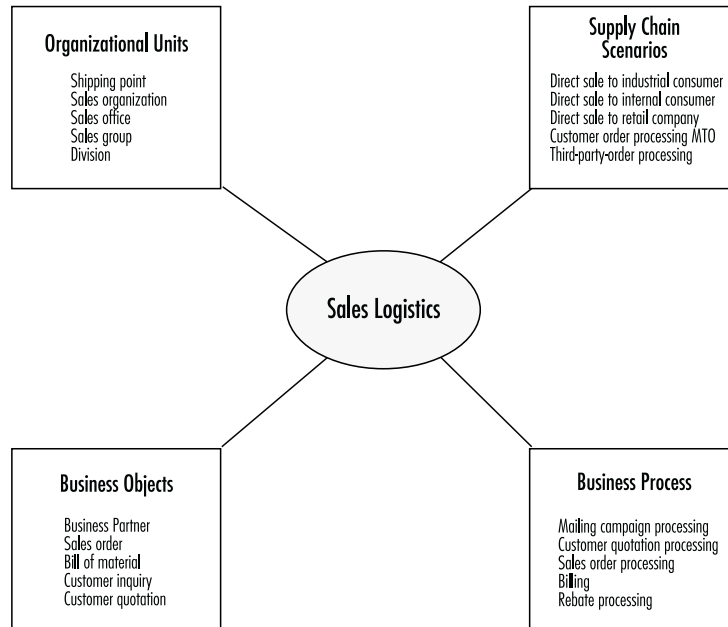




In the past, manufacturers controlled the marketplace by determining the price, quality, specifications, and delivery parameters of their products. Companies were organized as isolated departments, each dedicated to specific fulfillment functions along the value chain. Under a top-down, command-and-control philosophy, isolated departments optimized their own individual functions along the chain. This system rarely incorporated customer demands into the rigidly defined departmental structures. Rather, the system functioned by aligning customer expectations with the manufacturer's or distributor's structures and procedures. Today's customers demand that products be designed and built to their specifications and be delivered according to their terms. The isolated departmental approach simply will not work in the current environment of increased demands for product quality, massive product proliferation, and ever-shrinking lead times.

To meet these demands, companies are adopting the "customer-centric model," which unites the activities of the company around its customers' needs. They are engineering-efficient business processes to coordinate all activities that generate and satisfy customer demand. Optimal order management systems are also uniting customers with the company's internal operations (such as logistics, manufacturing, and accounting). The sales logistics business-process scenario in R/3™ allows users to so manage sales and distribution activities in an effective manner. The business processes include scenarios for sales, shipping, billing, sales support, and sales information. With real-time, online access to sales information, such tasks as order entry, delivery, and billing are all streamlined. In addition, sales and distribution can be integrated with procurement and production planning, improving turnaround time up and down the value chain.



► **Figure 5–1** Overview of scenario, process, organization, and business objects

The business-process scenarios in sales and distribution that we consider here are represented in the following activities: handling of standard orders, contracts and scheduling agreements, third-party orders, customer consignment stock, and others. This chapter offers a detailed overview of the standard order handling scenario, followed by a look at other main processes found in sales and distribution. Figure 5-1 illustrates the main sales logistics scenarios discussed in this chapter. Also included are the core processes, business objects, and organizational units that are part of the sales and distribution business process.

5.1 *STANDARD ORDER HANDLING SCENARIO*

In R/3™ parlance, a standard order is a document representing a one-time customer demand for products within standard delivery and accounting parameters. This scenario manages the following activities: 1) helping a customer decide what to buy; 2) processing customer orders; 3) coordinating delivery and related logistics; and 4) producing customer invoices. These are represented in Figure 5-2, which shows a general outline of how the standard order handling process

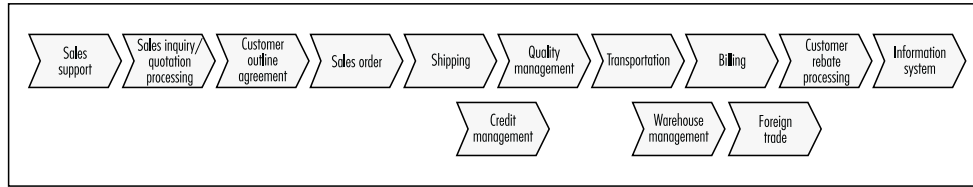


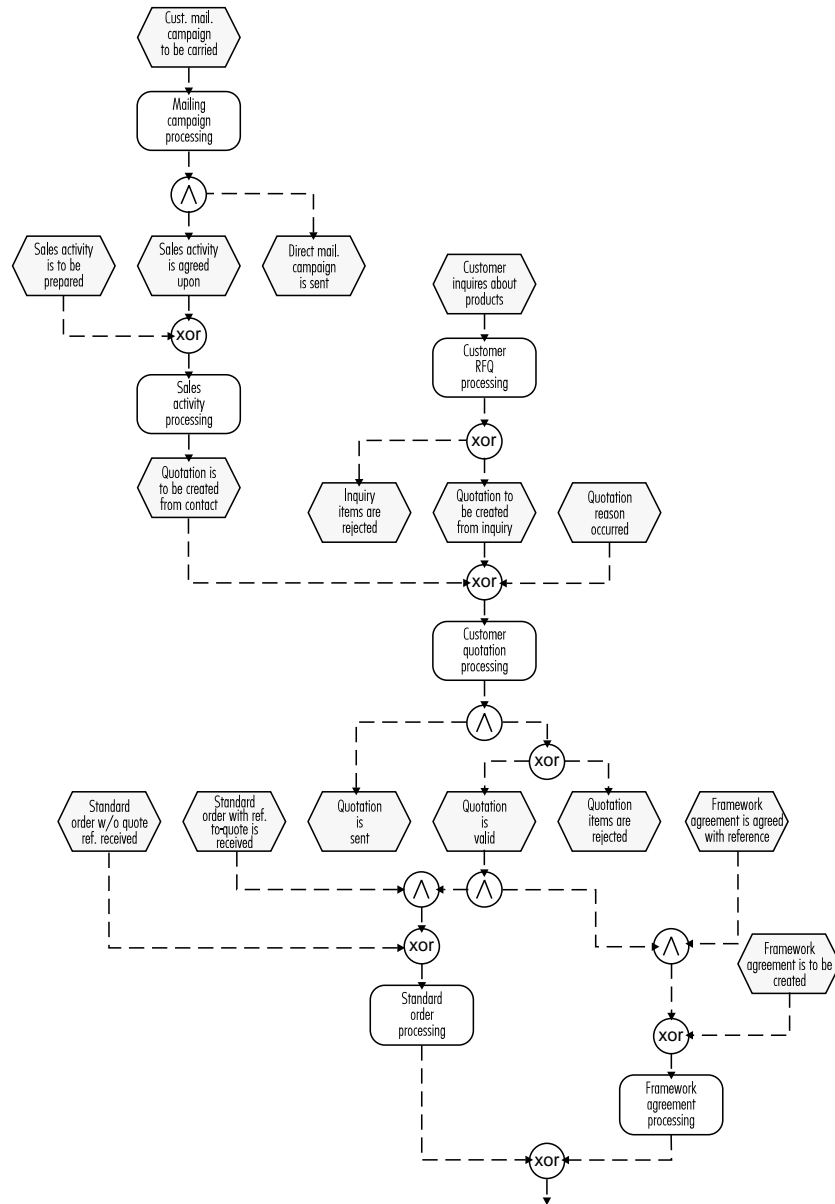
Figure 5-2 Value chain: Direct sale to an industrial customer

flows. First, the sales support helps acquire a prospective customer through some marketing channel. Next, the sales process creates various inquiries and ultimately processes the sales order. Credit management conducts credit limit checks, guarantees for open receivables, and generally oversees risk management. Shipping controls deliveries and issues goods. Warehouse management oversees stock placement and removal. Quality management provides the necessary controls for quality assurance, including inspections and checks of deliveries and returns. Transportation involves planning, shipping deadlines, means of transport, and assigning routes. If the shipment involves an international customer, then Foreign Trade tacks export control and declarations to authorities. And finally, billing may take the form of an invoice, credit/debit memo, and rebate processing.

An EPC model of this scenario is illustrated by Figures 5-3 through 5-5. Figure 5-3 shows this business-process scenario beginning by recording sales activities with customers, such as phone calls, meetings, and product presentations. Direct mail campaigns can be planned and monitored. As these activities result in customer inquiries, they are recorded in the system. A quotation, valid for a specified time period, is created on the basis of this inquiry.

After customer acceptance of the quotation, a standard sales order is processed. A standard sales order can also be processed directly from a customer without a quotation. The sales order documents the customer's demand, prices the order, and checks both customer credit and material availability. The sales order function in R/3™ utilizes a configurator to select configured products as well as a "conditions" program to manage complex pricing scenarios. The sales order process sends requirements to manufacturing (Figure 5-4).

This business-process scenario integrates order handling activities with the workflow of downstream delivery and logistics operations. Logistics operations include transportation planning as well as picking, packing, and shipping of products. The credit and material availability checks made during order entry are similarly available in this workflow. As goods leave the plant or warehouse, stock and value adjustments are made in the materials management system. To complete this scenario (Figure 5-5), invoices are processed and sent to custom-



► **Figure 5-3** Analyzing customer demand and creating an order

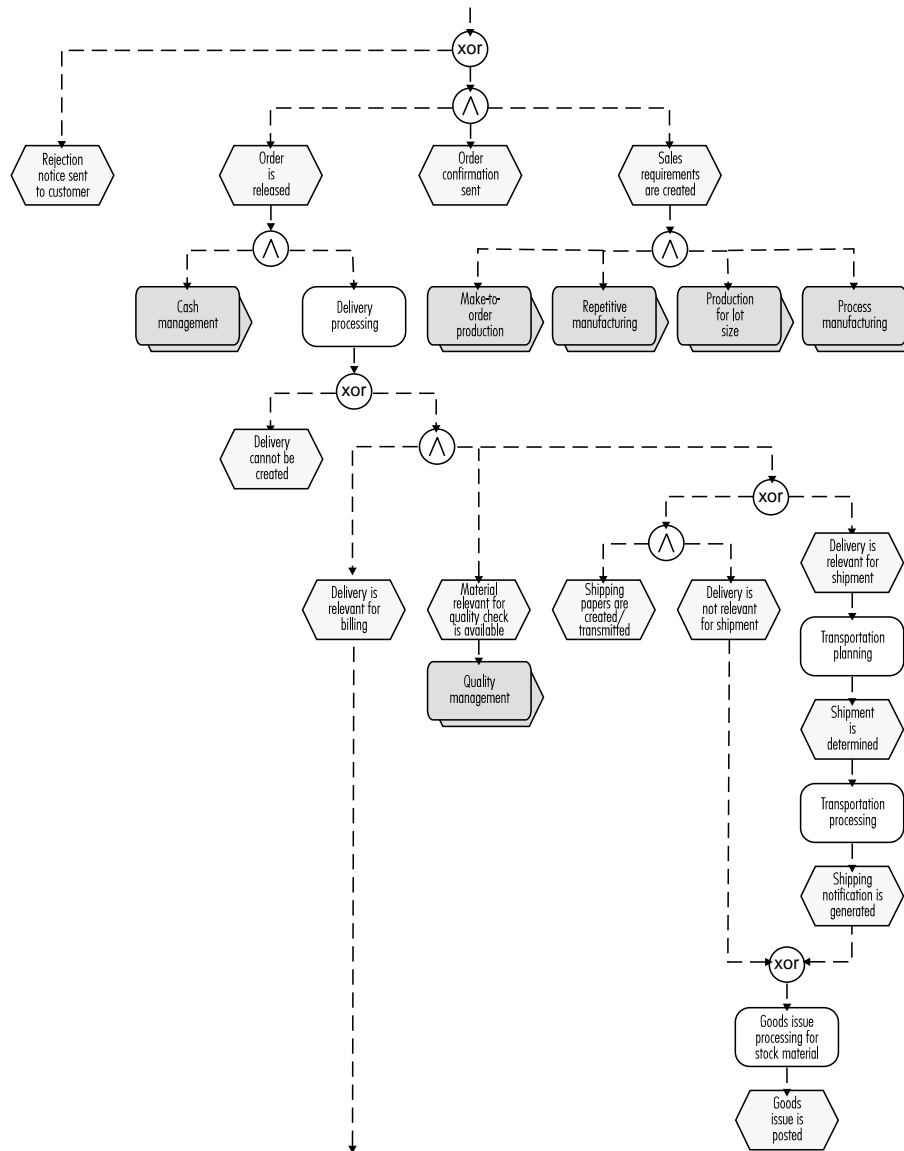
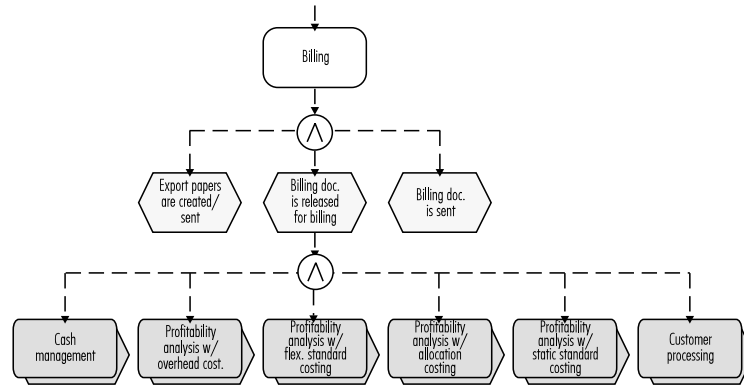


Figure 5-4 Delivery processing, transportation, and warehouse



► **Figure 5-5** Billing and finance

ers. The appropriate cash management, accounts receivable, and profitability systems are updated.

In the case of returned goods, for damage or other reasons, the system manages the receipt of these items and processes a credit memo. A subsequent free-of-charge delivery may be processed to replace the damaged goods. If company-owned packaging or shipping materials (e.g., pallets) are included in the original shipment, the system processes a pickup order to retrieve those materials. Damaged or lost packaging is charged to the customer.

Mailing Campaign Processing

We will now examine and link further the main tasks that comprise the standard order handling scenario as outlined in Figures 5-3 through 5-5. The first main task is mailing campaign processing. Direct mail campaigns can be created, using all of the sales information already stored in the system, such as the addresses of customers and prospective customers. Mailing campaign processing involves three events:

1. Determination of business partners: i.e., deciding which customers or prospective customers to target and making an address list
2. Initiation of correspondence: write sales letter, special offer, trade show invitation, etc.
3. Preparation of enclosures for the mailing campaign: create products sample, brochure or documentation

Once these tasks are accomplished, we can begin the mailing campaign.

Sales Activity Processing

Any kind of customer contact—a sales call, a telephone call, or sending a sales letter—is considered a sales activity. When stored as data, different kinds of sales activities can be valuable sources of information for employees in the sales department. Information about one sales activity (e.g., a direct mailing campaign) forms the basis for other sales activities (e.g., telemarketing calls).

Sales activity processing begins by determining what type of activity will take place (see Figure 5-3). Three options are possible:

- Personal—an in-person sales call
- Telephone—a phone sales call
- Written—a sales letter

One of these three kinds of sales activities will lead to the next task: determine business partners and/or a contact person. When we determine this information and enter it into the system, we can then record a description of the sales activity. For example, we may record a short comment about the activity, date and time of the activity, reason, outcome, analysis or status of the activity, and follow-up action. When the outcome of the sales activity is known, it can also be entered as data.

The outcome of sales activity leads to nine possible outcomes, some of which trigger other tasks:

- Unsuccessful sales activity
- Agreed-on follow-up sales activity
- Request for a quotation (RFQ) from the contact—triggers the task customer RFQ processing
- Quotation from the contact—triggers the task customer quotation processing
- Order from the contact—triggers the task standard order processing
- Credit or debit memo from the sales activity—triggers the task credit/debit memo request processing
- Return order from the sales activity—triggers the task returns processing
- Free-of-charge delivery from the sales activity—triggers the task free delivery processing
- Consignment sales order from the sales activity—triggers the task consignment fill-up order processing

All of the possible tasks that follow sales activity processing are included in the sales and distribution business-process scenario.

Customer RFQ Processing

As a result of the mailing campaign sales activity, a customer may inquire by mail or phone about such things as prices, terms of delivery, a description of the products, and so forth. The customer may also enter a RFQ from the company.

A quotation is an offer from a company to sell or deliver goods or services to a customer within a certain period of time and under certain conditions (prices, delivery times, terms of delivery, and material specifications). A quotation can be created with or without reference to a customer inquiry. For example, the company may want to let its customers know about a special offer or a new product. In this case, the quotation is created without reference to a customer inquiry. Alternatively, a quotation is created as a result of a customer inquiry. Inquiries and quotations provide important presales information that can be used to gauge market trends and help plan business strategies.

The task customer inquiry processing leads to two tasks: 1) determine customer inquiry business partner and 2) enter customer inquiry processing items.

These events lead to the next task: check inquiry item. Checking the inquiry item includes four possible events:

- Item is a make-to-order product.
- Item is kept in stock.
- Item is not kept in stock.
- Item is a material that can be configured.

If the last event is triggered—that is, if the item is a material that can be configured—the different parts of the material must be determined.

The next step is to edit the customer RFQ data by incorporating information from checking the inquiry item. Then, the final request for the quotation can be created. After the final request's creation, the next two steps in the chain are 1) monitor the request—because all quotations have a validity date, monitoring the request ensures that the inquiry or quotation is responded to quickly and within the relevant time period, and 2) check acceptance of the request.

The task check acceptance of the request is linked to two possible events: reject request and create quotation from the request. If the request is rejected for some reason, the request for quotation is canceled and the customer inquiry items are rejected (see Figure 5-3). If a quotation is created from the request, the next task in the chain, customer quotation processing, can begin.

Customer Quotation Processing

Both sales activity processing and customer RFQ processing are linked to the task customer quotation processing (see Figure 5-3). Under sales activity, a quotation is created from a contact. Under customer inquiry, a quotation is created because of a request. In both cases, we enter the quotation into the system, triggering the following events: 1) determination of the business partners of the quotation and 2) determination of quotation items.

Next, we ascertain the period for which the quotation is valid. This leads to the following possible steps: 1) check possible prices or taxes of item; and 2) check if item is in warehouse.

Checking the item's possible prices or taxes triggers these events: 1) item has different prices and taxes, or 2) item doesn't have different prices and taxes.

Checking the item for warehouse relevance then leads to these possible events:

- Item is a make-to-order product—two actions are possible. Consult controlling to find out how much it would cost to make the product; add that figure to the quoted prices and taxes. If the product is already in the warehouse, then determine a delivery date.
- Item is a material that cannot be configured—find out what variants of the product are available, then determine delivery date for the product.
- Determine if an availability check is required. If the goods are available, then the process can continue. If the goods are only partially available, then determine whether partial delivery is allowed.
- Item is in stock—triggers the tasks determining delivery dates and determining availability of goods.
- Item is not in stock.

After all the other tasks and related activities in the chain are completed, then we begin the task edit quotation. Editing the quotation involves entering all of the information gained about the quotation—prices, taxes, cost of custom order, delivery dates, availability of goods, determining variants, and so on—into the system. Next, the quotation is created.

Once we create the quotation and enter it into the system, three more tasks follow:

- Transfer quotation to sold-to parties
- Monitor quotation—watch to make sure that quotation is dealt with quickly and within the promised time frame
- Check validity of quotation

In the third case, check validity of quotation is the final step in customer quotation processing. If the quotation is invalid, it's rejected and the process stops. If the quotation is valid, the following four events can take place:

- Standard order processing
- Third-party order processing
- Customer contract processing
- Customer scheduling agreement processing

Standard Order Processing

When a buyer makes a sales order, he or she agrees to accept specified goods and services at specified prices and delivery dates from the seller. Sales orders can result from quotations. If an order does refer to a quotation, the quotation is binding when the validity period and terms of agreement are met.

Standard sales orders carry out normal sales transactions for a customer who orders goods. When a standard sales order is processed, the following tasks are carried out:

- Pricing
- Availability check (if this task is defined in the material master record)
- Transfer requirements to materials planning
- Shipping point and route determination
- Credit limit check

Standard order processing (see Figure 5-4) can begin when an order is placed, without connection to a quotation. In this case, the customer must be identified and then the order is entered into the system. Standard order processing is also, however, directly linked to sales activity processing and customer quotation processing:

- The sales activity processing link triggers the standard order processing when an order is created from a sales contact.
- The customer quotation processing link prompts standard order processing with a valid quotation or the placing of an order that stems from a quotation. In this case, an order arises from the quotation.

Once the order, wherever it came from, is entered into the system, the following tasks occur: 1) determine business partner, and 2) determine order items.

Next, the order must be checked for the following:

- Other prices or taxes—triggers the task carry out credit control
 - Batch relevance—triggers the task check warehouse
- Note: A batch is a subset of the total quantity of material held in stock. It's managed separately from other subsets of the same material. Examples of batches are different production lots (paints, dyes, wallpapers, pharmaceutical products), delivery lots, or quality grades of material.

Checking the warehouse leads to these possible events:

- Item is a make-to-order product—two actions are possible. Consult controlling to find out how much it would cost to make the product; add that figure to the quoted prices and taxes. If the product is already in the warehouse, then determine a delivery date.
- Item is a material that can be configured—find out what variants of the product are available. Then, determine delivery date for the product.
- Item is in stock—triggers the tasks determine shipping point, determine route of the order, determine and schedule shipping dates.
- Additionally, check the availability of the order items. If the item is only partially available, first see if partial delivery is acceptable to the customer. Acceptability of partial delivery or full availability of the items triggers the task create sales requirement.
- Item is not in stock.

After all the other tasks and related activities in the chain are completed, then we initiate the task edit order.

Once they're created, the sales requirements either prompt demand management in the area of production planning or, more likely, credit control in financial accounting.

After credit control occurs, one of three tasks is possible: 1) accept order, 2) block order, or 3) refuse order.

If the order is accepted, the next step is to edit text (i.e., make changes) in the system. If the order is blocked, it must first go back to credit control before the task, edit text, can take place. If the order is refused, the customer must be told and the items on order canceled.

When orders are accepted or, for some reason, blocked, the next step is to create a standard order. Four possible actions could follow:

- Transfer order to sold-to parties
- Change or edit the blocked order

- Monitor the order
- Cancel the order

If the blocked order is edited and finally released, the task delivery processing can begin.

BUSINESS OBJECT

► Sales Order

In today's business environment a sales order can range from a standard document or form, electronic mail, or an XML document processed over the Internet. Whenever a business transaction takes place between two parties the information in the transaction has to be contained in a sales order business object. This business object contains all the information in the SAP™ system relating to a sales order. The data represents the contractual arrangement between a sales organization and a sold-to party (customer) concerning goods to be delivered or services to be rendered. A sales order contains information about prices, quantities and dates. The request is received by a sales area, which is then responsible for fulfilling the order.

The business object sales order is used as a source of information for the following types of business analysis.

Report Subject	Information Delivery
Customer	Summarizes the order quantities and values resulting from business transactions with customers
Customer analysis	Lists breakdown statistics of customer, including period, sales organization, distribution channel and division, customer, and equipment
Product allocations	Used for long- and medium-term planning of sales, production, purchasing, inventory, management, etc.
Salesperson	Contains a list of the key fields and ratios that measure the performance of sales employees
Sales material	Summarizes the order quantities and values for articles or products (material) resulting from transactions with business partners
Sales office	Contains the ordering activities and customer transactions by sales office and sales group

Report Subject	Information Delivery
Sales order list	Retrieves detailed information about specific sales orders
Sales organization	Summarizes the ordering activities and customer transactions by sales organization

Delivery Processing

Several different tasks in both sales and procurement logistics can set off delivery processing. These include: standard order processing, customer contract call processing, free delivery processing, subsequent delivery processing free-of-charge, consignment fill-up order processing, consignment issue processing, returnable packaging issue processing, customer schedule agreement processing, and purchase order processing for stock transfer. It's also possible that the process begins without any reference to an order.

Standard order processing prompts delivery processing once an order is released (see Figure 5-4). The first task is to monitor the delivery date. Two events may follow: 1) delivery date takes place, or 2) delivery date doesn't take place.

When the delivery date does take place, the next task is to choose the kind of delivery. This choice involves four possibilities:

- Create without reference to an order
- Create from an individual sales order
- Create from delivery-due list (a work list made up of all sales orders and scheduling agreements that are due within a specified period of time)
- Create from stock transport order

The first choice leads to the task determine delivery items. The second choice prompts: open delivery from sales order. The third choice leads to: edit delivery due list. And the fourth choice is followed by: open delivery from stock transport order.

All of these four tasks lead to the next step: open delivery. Once opened, the following task is: carry out credit control. This task connects to finance. One of two things may now happen: credit requirements are fulfilled, or delivery can't be created.

If credit control is successful, a series of tasks follow: determine or transfer delivery route, determine serial numbers of delivery item, and, finally, check

delivery items. Checking the delivery items triggers one of two events: 1) item is not in stock, or 2) item is in stock.

If the item is in stock, the next task is to determine the picking location. This leads to checking to see if the item is handled in batches or not. Three possible events follow:

- Item is handled in batches.
- Item is not handled in batches.
- Warehouse management determines delivery batch.

When the item is not batch handled, the next steps are to choose a batch and to check if batch splits are allowable. Batch splitting designates transferring a certain amount of one batch to another. These tasks lead to: determine delivery batch. Now another task in the chain can begin: check availability of delivery item. Here, two possible outcomes exist: 1) delivery items are available, or 2) delivery items are partially available.

If the items are only partially available, the next task is to see if partial delivery is allowed. This leads to: 1) correct the delivery quantity, and 2) reject the delivery item.

If the items are available or partial delivery is allowed, the following task occurs: check out use of warehouse management during picking. This task involves either picking with warehouse management or picking without warehouse management.

Picking with warehouse management involves no other tasks. Picking without warehouse management involves creating a picking list and then carrying out the picking without the help of warehouse management. Picking leads to two events: 1) delivery items are completely picked, or 2) delivery items are partially picked.

After complete picking of items, packing can take place. However, if not all of the items are picked, the results must be edited in the system. This is followed by two activities: 1) create partial delivery, or 2) create full delivery by picking again.

One task follows picking delivery items: pack delivery items. Once done, delivery information is edited, and then a delivery is created. This task triggers seven possible outcomes in sales and distribution (SD) or materials management (MM):

1. Create or transmit shipping papers (SD).
2. Check to see if billing is relevant (SD).
3. Goods issue processing for stock material (MM).
4. Batch goods issue processing (MM).
5. Consignment goods issue processing (MM).

6. Create stock transport order (SD).
7. Release scheduling agreement (SD).

It's also possible to monitor only the delivery without performing any of these tasks.

The second, third, fourth, and fifth events all lead to the task of billing in sales and distribution. In the case of the sixth event, create stock transport order, the next step is to update the order. In the seventh event, release scheduling agreement, the subsequent task is to adapt the agreement quantity.

Goods Issue Processing for Stock Material

In this segment of the logistical chain, goods issue processing for stock material comes after delivery processing in sales and distribution, as shown in Figure 5-4.

Credit control follows, with two possibilities: Either the credit limit is sufficient, or it is not. If there is enough credit, the process continues. Two options follow: post goods issue or select valuation type. If the goods issue is posted, links to project system and sales and distribution occur in the form of project update, delivery processing, local shipping, or printing of goods receipt slip.

It's also possible that warehouse management will remove the goods from storage. This leads to goods issue/removal from storage processing. Another possibility is that the warehouse isn't maintained by warehouse management. In this case, the material is simply issued.

Billing

One of the last tasks in the sales and distribution chain, billing, can be the result of several different sales and distribution functions, from delivery and returns to rebate settlement and third-party order. There is also a link to human resources when any kind of work is performed and later must be paid for. Whatever spurs billing on, the first task is to choose the type of invoice. This activity can include creating the invoice from a single document or from a billing due list. Once either is accomplished, a billing document is created.

The next task is to determine or transfer the billing prices and taxes. Two events may follow: a pro forma invoice and a billing document relevant to accounting. Here, it's possible the billing document is transmitted and then transferred, which leads to the function of project update in project system. Other tasks in other areas may also take place.

The invoice may just be monitored. It may also be checked to see if it has any connection to a volume-based rebate. Finally, controlling may take over the doc-

ument for its profitability analysis, or finance may use the document for customer invoice processing.

Billing tasks and possibilities are shown in Figure 5-5.

5.2 *CONTRACT HANDLING AND SCHEDULING AGREEMENTS*

The sales logistics chain includes business-process scenarios for the increasingly more complex area of contract handling and scheduling agreements. Businesses require ever-increasing levels of quality and responsiveness from a decreasing number of suppliers with whom they contract. Suppliers require systems that ensure compliance with customer contracts and delivery arrangements. Moreover, customers require that suppliers measure their own performance against these contractual arrangements.

Traditional systems use individual sales orders to manage customer demands, downstream logistics, and accounting activities. An order-based approach assumes that customer demands arrive at the supplier individually, but this is often not the case. The internal mechanisms used by suppliers to fulfill customer demands must support the actual business processes used by each customer.

Sales and Distribution outline agreements scenarios are used to record arrangements with customers to deliver specific quantities or values of goods or services within a predefined time period. The terms specified in the contract can be used as the basis for a scheduling agreement. The scheduling agreement allows you to determine specific delivery quantities and dates within a certain validity period. These scenarios differ in the way customers can specify delivery quantities and dates but are similar in coordinating delivery, logistics, and in producing customer invoices.

In R/3™ Release 4.0, business process scenarios for contract handling and scheduling agreement include:

- Customer scheduling agreement handling
- External service agents in customer scheduling agreement
- Customer scheduling agreement handling with delivery order

As with standard order handling, the scenarios for contract handling and scheduling agreements begin by recording sales activities with customers, such as phone calls, meetings, and product presentations. Direct mail campaigns can be planned and monitored. As these activities result in customer inquiries, they are recorded in the system. A quotation, valid for a specified time period, is created on the basis of this inquiry.

After customer acceptance of the quotation, an outline agreement is processed. An outline agreement can also be processed directly from a customer without a quotation. There are three scenarios for processing outline agreements in the R/3™ system:

- Contract handling
- Schedule agreements without release orders
- Schedule agreements with release orders

Contracts specify products and prices but do not include specific quantities or delivery dates. A contract documents terms and conditions controlling subsequent deliveries such as freight, (e.g., FOB delivered) or payment conditions (e.g., net 30 days). A contract may also specify the maximum value of all goods to be shipped. When a customer requests shipment, a release order is processed against the contract. This order is managed similarly to standard order handling, with credit checking, pricing, and use of the R/3™ configurator as well as document printing and subsequent delivery. The products, quantities, and values from each release order are updated on the contract.

Scheduling agreements contain specific products, quantities, and delivery dates. Each line item (individual product) on a scheduling agreement is broken down into delivery requests (subitems). Each delivery is specified by date, week, or month. For standard orders, subsequent delivery and logistics handling are triggered by order line items as each item is associated with one delivery date. In this case, the subsequent delivery and logistics are triggered by each schedule subitem. The processing of scheduling agreements uses the full functionality of standard orders, including checking of both credit and material availability as well as pricing and delivery scheduling.

In the scheduling agreement with release order scenario, deliveries are “held” by the system as unscheduled quantities until the customer requests shipment. This request is processed by a schedule release order. The release order creates a new delivery subitem with the required quantity and date as it concurrently subtracts the unscheduled quantity.

These scenarios integrate customer management activities with the workflow associated with downstream delivery and logistics operations. Logistics operations include transportation planning, as well as picking, packing, and shipping of products. The credit and material availability checks made during order entry are similarly available in this workflow. As goods leave the plant or warehouse, stock and value adjustments are made in the materials management system. To complete this scenario, invoices are processed and sent to customers. The appropriate cash management, accounts receivable, and profitability systems are updated.

In the case of returned goods, for damage or other reasons, the system manages the receipt of these items and processes a credit memo. A subsequent free-of-charge delivery may be processed to replace the damaged goods. If company-owned packaging or shipping materials (e.g., pallets) were included in the original shipment, the system processes a pickup order to retrieve those materials. Damaged or lost packaging is charged to the customer.

5.3 *THIRD-PARTY ORDER HANDLING*

Third-party sales arrangements leverage the relationship between a company and its customers. By managing customer service activities and related accounts receivable functions, an existing infrastructure is utilized to provide a flow of services and products to a customer even when they are not normally sold, stocked, or manufactured by the company. To realize the potential from this type of transaction, however, the systems used for managing the process should be transparent to the customer and streamline costs of fulfillment.

In a third-party sale, a company does not deliver its own products to a customer; rather, it commissions an external supplier to deliver its goods directly to the customer. In addition to processing a sales order, a company must coordinate the customer sale with a purchase from the supplier.

The R/3™ Release 4.0 business-process scenario for third-party handling is represented by the third-party order processing scenario. Just as with standard orders, the third-party scenario begins by recording sales activities with customers, such as phone calls, meetings, and product presentations. Direct mail campaigns can be planned and monitored. As these activities result in customer inquiries, they are recorded in the system. A quotation, valid for a specified time period, is created on the basis of this inquiry.

After customer acceptance of the quotation, a third-party order is processed. A third-party order can also be processed directly from a customer without a quotation. The order documents the customer demand, carries out pricing, and initiates credit checking.

The system creates a purchase requisition detailing the products, quantities, and delivery dates. This purchase requisition is associated with known sources of supply (e.g., purchase contracts or specific vendors), or vendor bids can be processed via RFQs. In either case, a special type of purchase order, a third-party purchase order, is processed and sent to the supplier. This purchase order directs the supplier to ship the products directly to the “ship-to address” identified on the original customer order.

As soon as the delivery to the customer has been completed and the invoice of the supplier processed, billing is carried out for the third-party order. The

shipped quantity on the vendor invoice is automatically copied to the billing document sent to the customer. Additional activities in this scenario include customer credit and debit memos and the processing of special vendor arrangements such as volume-based rebates and bonuses.

5.4 *CUSTOMER CONSIGNMENT STOCK HANDLING*

In a traditional vendor/customer transaction, transfer of ownership of inventory occurs with the physical flow of that inventory. Most inventory systems handle this adequately because the accounting of inventory simply mirrors the movement of product. However, a manufacturer may stock spare parts inventory at a customer site to enhance maintenance response time. Or, a manufacturer might not want to pay for an expensive item until it is used in production. To avoid delays in production resulting from a materials shortage, the customer might ask the vendor to stock the material at the customer's facility.

As trading partners work together to increase the overall responsiveness of the supply chain, these types of arrangements are becoming commonplace. Customers try to push the financial burden of maintaining inventories to upstream suppliers and increasingly negotiate for "point-of-use" payment schemes. Customers still maintain the same safety stocks—only now the supplier will "own" the inventory until the customer uses it in production or resells it. To safely and responsively accommodate these practices, a company is required to process the flow of goods in and out of customer-consigned inventories as easily as it processes standard customer orders.

Customer-consigned goods are items stored on the customer's premises for eventual use and/or sale but still owned by the company. When the customer notifies the company that the goods have been issued from the designated consignment inventory, ownership is transferred to the customer, a customer invoice is produced, and the corresponding accounts receivable entry is made. Goods not issued can be returned to the company.

In the R/3™ system, inventoried items are identified in the material master file. Any item can be transferred to a customer location as consigned stock where it is tracked with a "special stock" designation assigned to each customer. Because the same item may be sent to several customers, it is possible to have multiple consignment stocks of the same material—one for each customer. For each customer-specific stock, a moving average price is maintained. This price is used for valuing each issuance (i.e., sale) to that customer.

In R/3™ Release 4.0, the consignment handling business process is represented in the scenario direct sale to the consignment receiver. The scenario begins by recording sales activities with customers, such as phone calls, meet-

ings, and product presentations. Direct mail campaigns can be planned and monitored. In this scenario, customers' demand for product is fulfilled directly from a consigned inventory at their own site. As these stocks are drawn down, the customer may request additional goods. This request is processed with a special type of sales order, a consignment fill-up order. As with a standard order, a consignment fill-up order carries out pricing, initiates credit checking, and determines material availability. The sales order function in R/3™ uses a configurator to select configured products as well as a "conditions" program to manage complex pricing scenarios. The sales order process sends requirements to manufacturing.

This scenario integrates order handling activities with the workflow of downstream delivery and logistics operations. Logistics operations include transportation planning, as well as picking, packing, and shipping of products. The credit and material availability checks made during order entry are similarly available in this workflow. When goods leave the plant or warehouse, stock is transferred to a customer "special stock" inventory location.

Customers notify the company when goods have been issued from the consignment inventory, and a consignment issues transaction is posted. Invoices are processed and sent to customers. The appropriate cash management, accounts receivable, and profitability systems are updated.

Customers may request the company to pick up unwanted or excess goods in the consigned inventory. This request results in the processing of a pickup order with the goods then returned to standard company inventory. Again, in the case of returned goods, for damage or other reasons, the system manages the receipt of these items and processes a credit memo.

5.5 *CASH ORDER HANDLING*

Order management systems used in the industrial sectors (e.g., by wholesale distributors and manufacturers) divide the order fulfillment process into discrete functions: order taking, credit management, logistics handling, invoicing, and accounts receivable. This breakdown of work corresponds to a standard mode of doing business whereby suppliers receive orders from their customers and use an invoicing and accounts receivable mechanism for handling the financial aspects of the sale.

In an over-the-counter scenario, however, the customer-supplier interaction is different. To begin with, the supplier expects to get paid without going through a traditional accounts receivable cycle (invoice, statement, payment). Second, the customer expects to receive the requested goods immediately.

Cash orders are used to process sales where customers pick up and pay for products at the same time.

This scenario begins when a customer arrives at the company to buy goods for cash. A special order type, a cash order, is used to record the transaction. The total amount of cash received from the customer is entered on the order along with the desired products. The requested goods are issued from inventory and given to the customer. A copy of the order is given to the customer as a receipt, and the invoice is printed and mailed to the customer at a later date.

If customers return damaged goods, the system processes the receipt of these items and produces a credit memo. Optionally, a subsequent free-of-charge delivery can be processed to replace the damaged goods.

5.6 *RUSH ORDER HANDLING*

R/3™ processes each stage of the sales fulfillment cycle with a different document. Examples include quotations, inquiries, sales orders, deliveries, and billing documents. Each document contains information for processing the relevant business transaction. Delivery documents are normally created subsequent to the sales order document and initiate the logistics and delivery process. In the case of a “rush order,” the delivery document and sales order can be created at the same time. All sales and shipping functions, such as availability check and delivery scheduling, are carried out for both documents at the same time.

As with standard order handling, the rush order handling scenario begins by recording sales activities with customers, such as phone call, meetings, and product presentations. Direct mail campaigns can be planned and monitored. As these activities result in customer inquiries, they are recorded in the system. A quotation, valid for a specified time period, is created on the basis of this inquiry.

After customer acceptance of the quotation, an order is processed. An order can also be processed directly from a customer without a quotation. If the customer requires immediate delivery, a special type of order, a rush order, is used to process the transaction. As with standard orders, rush orders carry out pricing and perform credit checking. The sales order function in R/3™ uses a configurator to select configured products as well as a “conditions” program to manage complex pricing scenarios.

With standard orders, the delivery document is created subsequent to the sales order. In this case, the system creates the sales order document and the delivery document at the same time, and the workflow associated with delivery can begin immediately.

The delivery and logistics workflow includes transportation planning as well as picking, packing, and shipping of products. When goods leave the plant or

warehouse, stock and value adjustments are made in the materials management system. To complete the usual flow of this scenario, invoices are processed and sent to customers and the appropriate cash management, accounts receivable, and profitability systems are updated. In the case of returned goods, for damage or other reasons, the system manages the receipt of these items and processes a credit memo.

5.7 *MAKE-TO-ORDER SALES ORDER HANDLING*

In the make-to-order sales order handling scenario, a sales order taken in SD that is not covered by finished goods stock in the warehouse leads to the sales-order-based processing of a product. Generally, more than one manufacturing level is involved, and a subset of the components is not covered by warehouse stock but is instead specially manufactured or procured for this sales order.

Production can start directly from sales and distribution, or it can be triggered after requirements planning has been carried out through conversion of a planned order.

Sales-order-based processing distinguishes between the following types of products:

- Nonvariant products
- Single-level products with variants, without order Bill of Materials (BOMs)
- Multilevel products with variants, with or without order BOMs

A nonvariant product is defined uniquely with a material number and is described by a single-level BOM or by a variant of a multiple BOM. In this case, you usually want to start production without having to offset the product's requirements with planning. You can, however, plan single-level BOMs neutrally and offset them using dependent requirements. Sales order processing is no different in this case than it is for other uniquely defined products.

Products with variants, on the other hand, require additional information and master data, such as:

- Characteristics and values
- Classes and object dependencies
- Configuration profiles
- Variant conditions for pricing (optional)
- BOMs and routings with selectable items and operations

In this case, each product is configured to match the customer's needs. To achieve this, the system, using classification criteria, performs a valuation in the sales order. Then, during the subsequent production process, it uses a stored set of rules to select assemblies from a proposed super-BOM. This method of defining a product is interesting particularly when you have complex products with a high number of variants.

This process is also suitable for products that can be described in detail using characteristics with reference to a sales order. In exceptional cases, a variant configured in the sales order can be used as the basis for additional modifications in production just to meet this one customer need. This is known as an order BOM. Order BOMs can only be triggered directly from the sales order. Once the sales order has been posted, they must be processed and adjusted.

5.8 *ASSEMBLY-TO-ORDER SALES ORDER HANDLING*

The assembly-to-order sales order handling scenario differs from the make-to-order sales order processing scenario as follows:

- The product's components have already been produced and are available in the warehouse.
- Production proceeds in a single step.
- This process is also suitable for products that can be described in detail using characteristics with reference to a sales order.

5.9 *EMPTYES AND RETURNABLE PACKAGING HANDLING*

Returnable packaging consists of items that sit in the customer's warehouse but are still the property of your company. Customers are not required to pay for returnable packaging unless it is not returned to your company by a certain date. So this function lets you handle the settlement or return of Euro pallets or empties, for example. You can also handle the sale of returnable packaging to a third party this way. Because stocks of returnable packaging are still part of your valued inventory, you must manage them in your system.

The following conditions apply:

- You must manage returnable packaging stock separately from the rest of your stock so that you can maintain an overview of what the customer has in his warehouse.

- You must manage returnable packaging stock separately for each customer.
- Processing empties and returnable packaging consists of the following separate business processes:
 - Shipment of returnable packaging—returnable packaging is recorded as a separate item in a regular order and shipped to the customer.
 - Pickup of returnable packaging—picking up returnable packaging is handled with a special order.
 - Charges for packaging not returned

Returnable packaging can be billed to the customer if he wants to keep it or if he has damaged it.

5.10 *RETURNS HANDLING*

This scenario describes returns handling, which can be initiated by the customer or by the external sales force. Causes for returns can include, for example, defective goods, deliveries in error, purchase orders in error, and returns received before the return deadline has expired in the case of a purchase on spec.

Returns can be recorded as part of a customer contact, for example, a phone call. This information then becomes the basis for subsequent returns processing.

When a recall must be carried out as part of Quality Assurance as a result of product deficiencies, a direct mail campaign can be used to notify affected customers. Various situations can arise during returns processing:

- A return is created to handle the process. When the returned goods are received in the warehouse, a returns delivery is created that references this return. The goods issue that is posted for the returns delivery records the receipt of the goods into your stock.
- After the goods receipt, there is a returns check, in which the eligibility of the complaint is checked, and a usage decision is made for the goods (e.g., reprocess, scrap).
- If the customer wants to have the corresponding amount refunded, a credit memo request can be created with reference to the return. When the credit memo request has been approved, a credit memo is generated for the customer.
- If the customer wants the goods to be replaced, a subsequent delivery free of charge is created with reference to the return.

5.11 *DECENTRALIZED SHIPPING*

Most companies have realized that high levels of customer response cannot be achieved without tightly integrating their logistics, inventory, and order management functions. Software that can unite these functions around a centralized database has been the standard solution. On the other hand, these same companies often manage complex warehouses and distribution centers, which process high volumes of shipments. Optimization of the operations in these locations requires local access and control of high-response systems that are available all the time. The challenge, therefore, is to provide a hybrid approach, which satisfies the requirements of providing integrated data access on a global basis while enabling the implementation of local distributed systems.

Decentralized shipping (not included in Release 4.0) processes the delivery logistics of sales orders on a remote standalone computer without online access to a centralized system. The R/3™ system uses a technology, called Application Linking and Enabling (ALE), to implement distributed solutions such as decentralized shipping (see Section 14.5). In this approach, special types of business information documents, called Intermediate Documents (IDOCs), are automatically transmitted between communicating systems. The information transferred on these IDOCs synchronizes the databases on these “loosely coupled” systems. To use decentralized shipping, a company maintains a database that describes the relationships between the centralized order management system and the remote computers used in its distribution centers and warehouses. This database is used by R/3™ to automatically generate the IDOCs used in communicating between the host and remote systems.

Sales orders are entered on the host (central) computer. Stock control is also managed on the host system, where the availability of the order items is checked and scheduling for the shipping activities is carried out. Delivery data are transferred to the decentralized shipping computer, where, on the delivery due date, the shipping activities are initiated. Relevant data from the material master records are available in the remote computer. Customer data are transferred from the central system to the decentralized computer for each transaction.

The decentralized computer automatically creates a delivery and initiates picking. Picking can be linked with the warehouse management system. The quantities and batch specifications are confirmed in the delivery. Packaging, weight, and loading data can be printed on the shipping papers. When the delivery is completed, the goods issue for the delivery is confirmed. The data are then transferred back to the host system where order and inventory status is updated, and the delivery is released for billing.

Sales and Distribution Customer Example

Many of SAP™'s customers have found that the integration of sales and distribution applications in R/3™'s logistics chain has improved the performance of their companies. In the rest of this chapter, we take a look at a company whose business engineering efforts have been enhanced by R/3™'s integrated logistics.

Micrografix Corporation, Richardson, Texas

Micrografix Corporation, one of the premier developers and marketers of graphics software in the world, was the first company to develop Windows-based graphics applications for personal computers. Micrografix caters to a wide variety of customers—from very large companies to individuals who order Micrografix products by phone—around the world. The company's two distribution operations are in Texas and the Netherlands.

Micrografix took on reengineering with one main idea in mind—to maintain its strong competitive position in the future. Micrografix competes in a dynamic industry that has recently seen growth rates among individual companies at almost 100 percent per year. The outlook for Micrografix is promising, but all companies must ensure that their internal systems help, not hinder, continued success.

“Micrografix wanted a growth management tool for its domestic and international business,” Robert Lytton, director of management systems, explains. “We have to fulfill the commitment to our customers to develop and deliver quality products and services, and at the same time, fulfill the commitment to our stockholders by being a profitable company. It is very important, then, that we make certain our business runs efficiently and effectively.”

One important step on the road to increased efficiency was to replace the company's information systems with an integrated system that gave access to online, real-time information. Micrografix chose SAP™'s R/3™ system as the cornerstone of its reengineering effort because of its versatility and ease-of-use for everyone from executives and accountants to someone who works on the loading dock.

Micrografix reengineered by organizing its work processes into “value chains,” groups of activities that add value to a company's product for its customers. Supported by the R/3™ system, the company's “value chains” include order processing (where the company takes orders, ships the product, sends out a bill, and processes accounts receivable), materials management (sales forecasts, purchasing, receiving, accounts payable, inventory management, and material requirements planning), and financial controlling (“back-end” reporting on all of the activities in the business).

After the initial phase of implementation, Micrografix saw that R/3™ was delivering immediate benefits. In particular, Micrografix found that R/3™'s integrated sales and distribution applications produced significant dividends. Improvements in this area included maintaining a single customer database and developing a sales tax interface that automatically calculates sales taxes on all orders and invoices.

5.12 R/3 SALES LOGISTICS SUMMARY

The following tables provide an overview to the main scenarios, core processes, business objects, and organizational units that make up R/3 Sales Logistics.

Scenarios

- ▶ Direct sale to industrial consumer
- ▶ Direct sale to internal consumer
- ▶ Direct sale to retail company
- ▶ Direct sale to
- ▶ Customer order processing MTO
- ▶ Customer order processing ATO
- ▶ Component supplier processing
- ▶ Third-party-order processing

Core Processes

- ▶ Material master processing
- ▶ Customer master data processing
- ▶ Condition processing
- ▶ Mailing campaign processing
- ▶ Sales activity processing
- ▶ Customer quotation processing
- ▶ Sales order processing
- ▶ Credit limit check
- ▶ Outline agreement
- ▶ Goods issue processing
- ▶ Delivery processing
- ▶ Transport

- ▶ Foreign trade
- ▶ Billing
- ▶ Rebate processing

Business Objects

- ▶ Sales
 - Customer inquiry
 - Customer quotation
 - Sales order
 - Customer outline agreement
 - Customer complaints order
- ▶ Shipping
 - Customer delivery
 - Transport
- ▶ Billing
 - Customer billing document
- ▶ Sales Support
 - Partner sales activity
 - Mailings

Organizational Units

- ▶ Sales organization
- ▶ Distribution channel
- ▶ Division
- ▶ Sales Area
- ▶ Plant
- ▶ Sales office
- ▶ Sales group
- ▶ Shipping point
- ▶ Loading point
- ▶ Transportation planning point