management • Interfaces • ERP Integration • General Settings • Map Warehouse Numbers from ERP System to EWM.

Figure 2.17 Mapping an SAP ERP Warehouse Number to an SAP EWM Warehouse Number

Control for RFC Queue

Communication between applications of different systems in the SAP environment includes connections between SAP systems as well as between SAP systems and non-SAP systems. RFC is the standard SAP interface for communication between SAP systems. RFC calls a function to be executed in a remote system. In

essence, RFC is one of the mechanisms by which the SAP ERP and SAP EWM systems communicate to each other. There is now a whole series of different RFC variants, and each has different properties and is used for a specific purpose. The one relevant here is qRFC, as mentioned earlier. To guarantee that multiple logical units of work (LUWs) are processed in the order specified by the application, tRFC can be serialized using queues (inbound and outbound queues), which is why this type is called queued RFC, or qRFC.

In the configuration menu shown in Figure 2.18 , you define the queue types to be used for communication between SAP ERP and SAP EWM. You can define the aggregation level for individual queues because this will have an impact on the performance. Selecting the correct option here plays a part in the success of your system environment.

You can navigate via the SAP EWM IMG menu path, Extended Warehouse Management • Interfaces • ERP Integration • General Settings • Control for RFC Queue.

Figure 2.18 qRFC Configuration

Setting Control Parameters for SAP ERP Version Control

In the configuration menu shown in Figure 2.19 , you can influence the behavior of certain general functions with the connected SAP ERP system. Certain options aren't relevant for SAP ERP because not all SAP ERP versions have the interfaces that provide SAP EWM. You can access this via the SAP EWM IMG menu path, Extended Warehouse Management • Interfaces • ERP Integration • General Settings • Set Control Parameters for ERP Version Control.

Figure 2.19 Setting Control Parameters for SAP ERP Version Control

Assignment of Business Partners and Supply Chain Units to a Warehouse

The default settings maintained in this assignment are proposed during the course of warehouse processes, for example, the manual creation of a warehouse request. This is a one-time activity for each warehouse.

You maintain this setting in the SAP EWM IMG menu path, Extended Warehouse Management • Master Data • Assign Warehouse Numbers (see Figure 2.20).

Figure 2.20 Assignment of Business Partners and Supply Chain Units to a Warehouse

2.6   Summary

In this chapter, we discussed setting up the organizational structure in SAP ERP and SAP EWM systems. We also discussed linking these SAP ERP and SAP EWM warehouses, other important integration settings, and their hierarchical connection down the structure. While these form the basics to set up an organization structure relevant to SAP EWM, a very detailed analysis of the customer organization and warehouse structure should be carried out during the business blueprint exercise. It's not uncommon for an organization structure signoff during the