Will Hershey ever be able to recoup the market share lost in the debacle of Halloween 1999? During the late summer, Hershey made the decision to implement their SAP enterprise system using the “Big Bang” approach. In enterprise system terminology, Big Bang is the immediate cut-off of the old Information System with a complete implementation of the new enterprise system. When Hershey made the conversion to the SAP system, they were unable to match orders with production and delivery systems. Additionally, information did not flow through properly to billing systems, causing billing errors, delayed collections, and erosion of customer goodwill. Ultimately, Hershey was unable to fulfill customers’ orders for Halloween candy and seasonally adjusted sales dipped an estimated 5%–7%. Many analysts believe that Hershey will never regain lost market share of 3%–5%. This is but one of many cases of such failures and highlights the importance to organizations of having well-integrated systems for the M/S and RC processes. Failure to integrate data between the two processes may leave a company suffering from the “trick” rather than enjoying the “treat.”

Synopsis

This chapter covers the revenue collection (RC) process. In enterprise system terms, the marketing and sales (M/S) and RC processes jointly fulfill what is commonly known as the “Order to Cash” process you saw in Figure 10.1 on page 326. The RC process is triggered by the M/S activities covered in Chapter 10. In fact, many firms do not distinguish between the two processes as clearly as we have in this book.

This chapter first defines the RC process and describes its functions. Over and above event recording aspects of the process, we examine RC’s importance in meeting customer needs and show how companies have used the RC process to gain competitive advantage. We explore technologies that have been used to leverage the process and to compete in an environment increasingly driven by enterprise systems and e-business. Based on this business environment, we consider the imprint of the RC process on the organization, again taking both a horizontal and vertical perspective. We follow this with discussion of both the logical and physical aspects of a typical process implementation. As in Chapter 10, control issues are dispersed throughout the chapter and are summarized by application of the control framework of Chapter 9.
**Learning Objectives**

- To describe the business environment for the revenue collection (RC) process
- To analyze the effect of enterprise systems and other technologies on the RC process
- To describe the RC process logic, physical characteristics, and support of management decision making
- To describe and analyze controls typically associated with the RC process

**Introduction**

The M/S process performs the critical tasks of (1) processing customer orders and (2) shipping goods to customers. The RC process completes the Order-to-Cash business process by accomplishing three separate yet related activities: (1) billing customers, (2) managing customer accounts, and (3) securing payment for goods sold or services rendered.

The **revenue collection (RC) process** is an interacting structure of people, equipment, methods, and controls designed to:

1. Support the repetitive work routines of the credit department, the cashier, and the accounts receivable department
2. Support the problem-solving processes of financial managers
3. Assist in the preparation of internal and external reports
4. Create information flows and recorded data in support of the operations and management processes

First, the RC process supports the repetitive work routines by capturing, recording, and communicating data resulting from the tasks of billing customers, managing customer accounts, and collecting amounts due from customers. Next, the RC process supports the problem-solving processes involved in managing the revenue stream of the company. As but one example, the credit manager, reporting to the treasurer, might use an accounts receivable aging report such as the one in Figure 11.1 to make decisions about extending further credit to customers, pressing customers for payment, or writing off worthless accounts. Third, the RC process assists in the preparation of internal and external reports, such as those demanded by investors and bankers. Finally, the information process creates information flows and stored data to support the operations processes and decision-making requirements associated with the process.

The RC process occupies a position of critical importance to an organization. For example, an organization needs a rapid billing process, followed by close monitoring of receivables, and a quick cash collections process to convert sales into cash in a timely manner. Keeping receivables at a minimum should be a major objective

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1 To focus our discussion, we have assumed that these departments are the primary ones related to the RC process. For a given organization, however, the departments associated with the RC process may differ.
of an RC process. While we tend to associate the RC process with mundane record-keeping activities, the process also can be used to improve customer relations and competitive advantage. First, let’s take a look at the organizational aspects of the RC process.

Organizational Setting

Figure 11.2 (page 376) presents a horizontal view of the relationship between the RC process and its organizational environment. Like its counterpart in Chapter 10, it shows typical information flows handled by the RC process. The flows provide an important communications medium among departments and between departments and entities in their relevant environment. The object here is simply to have you identify the major information flows of the RC process. Technology Insight 11.1 (page 377) discusses how horizontal information flows in an enterprise system become automated and therefore more efficient in terms of supporting the RC process.
Figure 11.2  A Horizontal View of the RC Process

NOTES:

1. The information flows shown above are representative of those related to revenue collection process. The figure, however, does not show all information flows. For example, sales returns and allowances are not shown.

2. See Table 11.1 for a description of information flows 1–10.

Review Question
How does the RC process relate to its organizational setting?

Table 11.1  Description of Horizontal Information Flows*

<table>
<thead>
<tr>
<th>Flow No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Shipping department informs the accounts receivable department (billing section) of shipment.</td>
</tr>
<tr>
<td>2</td>
<td>Accounts receivable department (billing) sends invoice to customer.</td>
</tr>
<tr>
<td>3</td>
<td>Accounts receivable department (billing) informs general ledger that invoice was sent to customer.</td>
</tr>
<tr>
<td>4</td>
<td>Customer, by defaulting on amount due, informs credit department of nonpayment.</td>
</tr>
<tr>
<td>5</td>
<td>Credit department recommends write-off and informs accounts receivable department.</td>
</tr>
<tr>
<td>6</td>
<td>Credit department, by changing credit limits, informs sales order department to terminate credit sales to customer.</td>
</tr>
<tr>
<td>7</td>
<td>Accounts receivable department informs general ledger system of write-off.</td>
</tr>
<tr>
<td>8</td>
<td>Customer makes payment on account.</td>
</tr>
<tr>
<td>9</td>
<td>Cashier informs accounts receivable department (cash applications section) of payment.</td>
</tr>
<tr>
<td>10</td>
<td>Cashier informs general ledger of payment.</td>
</tr>
</tbody>
</table>

*Many of these steps may be automated. See Technology Insights 11.1 and 11.3 for descriptions of these steps in an enterprise system implementation.
The "Order-to-Cash" Process: Part II, Revenue Collection (RC) Chapter 11

Enterprise System Support for Horizontal Information Flows

The information flows presented in Figure 11.2 are very similar to what we would expect if the organization were using an enterprise system. However, many of the tasks outlined would occur quite differently because of the messaging capabilities embedded in contemporary enterprise systems. Let’s take a look at each of the information flows in Figure 11.2.

1. The flow of information from the shipping department to the accounts receivable department (billing section) is an automatic trigger from the enterprise system. As soon as the shipping department enters the shipment into the enterprise system, a message is sent to the billing module in preparation for step 2. If necessary, a message of the update could also be routed to the accounts receivable department.

2. As a regularly scheduled event, the billing department uses the enterprise system to generate an invoice and transmit the invoice to the customer either by mail or electronically.

3. The generation of the invoice (step #2) automatically updates the accounts receivable balances in the general ledger portion of the enterprise system.

4. Periodic reports are generated based on lack of customer payment and trigger a credit hold on the account. A message is also automatically routed to the credit department to review the account.

5. As a regularly scheduled event, the credit department reviews accounts and determines when accounts should be written off. A message is routed to the accounts receivable department authorizing a write-down, and accounts receivable confirms.

6. As a regularly scheduled event, the credit department reviews and revises credit for customers and changes are automatically made to the credit data accessible by the sales order department.

7. Authorization of write-down in flow #5 by the accounts receivable module automatically updates general ledger balances.

8. Customer payment is received either by mail or electronically.

9. Cashier records payment into the enterprise system and the accounts receivable balances are updated. Accounts receivable instantly has updated information.

10. Recording of payment by cashier (step #9) automatically updates general ledger balances.

As is apparent, much of the processing of information flows becomes simply automatic updating of relevant data stores. These automatic updates occur because of the integrated nature of the enterprise system and its underlying database. If the information needs to draw the attention of another person, automatic messaging systems can automate the notification process as well.
Next, we introduce the key “players” shown within the “Finance” entity of Figure 11.2 (i.e., those boxes appearing in the right-most triangle of that figure). As illustrated by the figure, the major organizational subdivision within the finance area is between the treasury and controllership functions. Most organizations divorce the operational responsibility for the security and management of funds (treasury) from the recording of events (controllership). In other words, the treasurer directs how the company’s money is invested or borrowed (i.e., an external focus), and the controller tracks where sales and other income comes from and how it is spent (i.e., an internal focus). The pervasive control plans (see Chapter 8) of segregation of duties and physical security of resources motivate this division between the treasury and the controllership functions.

Within the treasury function, the activities having the greatest effect on the RC process relate to the credit manager and the cashier. First, note that the credit manager is housed within the finance area rather than within marketing. This separation of the credit and sales functions is typical. If the credit function were part of marketing, credit might be extended to high-risk customers simply to achieve an optimistic sales target.

It is important also to separate the credit function (event authorization) from the recordkeeping functions of the controller’s area. Within the controller’s area, the major activities involved with the RC process are those of the accounts receivable department. This functional area is primarily involved in recordkeeping activities.

Managing the RC Process: Leveraging Cash Resources

It seems a simple concept—to increase net income without increasing the amount of sales you must reduce costs. The RC process provides several opportunities to cut costs through emerging technologies and improved management processes. We discuss three frequently used methods in this section: (1) customer self-service systems, (2) digital image processing systems, and (3) cash receipts management.

**CRM: Customer Self-Service Systems**

In Chapter 10 we saw customer relationship management (CRM) systems and how they can be used to improve customer management and service during the M/S process. We extend that discussion here by looking at another common feature of CRM systems—customer self-service systems. A customer self-service system is an Information Systems extension that allows a customer to complete an inquiry or perform a task within an organization’s business process without the aid of the organization’s employees.

Banks were probably the first industry to implement such systems on a broad base with the introduction of automated teller machines (ATMs). ATMs allow a customer to withdraw cash, make deposits, transfer funds between accounts, and so forth, without the help of a teller. Another place where similar added convenience has become widespread is the so-called “pay-at-the-pump” system for purchasing gasoline. In many cases, a human worker is not even required on-site, as a set of gasoline pumps are provided on location and purchases are made with either credit or debit cards. Telephone systems through which the customer selects options and enters account information with number keys are a common self-service application.
Internet systems that provide access to customers are now the norm in many industries. While these systems tend to take customers about as much time to use as telephone-based systems, studies show that consumers prefer Internet-based systems to the much-maligned phone-based systems. Internet-based systems also bring much more capability to systems. For instance, delivery companies (i.e., FedEx, UPS, etc.) now allow users to connect through the Internet and identify where their package is currently located, and if delivered, who signed for it.

A major benefit of these systems arises from the interconnection of customer self-service systems with enterprise systems. In some companies, customers can now check on their orders as they progress through the manufacturing process or even check on inventory availability before placing orders. Some of the more advanced systems also let customers check production planning for future manufacturing to determine if goods will be available at the time they will be needed.

Why are companies so interested in customer-self service systems and willing even to allow access to information in their internal systems? Quite simply, the payback on such systems is huge because of the reduced number of people needed to staff customer call centers. Reduction of staffing needs for call centers counterbalances the high human turnover in such centers, a result of boredom associated with the job.

Digital Image Processing Systems

Many of the capabilities of digital image processing systems were explored in Chapter 4. Here, we take a brief look at the use of digital image processing systems in the RC process. Because of the amount of paper documents that traditionally flowed through the RC process, the ability to quickly scan, store, add information to, and retrieve documents on an as-needed basis can significantly reduce both labor costs for filing and the physical storage space and structures necessary for storing paper-based files.

Here is how digital image processing systems typically work. Given the abundance of digital image documents that rapidly stack up in a large payment processing center, these documents need to be organized and filed away (much like their paper counterparts). Electronic folders are created to store and organize related documents. The folders are retrievable via their electronic tabs. As a result, the image storage and retrieval processes logically parallel the same processes used in traditional paper systems, without the headache of storing the mounds of paper and having to deliver requested documents by hand across the building or even across the world. Likewise, if a customer contacts a customer service representative, the representative can quickly retrieve the digital image of each customer statement and provide the customer a timely response—avoiding wasted time with retrieving paper documents and possible call-backs to the customer. Specific examples from practice are discussed in Technology Application 11.1 (page 380). We will take another look at the use of digital image processing during the controls discussion later in this chapter.

Managing Cash Receipts

The advent of electronic banking has made companies acutely aware of the critical importance of sound **cash management** for improving earnings performance. The name of the cash management game is to free up funds so that they either can be invested to earn interest or used to reduce debt, thus saving interest charges. Of course,
before cash can be invested or used for debt reduction by the treasurer, it first must be received and deposited. The overall management objective, therefore, is to shorten as much as possible the time from the beginning of the selling process to the ultimate collection of funds.

In the billing function, the goal is to get invoices to customers as quickly as possible, with the hope of reducing the time it takes to obtain payments. Having the RC process produce invoices automatically helps ensure that invoices are sent to customers shortly after the goods have been shipped. Additionally, documents are much easier to find, as they can be cross-indexed by customer account, invoice number, date of occurrence, customer name, or other ways.

At the other end of the process, the treasurer is concerned with potential delays in collecting/depositing customer cash receipts and having those receipts clear the banking system. The term float, when applied to cash receipts, is the time between the customer’s making payment and the availability of the funds for company use. Float is a real cost to a firm. Enhanced processing of checks, charge cards, and debit cards can reduce or eliminate float associated with cash receipts.

Technology Insight 11.2 (page 381) discusses four other Internet-enabled mechanisms that organizations have used to shorten the float, improve e-business practices, or achieve other economies. As e-business opportunities increase, these e-payment mechanisms will become the norm in the cash receipts process.

Review Question
What is a lockbox? Why is a lockbox used?
The “Order-to-Cash” Process: Part II, Revenue Collection (RC)  Chapter 11

Solutions for the Float Problem

One of the earliest initiatives in the realm of electronic funds transfer (EFT) is the automated clearing house (ACH). If you have ever had your paycheck deposited directly to your checking account, you have been a party to an ACH transaction. Over 40,000 companies use ACH, most of them for direct deposit. In addition, the government is a big user of ACH. For instance, each month millions of senior citizens have social security checks deposited electronically through the ACH banking network. The idea of the ACH system is similar to that of a debit card. Through a prearranged agreement between trading parties, the collector’s bank account is credited and the payer’s account is debited for the amount of a payment. This transaction might happen at specified recurring intervals as in the case of direct deposit, or it might be initiated by the payer—a so-called customer-initiated payment (CIP)—via a touch-tone or operator-assisted phone call or through a personal computer.

Another solution is the use of a lockbox for processing customer payments. A lockbox is a postal address, maintained by the firm’s bank, which is used solely for the purpose of collecting checks. A firm selects a variety of banks with lockboxes across the country so that customer mail arrives quickly at the lockbox. The bank constantly processes the lockbox receipts, providing a quick update to the firm’s bank balance. To provide the collecting company with the information to update customer accounts, the lockbox bank traditionally sends the company the remittance advices (RAs), photocopies of the checks, and a listing of the remittances, prepared by scanning the RAs. Many banks now offer an electronic lockbox service, by which the lockbox bank scans the payer’s remittance advice details into its computer system and then transfers the remittance advice data electronically to the collector’s accounts receivable computer system. Obviously, the electronic lockbox allows the company to post cash receipts more rapidly, at reduced cost, and with more accuracy.

Two other technologies of interest relate to emerging payment methods for e-business. A major problem for e-business concerns payment by individual customers. Many people are hesitant to transmit personal credit card information across the Web, and others do not have sufficient credit card funds available to use. An alternative is to use either an electronic check or electronic cash. An electronic check closely resembles a paper check with the inclusion of the customer’s name, the seller’s name, the customer’s financial institution, the check amount, and a digital signature. Public key cryptography is used to protect the customer’s account. With electronic cash, a financial institution issues cash that is placed into an electronic wallet. The cash is issued in an electronic form much the way it would be in paper form. Cash is loaded onto the wallet and spent in a manner similar to a phone card. The wallet may be a card or it may be data stored on a server or the individual’s computer. However, unlike using a check, the individual making the cash transfer is generally not traceable. Electronic cash has been a little slower to catch on, as banks are only beginning to support the cash form, and accessibility to customers for use is still limited.

Review Question

Describe several ways that companies have used IT to reduce the float connected with cash receipts.
The principal activities of the Revenue Collection process are to bill customers, collect and deposit cash received from those customers, record the invoices and cash collections, and inform the general ledger system to make entries for sales and cash receipts. In addition to the billing and cash receipts functions, the RC process manages customer accounts. Activities normally included in this process are sales returns and allowances, account write-offs, and sending periodic statements to customers. This section shows and explains the key event data and master data used by the process.

Logical Data Flow Diagrams

As you learned in Chapter 2 and saw applied in Chapter 10, our first view of the process is a general one, shown in the form of a context diagram. For the RC process, that view appears in Figure 11.3. Note the external entities with which this process interacts and the data flows running to and from those entities.

Now let’s explode Figure 11.3 into the level 0 diagram reflected in Figure 11.4. In this expanded view of the process, we see that the single bubble in Figure 11.3 has become three process bubbles. We also see the event and master data for this process. At this point, review Figure 11.4 and compare it to Figure 11.3 to confirm that the
two figures are “in balance” with each other. Each of the three process bubbles shown in the level 0 diagram are decomposed into their lower-level diagrams in Appendix A.

In the section “Logical Data Descriptions” that follows later in the chapter, we define or explain the accounts receivable master data, sales event data, and invoice data. Before proceeding, let’s take a brief look at the information content of an invoice. Figure 11.5 (page 384) is an example of a sales order inquiry of invoice items.
The invoice is a business document used by a vendor to notify the customer of an obligation to pay the seller for the merchandise ordered and shipped. Notice that the information at the top of the screen represents that part that would be printed to an invoice to identify the unique order placed and associated with a specific customer. The body of the screen captures the item or items ordered by the customer and the related pricing information. When the invoice is printed, it may often include the payment details.

**Logical Data Descriptions**

Seven data stores appear in Figure 11.4, the level 0 diagram, five of which are related to event occurrences. Of the two master data stores, the customer master was defined in Chapter 10.

Accounts receivable master data contain all unpaid invoices issued by an organization and awaiting payment. As the invoice is created, a record of the receivable is entered in the master data. Subsequently, the records are updated—i.e., the receivable balance is reduced—at the time that the customer makes the payment. The
records also could be updated to reflect sales returns and allowances, bad debt write-offs, or other adjustments.

The accounts receivable master data provide information useful in minimizing outstanding customer balances and in prompting customers to pay in a timely manner.

Now let’s look at the event data maintained in the RC process. First, the process records an entry for the sales data after it has validated the shipment and as it produces an invoice. In the previous section, we showed you a specimen invoice (see Figure 11.5). The logical data definition for sales event data would essentially comprise one or more records of invoices. However, each data record would not contain all of the details reflected on the invoice itself. For example, item numbers, descriptions, quantities ordered, quantities shipped, and quantities back ordered typically are not recorded in the sales event data. Rather, these details would be found in the invoice data.

Accounts receivable adjustments data are created as sales returns, bad debt write-offs, estimated doubtful accounts, or similar adjustments are processed as part of managing customer accounts. As in any event data, records in this data store are typically keyed by date.

Cash receipts data, created when customer payments are recorded, contain details of each payment as reflected on the remittance advice accompanying a payment. A remittance advice (RA) is a business document used by the payer to notify the payee of the items being paid. The RA can take various forms. For instance, it may be a copy of the invoice, a detachable RA delivered as part of a statement periodically sent to the customer (often a “stub” attached to the statement, a turnaround document), or a stub attached to the payer’s check. In any case, RC uses the RA to initiate the recording of a cash receipt. Finally, as its name suggests, the remittance advice file contains copies of the remittance advices themselves.

Types of Billing Systems

In general, there are two kinds of billing systems. A postbilling system prepares invoices after goods have been shipped and the sales order notification has been matched to shipping’s billing notification. The data flow diagrams in this section and in Chapter 10 assume a postbilling system.

A prebilling system prepares invoices immediately on acceptance of a customer order—that is, after inventory and credit checks have been accomplished. Prebilling systems often occur in situations where there is little or no delay between receipt of the customer’s order and its shipment. For instance, prebilling systems are not uncommon in catalog sales operations such as that of L.L. Bean. In such systems, there is no separate sales order document; copies of the invoice serve as the picking ticket, packing slip, and other functions required by the M/S process.2 In other words, the customer is billed (and the inventory, accounts receivable, and general ledger master data are updated) at the time the customer order is entered. However, the customer copy of the invoice is not released until shipment has been made. For this type of system to operate efficiently, the inventory control system must be very reliable. If an order is accepted and an item then turns out to be unavailable, all financial records have to be adjusted.

2 By eliminating one source document (the sales order) and a separate data transcription step (from shipping documents to the customer invoice), prebilling helps to ensure certain control goals. For that reason, we include prebilling procedures as a control plan for the billing process in a later chapter section.
Physical Process Description of the Billing Function

Figure 11.6 presents a process for billing events. From Chapter 10, you have an understanding of the order entry and shipping functions leading up to billing. Review the flowchart for general ideas.
The Billing Process

At the time the sales order documents were prepared in the order entry department, copy 1 was sent to the billing department (the annotation to the left of the sales order data indicates that these "sales order notifications" are held pending receipt of the shipping notices). At the end of each day, billing receives (from the shipping department) batches of bills of lading (copy 1), accompanied by shipping notices (sales order copy 2).
In the billing department, a clerk compares the details of these documents. Data that fail to pass the document-matching control are removed from the batch; these data are handled by a separate exception routine. Corrected data will be submitted to the computer during a subsequent processing cycle.

If there is agreement among the data items, the billing clerk prepares batch totals, logs each batch, and sends the batches to data control. Data control logs the batches and forwards them to data preparation. Data preparation clerks records the shipping notices to the sales event database. A second clerk reenters the inputs. After reconciliation of any differences between the manually calculated batch totals and the batch totals calculated by the program, the sales data are forwarded to computer operations. This concludes the recording process.

The first step of the update process is to sort and merge sales data in order to prepare the data for sequential processing against the accounts receivable master data. A maintenance run brings the master data up to date and prints one or more reports. Any errors discovered during the process run are recorded with the error suspense data along with a record of each sales order (i.e., shipping notice) number processed during the run.

Output invoices are sent back to data control to be logged out and then are sent to the billing department. Once the invoices have been received by the billing department, a clerk logs the batch back in and matches the invoices with the sales orders and bills of lading. If the documents match, the original invoice is sent to the customer, and the copy is filed with the sales order and bill of lading.

Once you have had the opportunity to study the billing process documented in Figure 11.6, stop and consider how this might change in an enterprise system environment. After you have thought through the impact and the resulting changes to Figure 11.6, read Technology Insight 11.3, which provides an overview of how a fully implemented enterprise system impacts the billing process discussed in this chapter.

TECHNOLOGY INSIGHT 11.3

Enterprise System Support for the Billing Process

The main effect of the introduction of an enterprise system into the billing process depicted in Figure 11.6 is the integration of the processing programs and the various data stores into a single unified processing system with a single underlying database. In terms of the diagrams, the primary impact is therefore on the activities depicted within the “data center.” These changes are demonstrated in the diagram on page 389. Note that the systems flowchart has significantly simplified, but the consolidation of all of the processes and databases shown in Figure 11.6 to the single process and database in the figure shown on page 389 is indicative of the complexity within an enterprise system. You should also recognize that for clarity and comparability the diagram shows the use of batch totals and batch comparisons. In many enterprise-wide environments, traditional batch control procedures as depicted on page 389 might not be retained, depending on how much the organization decides to change its business processes upon implementation of the enterprise system.
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TECHNOLOGY INSIGHT 11.3 (continued)
Selected Process Outputs

A variety of outputs (records, documents, statements, and reports) are generated in this process. The key document/record produced by the process depicted in Figure 11.6 is the sales invoice. (Invoice records are depicted in Figure 11.5 on page 384.) The computer numbers these documents/records sequentially.

Another important document, the customer monthly statement, is prepared at the end of each month from data appearing in each customer's accounts receivable master data record. Sending periodic customer statements is part of the function of managing customer accounts. Other analyses and reports can be prepared as needed. For example, if an accounts receivable aging report were desired, the relevant account data would be extracted from the accounts receivable master data. (Figure 11.1, page 375, illustrates a typical accounts receivable aging report.)

Application of the Control Framework for the Billing Function

This section applies the control framework to the billing function. Figure 11.7 presents a completed control matrix for the systems flowchart depicted in Figure 11.6. Figure 11.6 is annotated to show the location of the control plans keyed to the control matrix.

Control Goals

The control goals listed across the top of the matrix are derived from the framework presented in Chapter 9. Effectiveness of operations shows only two representative operations process goals. Obviously, in actual billing processes, other operations process goals are possible. As mentioned in Chapter 9 and reinforced in Chapter 10, the resource security column should identify only the assets that are directly at risk. For that reason, cash is not listed because it is only indirectly affected by the validity of the billings. The resource of interest here is the accounts receivable master data. Controls should prevent unauthorized access, copying, changing, selling, or destruction of the accounts receivable master data.

To focus our discussion, we limit our coverage of process inputs to just the shipping notice. Note, however, that other process inputs could be included in the matrix. From the point of view of the billing process, valid bills are those that are properly authorized and reflect actual credit sales. For example, a bill should be supported by a proper shipping notification and should be billed at authorized prices, terms, freight, and discounts.

Recommended Control Plans

Each of the recommended control plans listed in the first column of the control matrix is discussed in Exhibit 11.1 (page 392). This exhibit is divided into two sections:

- A. Billing process control plans that are unique to the billing process.
- B. Controls for the processing technology in place or that apply to any business process. Your study of Chapter 9 supplies understanding of how these
plans relate to specific control goals. In other words, you should be able to explain the cell entries in Figure 11.7 for these four control plans. If you cannot do so readily, review Chapter 9.

As usual, you will find that some of the recommended control plans are present in the process and others are missing. As you study the control plans, be sure to notice where they are located on the systems flowchart.
### Exhibit 11.1  Explanation of Cell Entries for Control Matrix in Figure 11.7

#### A. Billing Process Control Plans

**M-1: Employ a prebilling system.**

*Operations process goal A:* If a prebilling system were used, it would shorten the time needed to bill customers and thus help to ensure operations process goal A—to bill customers promptly upon evidence of shipment. Upon notification that the shipment has been made, billing the customer involves simply releasing (mailing) the customer copy of the invoice.

*Efficient employment of resources:* By collapsing two processes—preparing the sales order and generating the customer invoice—into a single operation, a prebilling system employs system resources more efficiently.

*Completed shipping notice input accuracy:* Collapsing sales order preparation and customer invoice generation into a single operation improves billing accuracy by eliminating a separate data entry step.
**P-1: Independent billing authorization.**

*Completed shipping notice input validity:* Comparison of sales orders, received directly from order entry, with shipping notifications received from shipping, reduces the possibility that shipping notifications are invalid by verifying that each shipment is supported by an approved sales order.

**M-2: Confirm customer accounts regularly.**

*Completed shipping notice input validity,* *Completed shipping notice input accuracy:* The customer can be a means of controlling the billing process. By sending regular customer statements, we use the customer to check that invoices were valid and accurate. Most organizations send statements, but that process is beyond the scope depicted in Figure 11.6.

*Accounts receivable master data update accuracy:* Because statements are produced from the accounts receivable master data, the customer also determines the accuracy of accounts receivable updates.

**M-3: Check for authorized prices, terms, freight, and discounts.**

*Completed shipping notice input validity:* The billing process in Figure 11.6 seems to have no explicit, independent check for authorized prices, terms, discounts, and freight charges. Note that the word “authorized” speaks to the control goal of input validity. The system should access a file containing approved pricing, which may be stored at the product or customer level.

*Completed shipping notice input accuracy:* Having prices, terms, discounts, and freight charges independently checked by a second person helps to ensure input accuracy. Because much of the information necessary to calculate these amounts is not known until after shipment, we would expect to see prices, terms, freight, and discounts being calculated during the billing process by using an approved set of criteria. At a minimum, we would expect to see access to the inventory master data for a price check for the items shipped. Criteria for the terms, discount, and freight *might* be located on the customer master data (or accounts receivable master data) or within the billing program.

**P-2: Edit the shipping notification for accuracy.**

*Completed shipping notice input accuracy:* The output of the “Error and summary report” in Figure 11.6 implies that the update run performs some programmed edits. Programmed edits greatly increase the accuracy of entering sales data by using the computer to edit the data input.

**P-3 and P-4: Tickler files.**

*Bill customers promptly,* *Completed shipping notice input completeness:* Figure 11.6 includes two instances of this control plan. Monitoring the first tickler file (P-3) ensures that all shipping notices are received from shipping in a timely manner. Monitoring the second file (P-4) ensures that all invoices are prepared in a timely manner.

**P-5 and P-6: One-for-one checking of outputs to inputs.**

*Completed shipping notice input accuracy:* One-for-one checking occurs in Figure 11.6 as follows:

- The sales order (sales order notification), the shipping notice (sales order copy 2), and bill of lading are matched with one another in billing (P-5).
- The sales order is matched against the invoice in the billing section (P-6).

Each of these instances of one-for-one checking helps ensure that data entered are accurate. Matching the shipping notification with the sales order, for example, checks that the quantity ordered is the quantity shipped.
Completed shipping notice input validity: In the case of plan P-5, the goal of shipping notice input validity is addressed because no shipping notice is processed unless it is supported by an authorized sales order.

Completed shipping notice update accuracy: Matching the invoice—an output of the update process—with the sales order (P-6) verifies that the updates are accurate.

B. Technology-Related Control Plans

P-7: Manual agreement of batch totals.

Completed shipping notice input validity, completeness, and accuracy: The broken line from that batch total to the key-to-disk computer screen display at the bottom of the data preparation column (annotated P-7a) indicates a reconciliation of the input totals to the totals of the inputs actually recorded in the sales event data. If we assume that the batch total is either a dollar total or hash total, we are justified in making cell entries in all three columns: input validity (IV), input completeness (IC), and input accuracy (IA). On the other hand, item or line counts help to ensure IC and IA (not IV), while document or record counts address the goal of IC only.

Accounts receivable master data update completeness and accuracy: Another instance of manually verifying batch totals is depicted by the broken line (annotated P-7b) that connects the batch total file at the bottom of the data preparation column with the “Error and summary report” appearing in the computer operations column. Note that in this case, input totals are being reconciled to output totals (i.e., those resulting from updating the accounts receivable master data). Therefore, we show entries in the columns for update completeness (UC) and update accuracy (UA).

Again, if the batch totals comprised only document/record counts, we could not justify a cell entry in the UA column.

M-4: Computer agreement of batch totals.

Efficient employment of resources: Computer agreement of batch controls improves efficiency through automation of the process.

Input and update control goals: This control does not appear in the flowchart nor is it mentioned in the physical process description narrative. Therefore we cannot make any of the P (present) entries made for control plan P-7.

M-5: Batch sequence check.

Completed shipping notice input validity and completeness: To apply this control, the data entry clerk first must enter the range of serially numbered documents that comprise each batch. There is no evidence that this is being done in Figure 11.6, so we cannot determine if extra shipping notices are input (IV) or if any valid notices are not input (IC).

P-8: Cumulative sequence check.

Completed shipping notice input completeness: A cumulative sequence check matches the serial numbers of individual inputs—in this case shipping notices—against data containing all possible serial numbers—in this case all sales order numbers. In Figure 11.6, the “Cumulative numerical sequence” (of sales order numbers) stored on the disk in computer operations controls the input of the shipping notices. Either a batch sequence check or a cumulative sequence check—by accounting for all of the numbers preprinted on input documents—helps to ensure input completeness (IC).

Completed shipping notice input validity: Because duplicate numbers are rejected, input validity is assured because an actual shipment of goods cannot be recorded twice (i.e., the second instance of the same document number must be invalid).
As discussed earlier, the procedures employed in collecting cash vary widely. For example, some companies ask customers to mail checks along with remittance advices to the company, others ask customers to send payments to a designated bank lockbox, while in e-business environments some form of electronic funds transfer is generally used.

Figure 11.8 (page 396) depicts a process in which customer payments arrive by mail. The source documents include checks and remittance advices. Each day, the process begins with mailroom clerks opening the mail. Immediately, the clerks endorse all checks. They assemble enclosed statements (remittance advices that come in the form of billing statement detachments from the customer invoice—i.e., turnaround documents) in batches and prepare batch totals for control purposes.

The receipts data—batch total and remittance details from the customer billing statements—are then entered into the computer system via a scanning process and use of optical character recognition technology in the mailroom. The computer edits the data...
Figure 11.8: Systems Flowchart of the Cash Receipts Function
as they are entered and computes batch totals. Once the data are verified, details are written to the cash receipts event data. The batched statements are sent to the accounts receivable department for filing, and the checks are transferred to the cashier.

For most processes of the type illustrated in Figure 11.8, input requirements are minimal. As indicated, the editing process verifies the correctness of the entered data, including customer number and so forth. By accessing open invoice data that reside within the accounts receivable master data, the process also verifies that any cash discounts taken by the customer are legitimate (i.e., they have been authorized). To check

TECHNOLOGY INSIGHT 11.4

Enterprise System Support for the Cash Receipts Process

The main effect of the introduction of an enterprise system into the M/S process depicted in Figure 11.8 is the integration of the processing programs and the various data stores into a single unified processing system with a single underlying database. In terms of the diagrams, the primary impact is therefore on the activities depicted within the “data processing department.” These changes are demonstrated in the diagram below.
the dollar amount of each invoice remitted, the system calculates the balance due by adding the cash payment to the cash discount taken (if any); it then compares the computed balance-due total to the balance-due total scanned in by the mailroom clerk.

Once the data have passed all the control checks, the accounts receivable master data are updated. Also, the computer generates various cash reports and prepares the deposit slip. The deposit slip is transferred to the cashier. The cashier compares the checks and the deposit slip; if they agree, all documents are sent to the bank.

Once you have had the opportunity to study the cash receipts process documented in Figure 11.8, consider how this process might change in an enterprise system environment. After you have thought through the impact and the resulting changes to Figure 11.8, read Technology Insight 11.4, which provides an overview of how a fully implemented enterprise system affects the cash receipts process discussed in this chapter.

Application of the Control Framework for the Cash Receipts Function

The control framework is applied to the cash receipts function in this section. Figure 11.9 presents a completed control matrix for the annotated systems flowchart depicted in Figure 11.8.

Control Goals

By now, you are familiar with the control goals listed in the column headings of the matrix. We will discuss only two of those goals. First, as you learned in Chapter 7, the COSO study and report on internal control recommends three categories of control goals, the third being compliance with applicable laws, regulations, and contractual agreements. Also, recall that we elect not to show the “compliance” goal as a separate category but to include it under the system goals for the operations system. As we did with Causeway’s cash receipts process in Chapter 9, we assume that the company whose process appears in Figure 11.8 has loan agreements with its bank that require it to maintain certain minimum cash balances on deposit. For that reason, operations process goal C—“To comply with minimum balance agreements with our bank”—appears in Figure 11.9.

Our second comment concerns the input validity (IV) control goal. We define valid remittance advices as those that represent funds actually received and for which cash discounts have been authorized and approved.

Recommended Control Plans

Each of the recommended control plans listed in the matrix is discussed in Exhibit 11.2 (page 400). We have intentionally limited the number of plans to avoid redundancy. As you study the recommended control plans, be sure to check where they are located on the systems flowchart. Note that Exhibit 11.2 is divided into two sections: (A) Cash receipts process control plans that are unique to the cash receipts function, and (B) other control plans.
### Figure 11.9 Control Matrix for the Cash Receipts Function

<table>
<thead>
<tr>
<th>Recommended Control Plans</th>
<th>Control Goals of the Business Process</th>
<th>Control Goals of the Operations Process</th>
<th>Control Goals of the Information Process</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ensure effectiveness of operations by achieving the following operations process goals:</td>
<td>Ensure efficient employment of resources</td>
<td>Ensure security of resources (cash, accounts receivable master data)</td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>P-1: Immediately endorse incoming checks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-2: Deposit slip file</td>
<td>M-1</td>
<td>M-1</td>
<td>M-1</td>
</tr>
<tr>
<td>M-1: Immediately separate checks and remittance advices</td>
<td>M-1</td>
<td>M-1</td>
<td>M-1</td>
</tr>
<tr>
<td>M-2: Reconcile bank account regularly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-3: Enter cash receipts close to where cash is received</td>
<td>P-3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-4: Edit cash receipts for accuracy</td>
<td>P-4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-5: Tickler file of checks</td>
<td>P-5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-6: One-for-one checking of deposit slip and checks</td>
<td>P-6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-7: Manual agreement of batch totals</td>
<td>P-7</td>
<td>P-7</td>
<td>P-7</td>
</tr>
<tr>
<td>P-8: Procedures for rejected inputs</td>
<td>P-8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-9: Compare input data with master data</td>
<td>P-9</td>
<td>P-9</td>
<td>P-9</td>
</tr>
<tr>
<td>P-10: Turnaround documents</td>
<td>P-10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Explanation of cell entries – see Exhibit 11.2.

**KEY:**
- Possible operations process goals include:
  - A—Optimize cash flow by minimizing overdue accounts and reducing the investment in accounts receivable.
  - B—Provide for query and reporting functions that support accountability and meet specific problem-solving requirements (e.g., accounts receivable listings by invoice due date, cash on deposit by bank).
  - C—Comply with minimum balance agreements with our bank.
- IV = input validity
- IC = input completeness
- IA = input accuracy
- UC = update completeness
- UA = update accuracy
Exhibit 11.2  Explanation of Cell Entries for Control Matrix in Figure 11.9

A. Cash Receipts Process Control Plans

P-1: Immediately endorse incoming checks.
   Security of resources: To protect the checks from being fraudulently appropriated, the checks should be restrictively endorsed (i.e., “For deposit only . . .”) as soon as possible following their receipt in the organization. Lockboxes provide even more protection for the cash by having cash receipts sent directly to a bank.

P-2: Deposit slip file.
   Security of resources: By maintaining a completed deposit slip file, the cashier provides an audit trail to support each deposit, thereby protecting deposits from misappropriation. Should the deposit slip be filed prior to deposit, the validated deposit slip should be filed when it is returned from the bank.

M-1: Immediately separate checks and remittance advices.
   Operations process goals A, B, and C: Checks should be separated from the remittance advices and deposited as quickly as possible. This helps to optimize cash flow and to ensure that the organization complies with minimum balance requirements of loan agreements with its bank. If remittance advices are immediately separated from checks, the process of recording the remittance advices is accelerated because customer payment is recorded at the same time that the deposit is prepared. Faster recording of the remittance advices (i.e., updating customer balances more quickly) helps to minimize overdue accounts and reduces accounts receivable. Furthermore, since the information available from the system stays up to date, this control also provides more meaningful query and reporting functions.
   Security of resources: The faster the checks are deposited, the less chance that the cash can be diverted. At a minimum, cash should be deposited once a day.

M-2: Reconcile bank account regularly.
   Remittance advice input validity, Remittance advice input accuracy: By regularly reconciling the bank account, the organization confirms the validity and accuracy of the recorded cash receipts. The bank statement and validated deposit slips reflect actual cash deposits and the correct amount of those deposits. Ideally, a person who is independent of those who handle and record cash receipts and disbursements should perform the reconciliation.

B. Technology-Related Control Plans

P-3: Enter cash receipts close to where cash is received.
   Efficient employment of resources: The direct entry of cash receipts data by mailroom personnel provides for more efficient employment of resources because this arrangement eliminates costs associated with the handling of cash receipts data by additional entities.
   Remittance advice input accuracy: Because mailroom personnel have both the check and the paid billing statement (e.g., remittance advice), they are in a position to correct many input errors on the spot, thereby improving input accuracy.

P-4: Edit cash receipts for accuracy.
   Efficient employment of resources: Programmed edits provide quick, low-cost editing of data.
   Remittance advice input accuracy: By identifying erroneous or suspect data and preventing these data from entering the system, programmed edit checks help to ensure input accuracy.
Exhibit 11.2  Explanation of Cell Entries for Control Matrix in Figure 11.9 (continued)

P-5: **Tickler file of checks.**

*Remittance advice input completeness:* The cashier should monitor the temporary file of checks to ensure that a deposit slip is received for all cash receipts. Because the deposit slip is prepared from the cash receipts data, this plan helps to ensure completeness of cash receipts inputs.

P-6: **One-for-one checking of deposit slip and checks.**

*Remittance advice input validity:* This plan helps to ensure input validity because each recorded receipt reflected on the deposit slip is represented by funds actually received (i.e., an actual customer check).

*Remittance advice input accuracy:* Because the cashier compares details of the deposit slip to the checks themselves, the accuracy of remittance advice inputs is ensured.

P-7: **Manual agreement of batch totals.**

P-8: **Procedures for rejected inputs.**

(Plans P-7 and P-8 were discussed in Exhibit 11.1, pages 392–395. Refer to that discussion for an explanation of the cell entries in the cash receipts control matrix.)

P-9: **Match input data with master data.**

*Operations process goal A, Efficient employment of resources:* Cash receipts data can be entered more quickly and at a lower cost if errors are detected and prevented from entering the system.

*Remittance advice input validity:* The matching process verifies that any cash discounts deducted by customers have been *authorized.*

*Remittance advice input accuracy, Accounts receivable update accuracy:* Comparison to the accounts receivable master data reduces input errors. Updates to the accounts receivable data occur simultaneously with input.

P-10: **Turnaround documents.**

*Efficient employment of resources:* The use of the billing statement as a turnaround document reduces data entry that must be completed. Only the amount paid needs to be manually recorded by data entry personnel. Performance of this function early in the process—before the check and statement have been separated—facilitates a more efficient correction of errors.

*Remittance advice input validity:* By using the customer billing statement as the remittance advice, the turnaround document ensures the validity of the cash receipt source. Because we assume that the clerk enters the actual amount of the payment, we also know that the input amount is valid (supported by an actual payment).

*Remittance advice input accuracy:* Scanning of the computer-readable turnaround document reduces the risk of data entry errors, thereby improving accuracy.
Conclusions

With the conclusion of this chapter, we complete the discussion of the order-to-sales process, as depicted in Figure 10.1 (page 326). In later chapters, we discuss the interaction of M/S and RC with the other key business processes in an organization.

This chapter presented a number of ways that technology can affect the operations of RC. For example, technology was discussed as a means of solving certain problems regarding cash flow. What’s in the future? We are rapidly moving toward a checkless society. Even cash is becoming less of an accepted medium for payment. Your challenge will be to keep abreast of the ways businesses are affected by the transition from checks and cash to electronic transfers of money.
Lower-Level DFDs

Figure 11.10 decomposes bubble 1.0 of Figure 11.4 (page 383). Most of Figure 11.10 should be self-explanatory. As you saw in Chapter 10, when the M/S process produces a sales order, it notifies the RC process to that effect. These notifications are filed temporarily,\(^3\) until such time that M/S informs RC that the goods have been shipped. When triggered by the data flow “Shipping’s billing notification,” process 1.1 validates the sale by removing the sales order notification from the temporary file and comparing its details to those shown on shipping’s billing notification. If discrepancies appear, the request is rejected, as shown by the reject stub coming from bubble 1.1. Rejected requests later would be processed through a separate exception routine.

If the data flows match, process 1.1 sends a validated shipping notification to process 1.2. Process 1.2 then performs the following actions simultaneously:

- Obtains from the customer master certain standing data needed to produce the invoice.
- Creates the invoice and sends it to the customer.
- Updates the accounts receivable master data.
- Adds an invoice to the sales event data.
- Files a copy of the invoice in the invoice file.
- Notifies the general ledger that a sale has occurred (GL invoice update).

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\(^3\) Please recognize that, physically, this temporary data could take the form of an open sales order (i.e., an order not yet shipped) in a sales order master data store or SALES_ORDERS relational table, both of which you saw in Chapter 10.
Now let’s take a closer look at process 2.0 in Figure 11.4. Figure 11.11 is the lower-level diagram of that process.

As mentioned earlier, managing customer accounts involves an array of activities that typically occur between customer billing and later cash collection. Three of those activities are reflected in Figure 11.11: (1) sending periodic statements of account to customers, (2) accounting for sales returns and allowances or other accounts receivable adjustments, and (3) accounting for bad debts. The tasks required to maintain customer accounts can be resource intensive for an organization.

Now let’s examine briefly the processes that are diagrammed in Figure 11.11. In general, adjustments will always be necessary to account for sales returns, allowances for defective products or partial shipments, reversals of mispostings and other errors, estimates of uncollectible accounts, and bad debt write-offs. In Figure 11.11, processes 2.1 through 2.3 relate to sales returns adjustments. Process 2.5, “Prepare bad debts journal entry,” is triggered by a temporal event; namely, the periodic review of aging details obtained from the accounts receivable master data. One of two types of adjustments might result from this review:

- The recurring adjusting entry for estimated bad debts
- The periodic write-off of “definitely worthless” customer accounts

Note that, regardless of type, adjustments are recorded in the event data, updated to customer balances in the accounts receivable master data, and summarized and posted to the general ledger master data by the general ledger system.

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**Figure 11.11** RC Process—Diagram 2

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Like process 2.5, bubble 2.4, “Prepare customer statements,” is also triggered by a temporal event. In other words, it recurs at specified intervals, quite often on a monthly basis in practice. Details of unpaid invoices are extracted from the accounts receivable master data and are summarized in a statement of account that is mailed to customers. The statement both confirms with the customer the balance still owing and reminds the customer that payment is due. Therefore, it serves both operating and control purposes.

Figure 11.12, a lower-level diagram of process 3.0 “Receive payment” in Figure 11.4, completes our analysis of the events comprising the RC process. In this diagram, we see our earlier activities culminate in the collection of cash from customers. The check and remittance advice trigger the Receive payment process.

On receipt of the check and remittance advice from a customer, process 3.1 first validates the remittance by comparing the check to the RA. Mismatches are rejected for later processing. If the check and RA agree, the validated remittance is sent to process 3.2, which endorses the check and separates the check from the RA. Process 3.3 accumulates a number of endorsed checks, prepares and sends a bank deposit to the bank, records the collection with the cash receipts data, and notifies the general ledger system of the amount of the cash deposited.

While process 3.3 is preparing the deposit, process 3.4 uses the RA to update the accounts receivable master data to reflect the customer’s payment and then files the RA in the remittance advice file.
Logical Database Design

As we did in Chapter 10, we now look at how RC data would be structured in a database. To keep the discussion simple, we will look only at two basic economic events as they relate to this process—sales invoicing and cash receipts. We will not cover adjustments resulting from sales returns, bad debt write-offs, and estimated doubtful accounts. First, in Figure 11.13, let’s look at an E-R diagram of the invoicing and cash receipts events.

The SHIPMENT, CUSTOMER, and SALES INVOICE entities should look familiar from the E-R diagram in Chapter 10 (see Figure 10.13 on page 362). To those three, we have added a CASH RECEIPT entity. In this section, we will examine the relationships among SALES INVOICE, CUSTOMER, and CASH RECEIPT entities. Let’s next translate the E-R diagram into relational tables.

Figure 11.14, parts (a) and (b), reproduces selected relations from Figure 10.14 (see page 363) in order to emphasize the connections (linkages) among relations. These selected relations also remind us that before invoicing a customer, we first have accepted a customer’s sales order, picked the goods, and shipped the goods to the customer. Part (c) shows the new relations depicted in the E-R diagram in Figure 11.13. To simplify the tables, we have assumed that each inventory line item picked and shipped is billed at a single unit sales price from the INVENTORY_ITEM table.

**Figure 11.13** Entity Relationship (E-R) Diagram (Partial) for the RC Process

NOTE*: An $M$ to $N$ relation is shown under the assumption that a single cash receipt (remittance advice) could pay for several invoices or, alternatively, several partial payments could be received to settle a single invoice.
Figure 11.14  Selected Relationship Tables (Partial) for the RC Process

(a) Selected relations repeated from Figure 10.14

(b) Linkages (partial) to other relations

(c) To CUSTOMERS relation

(d) To SALES_ORDERS relation

(Shaded Attribute(s) – Primary Key)
Further, SALES_INVOICES (part b) ignores freight, sales taxes, or other items that might be billed to a customer. By using the SALES_INVOICES relation in part (b) and extracting other data, as needed, from other relations, consider how you would prepare the invoice record shown earlier in the chapter (see Figure 11.5, page 384).

The CASH_RECEIPTS and CASH_RECEIPT pays for SALES_INVOICE tables in part (c) substitute for the cash receipts data and remittance advice data discussed in the preceding section. For simplicity, we ignore customer cash discounts in the tables shown. First, note that Cust_No in CASH_RECEIPTS allows us to associate cash receipts with particular customers for the purpose of monitoring customer accounts and assessing any needed bad debt adjustments. In addition, Invoice_No in CASH_RECEIPT pays for SALES_INVOICE can be used to apply collections against specific open invoices. Finally, the linkages among CASH_RECEIPTS, CASH_RECEIPT pays for SALES_INVOICE, SALES_INVOICES, and CUSTOMERS can be used to determine customer accounts receivable balances at any moment in time.

**REVIEW QUESTIONS**

**RQ11-1** What is the revenue collection (RC) process?

**RQ11-2** What primary functions does the RC process perform? Explain each function.

**RQ11-3** How does the RC process relate to its organizational setting?

**RQ11-4** Why are customer self-service systems generally helpful in cutting customer service costs?

**RQ11-5** What is a lockbox? Why is a lockbox used?

**RQ11-6** Describe several ways that companies have used IT to reduce the float connected with cash receipts.

**RQ11-7** What are the sales data and accounts receivable data stores?

**RQ11-8** What is the difference between a postbilling system and a prebilling system?

**RQ11-9** What controls are associated with the billing function? Explain each control.

**RQ11-10** What controls are associated with the cash receipts function? Explain each control.

**DISCUSSION QUESTIONS**

**DQ11-1** Identify several examples of possible goal conflicts among the various managers and supervisors depicted in Figure 11.2 (page 376).

**DQ11-2** Based on the definition of float presented in the chapter, discuss several possibilities for improving the cash float for your company.
DQ11-3 (Appendix A) Using Figure 11.11 (page 404), list the kinds of data that might be running along the data flow that comes from the accounts receivable master data to bubble 2.1. Be specific, and be prepared to defend your answer by discussing the use(s) to which each of those data elements could be put.

DQ11-4 Discuss the information content of Figure 11.1 (page 375). How might this report be used by the sales manager, the credit manager or by the accounts receivable manager? If you were one of these managers, what other reports concerning accounts receivable might you find useful, and how would you use them? Be specific.

DQ11-5 Consult the systems flowcharts of Figures 11.6 (page 387) and 11.8 (page 396). Discuss how each of these processes implements the concept of segregation of duties discussed in Chapter 8. For each of the two processes, be specific as to which entity (or entities) performs each of the four data processing functions mentioned in Chapter 8 (assuming that all four functions are illustrated by the process).

DQ11-6 a. Discuss the conditions under which each of the following billing systems would be most appropriate: (1) prebilling system and (2) postbilling system.

b. Discuss the relative advantages of each of the billing systems mentioned in part a, from the standpoint of both the selling company and the customer.

**PROBLEMS**

NOTE: As mentioned in Chapter 10, the first couple of problems in the application chapters are based on the processes of specific companies. Therefore, the problem material starts with case narratives of those processes.

**CASE STUDIES**

**Case A: Midwest Insurance Co.**

**Background Information**

Midwest Insurance Co. is a major property/casualty underwriter based in St. Louis. It uses more than 3,000 independent insurance agents to market its products and collect premiums. In the past, agents typically have remitted the premiums to Midwest at a predetermined time each month by mailing the checks to a lockbox site or to a regional office of the insurance company. This method of cash collections has been slow, and accounting for the agents’ payments has been fraught with problems. Therefore, Midwest sought the help of Nationwide Bank (NB) in developing a more automated collection process. NB responded by developing an ACH-based “Customer-Initiated Payment Service (CIPS)” that allows the independent agents to pay Midwest with ACH debits initiated via a toll-free phone call or over the Internet. The next section describes how the CIPS process works; for simplicity, the description is limited to telephone-initiated payments.
Operation of the CIPS Process
By 8:15 p.m. EST on the 14th of each month, an agent calls the toll-free number and gives the bank operator the following information:

- The company number—Midwest’s four-digit designator
- The unit number—the agent’s eight-digit unique identifier
- The payment amount
- The agent’s PIN
- The effective date of the payment—a day (within the next 30 days) on which the payment is to be made

The bank operator keys the information to a payment database. Alternatively, the same information could be keyed in via the bank’s Web site. A preprocessing program checks to make sure all fields were filled in. Later in the evening, the bank uses the payment data to create a new file of transactions formatted to ACH standards. On each effective payment date, the ACH payment data is used to update the bank accounts of the agents and Midwest’s ACH concentration account at NB. Funds are then transferred from this ACH concentration account to Midwest’s primary concentration bank in New York City so they are available for investment on the transaction’s effective date.

The evening of the payment date, NB also transmits a data file of the settled payments to Midwest’s data center in Delaware. The data center uses the payments data to update its agents’ accounts receivable database and to post the payments to the general ledger. The following morning, the database is used to generate several reports, which can be viewed online or printed, depending on the option chosen by the users (i.e., by managers who access the database from Midwest’s St. Louis office).

Case B: Panhandle Department Stores (I)
Panhandle Department Stores operates at 30 locations in Texas and Oklahoma. The company’s headquarters are in Oklahoma City. The company accepts cash, national credit cards (VISA and MasterCard), and its own Panhandle charge card (PCC). Procedures for cash receipts are standard at each location. PCC billing and the treasury function are located at headquarters.

Customers present their purchases at a central checkout location at each store. Point-of-sale registers provide immediate updates to quantities on hand in the inventory master data, compile detailed data on sales, and accumulate “proof figures” used in cashing out the drawer at the end of each shift. Each store’s registers are tied to the central computer system in Oklahoma City.

Throughout the shift, clerks process the several forms of sales. At the end of the shift, the next clerk resets the proof totals. The front manager takes a hard copy of the proof totals for the shift completed and the drawer of the clerk whose shift was completed to the cashier, for “proving.” The cashier reconciles the drawer to the totals, prepares a two-part “cash out report” for each clerk on the shift, and updates the “over and short summary” maintained for each clerk. After the work for each shift is complete, these reports are sent to the front manager for review. Meanwhile, the clerk for the next shift has installed his own cash drawer and has begun processing sales.

Store deposits are made whenever the cash-on-hand balance reaches $25,000 and at the end of the day. For each deposit, the system prints out a deposit slip; a designated employee makes the trip to the local bank. The employee brings back a receipted deposit slip. Daily, the cashier prepares the national credit card (NCC) settlement sheets
in duplicate for each credit company. One copy of the settlement sheet and the supporting charge sales slips are submitted to the appropriate charge company for payment. The PCC slips, a copy of the NCC settlement sheet, a copy of the cash out report, and the day’s deposit slips are sent to Oklahoma City at 5:00 p.m. by courier mail.

In the cash receipts department at Oklahoma City, a sales report is obtained from the process at the end of each day. That report is reconciled to the cash out report and the deposit slips. The PCC slips are reconciled to that line on the cash out report. The PCC slips are then sent to data processing, where data preparation clerks enter the charges into a batch file on the computer. At 9:00 p.m. the batch is used to update the accounts receivable master data.

**Case C: Panhandle Department Stores (II)**

Before starting this case, review the facts in Case B.

Reimbursements from the national credit cards are deposited directly in the company’s main Oklahoma City bank, and the bank notifies Panhandle of these receipts. The cash receipts department reconciles these receipts to the NCC settlement sheets that previously had been submitted to the card companies (the settlement sheets had been filed by date until this time). All receipts from the company’s proprietary cards (PCCs) are received in Oklahoma City. The company uses a turnaround document, so it receives a check and a portion of the monthly charge card statement (on which the customer has filled in the amount remitted). The cash receipts clerk examines the check against the amount written on the document and, in a space reserved, enters the amount received on the document so that it can be computer scanned.

Checks and turnaround documents are batched. The documents are sent to data processing. The checks are deposited, and the deposit slip is photocopied. Copies of the batch totals and the deposit slips are filed separately by date. A copy of the deposit slip is sent to the treasurer’s office.

The turnaround documents are then scanned. Each evening at 10:00 p.m., customers’ accounts are updated with scanned data, and a cash receipts listing is produced and sent to cash receipts each morning, where it is checked against and filed with the related batch totals. A copy of the cash receipts listing is sent to the treasurer’s office.

**P11-1** For the company assigned by your instructor, complete the following requirements:

a. Prepare a table of entities and activities.

b. Draw a context diagram.

c. Draw a physical data flow diagram (DFD).

d. Prepare an annotated table of entities and activities. Indicate on this table the groupings, bubble numbers, and bubble titles to be used in preparing a level 0 logical DFD.

e. Draw a level 0 logical DFD.

**P11-2** For the company assigned by your instructor, complete the following requirements:

a. Draw a systems flowchart.

b. Prepare a control matrix, including explanations of how each recommended existing control plan helps to accomplish—or would accomplish in the case

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If the assigned case is an extension of an earlier case, limit your solution to the narrative contained in the assigned case.
of missing plans—each related control goal. Your choice of recommended
control plans should come from section A of Exhibit 11.1 (pages 392–394) or
Exhibit 11.2 (page 400) plus any technology-related control plans from Chap-
ter 9 that are germane to your company’s process.
c. Annotate the flowchart prepared in part a to indicate the points where the
control plans are being applied (codes P-1 . . . P-n) or the points where they
could be applied but are not (codes M-1 . . . M-n).

P11-3 Study the narratives of the case indicated by your instructor. Also refer to the two
operations process goals for the billing function in Figure 11.7 (pages 391–392),
and operations process goals A and B for the cash receipts function in Figure 11.9
(page 399).
In one paragraph for each of the four goals, compare and contrast the assigned
case processes in terms of their ability to achieve the goals. Cite specific features
that give a particular process a comparative advantage in terms of meeting a partic-
ular goal. Also, be specific in identifying the query or reporting opportunities in
the assigned cases.

P11-4 Assume the data collected in this case are stored in a data warehouse. Describe the
data and reports that could be used to help:
a. The treasurer decide how to invest the company’s money.
b. The controller determine if the company will have enough cash on hand.
c. The credit manager determine when to increase credit lines or cut off credit
to existing customers.

P11-5 The following capsule cases present short narratives of processes used by three actual
organizations whose names have been changed for the purpose of this problem.
You will use the cases to practice the mechanics of drawing data flow diagrams.

**Capsule Case 1: Cumberland County Registry of Motor Vehicles**
The Registry of Motor Vehicles (RMV) in Cumberland County, Kansas, has recently
simplified its license renewal process by automating the test-taking and fee-collection
steps in the process. RMV notifies drivers when their licenses are about to expire.
Drivers who renew their licenses in person at the RMV work with a computer that
looks and functions like an ATM machine. The process is described in the following
paragraphs.
After keying in his or her current driver’s license number, the applicant is pre-
sented with a touch-screen display that pulls up test questions stored within the com-
puter. Short video clips of typical traffic situations are shown, and questions are asked
about each clip. The applicant responds to the questions by selecting from options
presented on the screen.
The terminal scores the test, allows users to change address or other personal
information appearing on the screen, and “collects” the renewal fee. The user “pays”
the fee by inserting his or her VISA or MasterCard into a designated slot on the
computer.
The computer then prints a scored answer sheet, which the applicant takes to a
registry clerk. The clerk completes the process by administering a vision test, taking
a picture of the applicant, and issuing a license.
Capsule Case 2: Down Under Airlines

Background Information
Down Under Airlines (DUA) processes over 400 million tickets a year. The process of issuing the tickets is highly automated; a record of each ticket sold is stored in DUA’s database. But when passengers turn in tickets, gate agents stuff the flight coupons into envelopes and ship them to DUA’s Denver headquarters. Because of discrepancies between the original records housed in the ticket database and actual ticket use as reflected by the flight coupons (see the following NOTE), DUA, like other airlines, has to match every coupon against every ticket in the database in order to accurately account for passenger revenues. With the volume of tickets involved, manual matching is a daunting task. Image processing to the rescue!

(Note: For example, passengers might use a ticket from one airline to fly with another, or they might use only the A-B leg of an A-B-C flight, and so forth.)

Description of the New Image Processing System
DUA’s new system, designed by one of the Big Four professional service firms, functions as follows:

When a ticket is sold to a passenger by a travel agent or by one of DUA’s own 30,000 ticket agents, the seller enters a record of the ticket into DUA’s database, just as in the past. However, when flight coupons are received in Denver, they are now read by an image scanner that captures the images and stores them in an optical storage and retrieval library called Big File.

The ticket number appearing on the flight coupon is also scanned by an optical character recognition (OCR) system. The ticket numbers—an index to the ticket images themselves—are stored in a relational database, which is used to track the location of each ticket image in Big File.

Operators use a network of workstations to access ticket images. Special audit software matches each ticket image in Big File with ticket records in the mainframe database. If the image and record do not match (for instance, a three-leg ticket sold but only two legs used), the ticket number is included in the audit data. If the image and record do match, the ticket record is written to the passenger revenue data.

Capsule Case 3: Rosebud Supermarkets

Background Information
Rosebud Supermarkets Inc. operates a chain of grocery stores in Vermont. Rosebud accepts credit cards and debit cards at the point of sale (POS). To offer this service to customers, Rosebud has placed a pinstripe terminal within the reach of the customer at each checkout counter. The terminal, which is attached to the transport belt area that moves the groceries past the cashier, interfaces with the POS cash register. For customers who want to pay for their orders using a means other than with cash, the system works as described below.

Partial Description of Rosebud’s Checkout Process
(Note: Exception routines are among the features not described.)

When a customer presents his or her order at the checkout station, the cashier uses a POS scanner at the end of the belt area to ring up the customer’s order in the cash register and to produce a register tape for the customer. After the groceries have
been scanned, the cashier obtains the POS register total for the groceries purchased. Then, the customer hits the “enter” key in the pinstripe terminal. A screen display appears that shows the purchase total and asks the customer what type of payment option is desired. The customer selects from three options—credit card, direct debit (through local participating banks), or check authorization—by pressing a key opposite that option.

In the case of credit, the customer runs the credit card through the terminal’s magnetic stripe reader. The request for credit authorization is then transmitted to the appropriate credit card company. The credit card company sends back a credit authorization number for the purchased amount.

For the debit option, the customer runs a bank debit card through the card reader and then enters his PIN. As in the case of credit purchases, the data are transmitted to the appropriate bank. The bank responds by transmitting back an approval message.

For check authorization, Rosebud uses scannable courtesy cards. The courtesy card number and grocery total are transmitted to Rosebud’s internal check authorization system. The authorization system looks up the customer in its courtesy card data and notifies the cashier whether or not the check should be accepted.

For the capsule case assigned by your instructor, complete the following requirements:

a. Prepare a table of entities and activities.
b. Draw a context diagram.
c. Draw a physical data flow diagram (DFD).
d. Prepare an annotated table of entities and activities. Indicate on this table the groupings, bubble numbers, and bubble titles to be used in preparing a level 0 logical DFD.
e. Draw a level 0 logical DFD.

P11-6 Airlines have issued paperless tickets for several years now. Recently, they have begun experimenting with allowing travelers to print their own tickets using special bar coding technology located at commercial customer locations. The bar-code ticket system can be used to communicate with business customers’ accounting systems and other internal databases to speed up the billing process. These tickets would be scanned at the airport in the same way as paper tickets or airport generated boarding cards, when the passenger boards the plane.

a. Describe the advantages to the airline of this process. Compare it to both travel-agent-issued paper tickets and to paperless tickets.
b. Describe the advantages to the customer of this process.
c. Review Capsule Case 2 on Down Under Airlines. How would this change affect the process you diagrammed for Down Under Airlines? Make a copy of your diagrams, and show the changes you envision.

P11-7 The following is a list of 13 control plans from this chapter or from Chapter 9.

Control Plans
A. Independent billing authorization
B. Sales order tickler file in billing
C. One-for-one checking of sales order and invoice
D. Programmed edits of shipping notification
E. Interactive feedback check  
F. Computer agreement of batch totals  
G. Cumulative sequence check  
H. Document design  
I. Prenumbered documents  
J. Procedures for rejected inputs  
K. Turnaround documents  
L. One-for-one checking of deposit slip and checks  
M. Deposit slip file

Listed next are 10 statements describing either the achievement of a control goal (i.e., a system success) or a system deficiency (i.e., a system failure). List the numbers 1 through 10 on your solution sheet. Next to each item, insert one letter from the preceding list indicating the best control to achieve the desired goal or to address the system deficiency described. A letter should be used only once, with three letters left over.

Control Goals or System Deficiencies
1. Helps to ensure the validity of shipping notifications.
2. Provides a detective control to help ensure the accuracy of billing inputs.
3. Provides a preventive control to help ensure the accuracy of billing inputs.
4. Helps to ensure input validity by preventing duplicate document numbers from entering the system.
5. Helps to identify duplicate, missing, and out-of-range numbers by comparing input numbers to a previously stored number range.
6. Precludes a field salesperson from omitting the sales terms from the sales order, thus avoiding having the order rejected by the computer data entry personnel.
7. Helps to ensure the Information System control goal of input completeness in a periodic/batch environment.
8. Helps to ensure that all shipments are billed in a timely manner.
9. Meets the operations system control goal of efficiency of resource use by reducing the number of data elements to be key entered from source documents.
10. Provides an “audit trail” of deposits.

The following is a list of 15 control plans from this chapter or from Chapters 9 and 10.

Control Plans
A. Sales order tickler file in billing  
B. One-for-one checking of sales order and shipping notice by shipping department personnel  
C. Confirming customer balances regularly  
D. Entering shipping notice close to location where order is shipped  
E. Checking for authorized prices, terms, freight, and discounts
Listed below are 10 system failures that have control implications. List the numbers 1 through 10 on your solution sheet. Next to each number, insert one letter from the preceding list corresponding to the control plan that would best prevent the system failure from occurring. Also, give a brief (one- to two-sentence) explanation of your choice. A letter should be used only once, with five letters left over.

System Failures

1. Once goods are delivered to the common carrier, the shipping system at Goodtimes Video Corp. prepares a three-part shipping notice. Copy 2 of the notice is sent to billing to initiate the billing process. Many shipping notices have either been lost in transit or have been delayed in reaching the billing section.

2. A dishonest order entry clerk bypasses the credit-checking procedures every time a customer order is received from his brother-in-law’s firm. The clerk releases sales order copies to the warehouse and to the shipping department without submitting the orders to the credit department.

3. Because the mailroom clerks at Laxx Company do not take batch totals of incoming customer checks, the cashier has misappropriated several thousand dollars over the years by depositing company checks to his personal bank account.

4. Potpourri Merchandising Mart uses periodic processing for entering sales invoice inputs and updating customer accounts. Although it uses certain batch total procedures, Potpourri has experienced a number of instances of recording sales invoices to incorrect customer accounts.

5. The billing department at Gerrymander Corp. employs batch processing and uses prenumbered invoice documents. Nevertheless, a number of duplicate invoice numbers has been processed, resulting in numerous customer complaints.

6. Because Abraham Co. had been privately owned for years, it had never undergone an independent audit. When Abraham finally went public, the Securities and Exchange Commission required an audit of its financial statements. As part of its audit, the independent CPA firm found a large discrepancy between the accounts receivable general ledger balance and the underlying details of individual customer balances.

7. At Jonquil, Inc., billing sends shipping notices to the data entry group in data processing, where they are keyed into the computer. During the last month, an inexperienced data entry clerk made several errors in keying the shipping
notices. The errors were discovered by the internal auditors as part of their routine examination of the data processing department.

8. Sales at Defrod Corporation have declined considerably over those of the preceding year. In an effort to improve the financial statements, the vice-president of finance obtained a supply of blank shipping notices on which she fabricated 100 fictitious shipments. She submitted the fictitious documents to the billing department.

9. The mailroom at Whipoorwill Co. forwards checks and remittance advices to the accounts receivable department. A clerk checks the remittance advices against open invoices, as reflected in the accounts receivable master data. It is not uncommon for the clerk to note discrepancies, in which case the customer is contacted in an effort to reconcile the differences. Once all the discrepancies have been investigated and cleared, the accounts receivable clerk releases the checks to the cashier for deposit.

10. Clerks in the billing department at Abacus Enterprises, Inc., prepare sales invoices from a copy of the packing slip received from the shipping department. Recently, the company has experienced a rash of customer complaints that the customers have been billed for freight charges, despite the fact that they were promised free shipping.

P11-9

a. Redraw the appropriate part of Figure 11.4 (page 383), assuming a lockbox system is used. Also, prepare a lower-level data flow diagram for the cash receipts function, using the same assumption.

b. Redraw the appropriate part of Figure 11.4 assuming that, in addition to cash collections from charge customers, the organization also has cash sales and receives cash from the sale of equity securities. Prepare a brief, one- to two-sentence defense for each of the changes made.

Do not draw an entirely new Figure 11.4 for either part (a) or part (b). You might want to photocopy the figure from the chapter and then draw your additions and changes on the photocopy.