MANAGEMENT INFORMATION SYSTEM (Current Syllabus)

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Chapter 1 – Management Information Systems

- Information System
- Data Base Management System (DBMS)
- Management Information System (MIS)
- MIS Personnel
- Multi-Processor Environments
- MIS Security Issues

Information System:

THE INFORMATION SYSTEMS of automated hotels and restaurants can produce literally hundreds of reports for managers. However, simply distributing reports does not in itself ensure an effective information system. To achieve the full potential of an automated information system, system functions must align with management's information needs. Information systems also streamline the process of collecting and recording data and expand the ways in which information is organized and reported. These systems enable management to speed up the process by which useful information is made available to those who make decisions.

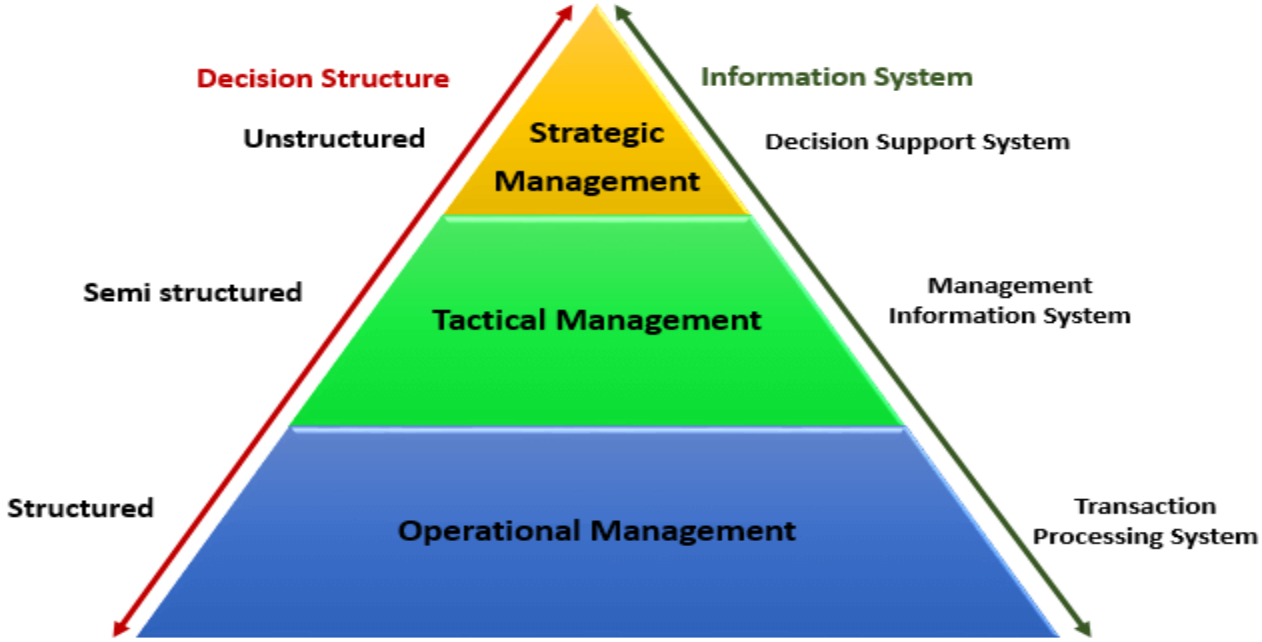
Typical Components of Information Systems

While information systems may differ in how they are used within an organization, they typically contain the following components:

1. **Hardware**: Computer-based information systems use computer hardware, such as processors, monitors, keyboard and printers.
2. **Software**: These are the programs used to organize, process and analyze data.
3. **Databases**: Information systems work with data, organized into tables and files.
4. **Network**: Different elements need to be connected to each other, especially if many different people in an organization use the same information system.
5. **Procedures**: These describe how specific data are processed and analyzed in order to get the answers for which the information system is designed.

Types of Information Systems

The type of information system that a user uses depends on their level in an organization. The following diagram shows the three major levels of users in an organization and the type of information system that they use.



Transaction Processing Systems (TPS)

This type of information system is used to record the day to day transactions of a business. An example of a Transaction Processing System is a Point of Sale (POS) system. A POS system is used to record the daily sales.

Management Information Systems (MIS)

Management Information Systems are used to guide tactic managers to make semi-structured decisions. The output from the transaction processing system is used as input to the MIS system.

Decision Support Systems (DSS)

Decision support systems are used by top level managers to make semi-structured decisions. The output from the Management Information System is used as input to the decision support system. DSS systems also get data input from external sources such as current market forces, competition, etc.

Management Information System:

DEFINITION:

A management information system (MIS) is an integrated man-and-machine system that provides the basic information that is necessary for supporting, planning, and controlling an organization. It is a combination of human and computer-based resources that results in collection, storage, retrieval, communication, and use of data for efficient management operations. Management information system is used for supplying information that can be used for arriving at an effective decision. Computerization has helped in increasing the speed and accuracy of processing data, which in turn has led to better decision-making.

The term 'management information system' is made up of three words—management, information, and system.

MANAGEMENT

Management is the process of achieving organizational goals and objectives by using manpower, materials, machines, money, and methods. The various functions of management are planning, organizing, staffing, controlling, and directing.

INFORMATION

It is defined as data that is organized and presented at a particular time and place so that the decision-maker can take the necessary action.

SYSTEM

It is a group of elements or components that are joined together to fulfill certain functions. It is an assemblage of procedures, processes, methods, and routine techniques that are united in some form to form an organized whole. A system has three basic parts, which are set in an orderly manner.

A management information system (MIS) is designed to provide managers with the information necessary to plan, organize, staff, direct, and control operations. An effective MIS is built around the information needs of managers. It can be designed so that system applications support decision-making activities at all levels within the organization. An effective MIS extends its power beyond routine report generation and provides managers with the information they need to:

- Monitor progress toward achieving organizational goals.
- Measure performance.
- Identify trends and patterns.
- Evaluate alternatives.
- Support decision-making.
- Assist in the identification of corrective action.

An MIS supports strategic planning, tactical decision-making, and operational decision-making. Strategic planning refers to decision-making activities through which future-oriented goals and objectives of an organization are established. Tactical decisions relate to activities required to implement strategic planning decisions. Operational decisions address specific tasks that normally follow previously established rules and patterns.

Once the information needs of managers have been identified, an MIS is designed to perform the following functions:

- Enable managers to better monitor and administer business transactions and activities.
- Provide a high level of operational and internal control over business resources.
- Produce timely and comprehensive reports formatted to the specific needs of management
- Reduce managerial paperwork and operational expenses by eliminating unnecessary source documents and streamlining data transfer and recording procedures.

Manual Information Systems VS Computerized Information Systems (MIS)

Data is the bloodstream of any business entity. Everyone in an organization needs information to make decisions. An information system is an organized way of recording, storing data, and retrieving information.

Manual Information System

A manual information system does not use any computerized devices. The recording, storing and retrieving of data is done manually by the people, who are responsible for the information system.

The following are the major components of a manual information system

- **People –**people are the recipients of information system
- **Business Procedures –**these are measures put in place that define the rules for processing data, storing it, analyzing it and producing information
- **Data –**these are the recorded day to day transactions
- **Filing system –** this is an organized way of storing information
- **Reports –**the reports are generated after manually analyzing the data from the filing system and compiling it.

The following diagram illustrates how a typical manual information system works

Advantages and Dis-advantages of a manual information system

Advantages:

The following are the advantages of manual information systems

- **Cost effective –** it is cheaper compared to a computerized system because there is no need to purchase expensive equipment such as servers, workstations, printers, etc.
- **Flexible –**evolving business requirements can easily be implemented into the business procedures and implemented immediately

Disadvantages:

The following are some of the disadvantages of a manual information system.

- **Time consuming –**all data entries need to be verified before filing, this is a time consuming task when done by humans. Retrieving data from the filing system also takes a considerable amount of time
- **Prone to error –** the accuracy of the data when verified and validated by human beings is more prone to errors compared to verification and validation done by computerized systems.
- **Lack of security –** the security of manual systems is implemented by restricting access to the file room. Experience shows unauthorized people can easily gain access to the filing room
- **Duplication of data –**most departments in an organization need to have access to the same data. In a manual system, it is common to duplicate this data to make it easy to accessible to all authorized users. The challenge comes in when the same data needs to be updated
- **Data inconsistency –** due to the duplication of data, it is very common to update data in one file and not update the other files. This leads to data inconsistency
- **Lack of backups –** if the file get lost or mishandled, the chances of recovering the computerized systems data are almost zero.

Computerized information were developed to address the challenges of manual information systems. The major difference between a manual and computerized information system is a computerized system uses a combination of software and hardware to record, store, analyze and retrieve information.

Advantages and Disadvantages of a computerized information system (MIS)

The following are some of the disadvantages of a computerized information system.

Advantages:

The following are the advantages of computerized information systems

- **Fast data processing and information retrieval –** this is one of the biggest advantages of a computerized information system. It processes data and retrieves information at a faster rate. This leads to improved client/customer service
- **Improved data accuracy –** easy to implement data validation and verification checks in a computerized system compared to a manual system.
- **Improved security –** in addition to restricting access to the database server, the computerized information system can implement other security controls such as user's authentication, biometric authentication systems, access rights control, etc.
- **Reduced data duplication –** database systems are designed in such a way that minimized duplication of data. This means updating data in one department automatically makes it available to the other departments
- **Improved backup systems –** with modern day technology, backups can be stored in the cloud which makes it easy to recover the data if something happened to the hardware and software used to store the data

- **Easy access to information –** most business executives need to travel and still be able to make a decision based on the information. The web and Mobile technologies make accessing data from anywhere possible.

Disadvantages:

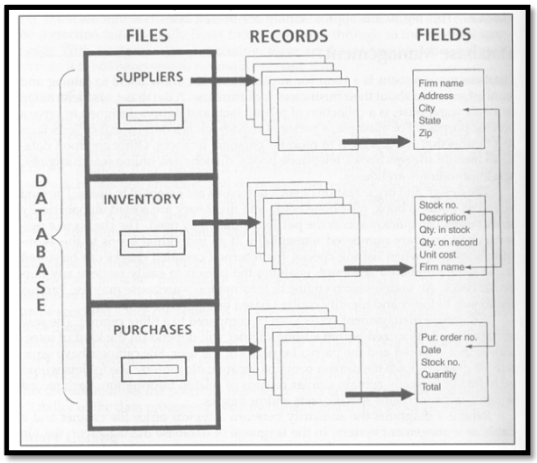
- **It is expensive to set up and configure –** the organization has to buy hardware and the required software to run the information system. In addition to that, business procedures will need to be revised, and the staff will need to be trained on how to use the computerized information system.
- **Heavy reliance on technology –** if something happens to the hardware or software that makes it stop functioning, then the information cannot be accessed until the required hardware or software has been replaced.

- **Risk of fraud –** if proper controls and checks are not in place, an intruder can post unauthorized transactions such as an invoice for goods that were never delivered, etc.

MANAGING MULTI PROCESSOR ENVIRONMENTS:

Electronic Data Processing:

Data are facts and/or figures to be processed into useful information. Data processing involves transforming raw facts and isolated figures into timely, accurate, and useful information. Every day, hospitality managers are bombarded with facts and figures about the results of operations. These individual pieces of data are relatively meaningless until they are organized or manipulated into useful information.



Information, the result of data processing, is clearly one of the most valuable resources of a hospitality business. Information can increase a manager's knowledge regarding guests, service, labor, finance, and other areas of concern. Information may reduce the uncertainty that managers may experience when making decisions. And, after decisions have been made, information can provide managers with important feedback on the effectiveness of their decisions and may indicate new areas of concern that call for corrective action. Data processing is not unique to the world of business; it is an important function that occurs in everyday life as well. Everyone processes data.

Types of Data:

There are three distinct types of data.

1. Alpha Data: It consists only of letters of the alphabet.
For example: the names of menu items, employees, and hotel guests are examples of alpha data.

2. Numeric data: It consists only of numbers.
Menu prices, room numbers, transaction amounts, and occupancy percentages are numeric data.

3. Alphanumeric data: It is composed of both letters and numbers.
A hotel's street address, a menu item's description, and personnel records are examples of alphanumeric data

Database Management System:

A Database is a collection of related data organized in a way that data can be easily accessed, managed and updated. Any piece of information can be a data, for example name of your school. Database is actually a place where related piece of information is stored and various operations can be performed on it.

DBMS:

A DBMS is a software that allows creation, definition and manipulation of database. DBMS is actually a tool used to perform any kind of operation on data in database. DBMS also provides protection and security to database. It maintains data consistency in case of multiple users. Here are some examples of popular dbms, MySQL, Oracle, Sybase, Microsoft Access and IBM DB2 etc.

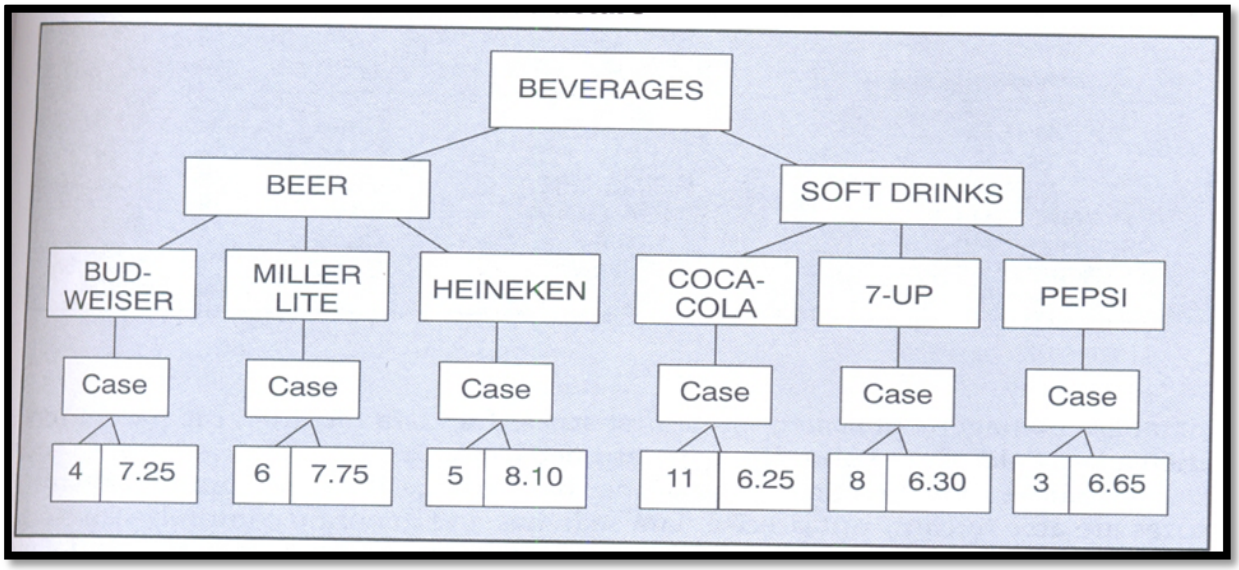
Files, Records, and Fields:

In a database management system, fields are labeled by categories that identify the kind of information they contain. Records are identified in terms of a primary key field, which contains unique information. The name of the primary key field becomes the basis for searches through a data file for a particular record.

The database of a hospitality business may be organized into many data files (such as personnel files, financial data files, guest history files, etc.). These files may contain dozens of records and scores of fields containing thousands of pieces of data. Database management applications structure the relationships among files, records, and fields in a way that ensures rapid access to information. However, not all database management software applications structure a database in the same manner.

Database Structures:

Database management applications structure a database by organizing data files, records, and fields in ways that facilitate searching for data, updating data, and generating reports for management. Database applications manage databases through either hierarchical structures or relational structures. A hierarchical database structure arranges data files, records, and fields into formations that resemble the structure of the roots of a tree. As the trunk of a tree leads into major roots, which in turn branch off into entire networks of roots, so a hierarchically structured database begins with a data file (the trunk), which opens onto a number of master records (the major roots), which in turn lead to intricate networks of



other subordinate records.

Input / Output Specifications:

Database applications require users to define an input area for data entry, a criteria area for directing queries, and an output area for directing results. Although database applications usually provide predetermined specifications (also referred to as default settings), users are encouraged to define specifications for these areas that best meet their needs. Input area specifications define data entry procedures. Screen templates can be designed to guide users with data input responsibilities.

Components of Database System

The database system can be divided into four components.

•Users: Users may be of various type such as DB administrator, System developer and End users.

•Database application: Database application may be Personal, Departmental, Enterprise and Internal

•DBMS: Software that allow users to define, create and manages database access, Ex: MySQL, Oracle etc.

•Database: Collection of logical data.

Functions of DBMS

- Provides data Independence
- Concurrency Control
- Provides Recovery services
- Provides Utility services
- Provides a clear and logical view of the process that manipulates data

Advantages of DBMS

- Segregation of application program.
- Minimal data duplicacy.
- Easy retrieval of data.
- Reduced development time and maintenance need.

Disadvantages of DBMS

- Complexity
- Costly
- Large in size

MIS Personnel

In large, fully automated hospitality properties, the MIS management staff may consist of a property systems manager and department systems supervisors. Generally, the property systems manager participates in the evaluation, selection, and installation of system hardware and is trained in network operations for specific software applications used throughout the property. The property systems manager, also known simply as the systems manager, provides on-premises systems support and, when necessary, functions as a network administrator and/or an applications software analyst.

Department systems supervisors are typically individuals already employed within a specific department who receive extensive training in the operation of specialty hardware, software, and network components used in the operating departments. Department systems supervisors train others within their operating departments and provide technical support services as appropriate.

The property systems manager has a wide range of responsibilities. More often a generalist than a technician, the systems manager must understand advanced technology (including hardware, software, network, and security components), information processing techniques, and inter-relations of functional areas within the property. Without this understanding, it would be difficult to direct the MIS to meet the specific information needs of managers throughout the property. The systems manager must also be skilled in system vendor relations and provide a reliable and efficient information distribution system for management and staff.

Other duties of a property systems manager include:

- Planning and controlling MIS activities, which include identifying the processing priorities within the system.
- Selecting department systems managers and establishing training programs.
- Managing multi-processor environments, which include developing system configuration and design alternatives in relation to the placement and processing capabilities of system components.
- Designing and implementing information back-up and security controls.
- Oversight of local and wide area networks, including elements of access and security.

SECURITY ISSUES OF MANAGEMENT INFORMATION SYSTEMS:

There are three major areas of MIS security—power backup systems, information backup systems, and information protection. The management of an organization focuses on the risks involved during power failure, information backup procedures, and unprotected information that might pose a potential threat to the hospitality operations. It may so happen that a competing hotel might gain access to the guest history files, which could lead to a hotel losing revenue. However, these can be avoided with proper security systems.

Power Backup Systems:

Fluctuation or interruption of power supply can lead to problems in working with computers. This problem can be significantly reduced by using an uninterruptible power supply (UPS). The UPS is equipped with a battery that is placed on the computer's electric line so that if there is any fluctuation in the power line of the computer, it would activate the battery, which would compensate for the energy deficiencies. This battery backup gives the computer continuous power supply. The system automatically recharges the battery as and when a normal power source becomes available.

A preventive maintenance programme is also necessary to protect against system breakdown. There should also be a predetermined emergency maintenance plan, outlining the steps to be followed during a crisis. For example, in addition to power

backup systems, there should also be plans for hardware backup availability, that is, sources for quickly obtaining essential parts such as a printer or keyboard.

Information Backup Procedures:
Information backup should be a standard operating procedure to ensure that no data is ever lost. There are three main ways of maintaining information backup:

- Redundant copy
- Duplicate copy
- Hard copy

Though many computer manufacturers suggest using more than one backup procedure, it is for the management to ensure that at least one practice is being followed information regularly. We will now discuss each procedure in detail.

Redundant copy:
This kind of copy is simultaneously prepared in two storage devices as and when transactions are carried out (the copies are saved in two external storage devices). Since an accounting system employs a disk drive as the base for one external storage device, it also requires a second disk drive. The data is stored in two separate disks, as and when data input is performed. It could be an expensive hardware configuration and requires more attention than other backup methods.

Duplicate copy:
This kind of copy is one of the most popular and efficient means of obtaining information backup. In a duplicate copy, the computer system records data in only one storage device; hence a second disk drive (as is necessary for a redundant copy) is not required. A copy of the data on the single drive can be later made on the same device using a blank disk. The backup tapes are stored and only used in case of disk error or failure; the orderly access to data does not reduce the property's ability to maintain efficient computer operations.

Hard copy:
Printouts from disk files can be used as a backup technique only in combination with either redundant or duplicate copy procedures. A user who relies on only hard copy information backup will face the difficult task of maintaining data files. In this situation, all the information stored on the hard copy has to be manually re-entered to restore the system's database. When a hard copy is used to supplement one of the other two methods of data storage it usually provides the means for troubleshooting any missing or incorrect transactional recording. A hard copy backup is usually taken by the hotels at the end of a

day's procedures or after the night audit has been completed. The hard copies are usually filed and a copy is sent to the department heads.

Information Protection:
Information protection is much more complicated than power backup procedures or information backup procedures, and should involve strategic considerations. Information must be protected from two major threats—external and internal.

External threats:
Since an organization is connected to external devices through the Internet, there could be instances of some of the data being transferred from the hotel's system to an individual's system. Cybercrime is now a huge threat to society and is caused by criminal or irresponsible action by individuals, making the Internet and other networks vulnerable to its effects. Hacking can be carried out by either an outsider or an employee of the company, who uses the Internet and other networks to steal or damage data and programs.

Internal threats:
To reduce internal threats to the security of information, organizations have passwords and different authorization levels for accessing the data. Security codes (e.g., a multilevel password system) are being used for security management. In this procedure, passwords are allotted to every individual using the system. Data would be provided as per the authorization level accessibility of the password. Hence, a waiter's password will not have the ability to void a sale or view the sales figures of an outlet, but the manager's password would have access to such data. Routine maintenance of the software and software updates are necessary to avoid transfer of information to unauthorized individuals.

A computer system may also be affected by a virus from either external or internal sources. A virus is an unauthorized programmed code that attaches itself to other programs. Viruses usually enter computer systems through external programs or files.

Chapter 2 – Selecting & Implementing Computer Systems

- Analysing current information needs
- Collecting sales information
- Establishing system requirements
- Requesting proposals from vendors
- Contract negotiation

THE IDENTIFICATION, EVALUATION, AND SELECTION of hospitality technology systems can be complex and time consuming. Many properties appoint a project team. The project leader generally has overall responsibility for purchasing the technology system. This person determines a schedule for the purchasing process and monitors the team's progress. The process begins as the team analyzes the current information needs of the business, collects relevant technology sales literature, and establishes system requirements. The results of this preliminary research are used to formulate a request for proposal (RFP) from vendors. The process continues with the evaluation of proposals and product demonstrations, contract negotiations, and the implementation of the new system. Throughout *the process, it is helpful to keep the* "nevers" of technology purchasing in mind.

- Never purchase hardware before software. After selecting software first, identify the hardware it requires.
- Never make a purchase decision based solely on cost. Too often, economic factors are given a disproportionate weight in the decision process.
- Never lose control of the purchasing process. Develop request for proposal documents, script on-site vendor demonstrations, and apply uniform criteria when evaluating vendor proposals.
- Never rely on enhancement promises. A system feature that is advertised, but not yet available for sale, may not actually become available for some time.
- Never be the first system user. New systems have no operational history and, therefore, are difficult to evaluate.
- Never allow technology to dictate operations. Changing operations to fit the demands of the technology is reverse logic (i.e., the tail wagging the dog).
- Never be the largest system user. Pushing the capabilities of a system's processing speed, file parameters, memory capabilities, and other functions may lead to a series of problems, many of which may not be resolved in a timely manner.
- Never be the last system user. System maintenance, ongoing technical support, enhancements, and the like may be difficult or impossible to obtain once the vendor has abandoned the product.
- Never allow a vendor to rewrite the business's technology requirements. A system that meets vendor specifications may not meet business needs; the focus must be on business needs.

Information Needs

The first step in analyzing the information needs of a business is to identify the types of information that various levels of management use in the course of operations. This can be done by compiling samples of reports presently prepared for management - for example, the daily operations report, basic financial statements, and reports. Once collected, the reports can be analyzed in relation to such variables as purpose, content, distribution, and frequency.

Report analysis identifies the types of information management uses, but does not necessarily reveal the information needs of the business. A separate survey needs to be conducted to evaluate the effectiveness of the format and content of current reports. Survey findings can provide the basis for immediate improvements in the information system and enable a more in-depth analysis to include flowcharts and a property profile.

A property profile compiles statistics about the installed information system. The types of categories and number of individual entries will vary from property to property. A property profile can be invaluable when communicating information needs of the business to system vendors. A well-designed property profile allows vendors to compare the property's information needs to those of similar properties. In addition, a property profile enables management to conduct a more informed and efficient review of technology sales literature.

Sales Literature

After creating a property profile, management should collect sales literature on a variety of technology systems that meet the general information needs of the business. Literature collection can result from:

- Sending inquiries to state and national hospitality trade associations. Attending hospitality industry trade shows.
- Visiting local technology system suppliers
- Conducting online searches for hospitality technology vendors

Trade associations and other organization regularly sponsor state, regional, and national trade shows. Attendance at trade shows typically places management in direct contact with hospitality technology vendors.

Management can also secure product information by visiting local system suppliers. This approach can be time-consuming and may not provide a representative view of the range of products on the market.

Perhaps the most effective approach to fact-finding is to use the information obtained from trade associations, attendance at trade shows, and visits to local vendors to formulate a general interest inquiry to be mailed or e-mailed to vendors of hospitality technology systems. This can be an efficient means of securing necessary information on various system solutions. Management may also choose to use broadcast mailings to secure more specific information, such as:

- Hardware documentation
- Software documentation
- Netware documentation

- Lists of installed users
- Sample report formats
- Sample training materials
- Suggested training and implementation scheduling
- Annual financial statements of the vendor’s business
- Purchase/lease options
- User support and maintenance programs
- Sample system contract

Gathering this information early in the process may prove valuable later when standardizing the response form that selected vendors will be required to complete when submitting system proposals to management. Before formulating the issues and categories of responses that will appear on the request for proposal document, management must analyze the needs of the business in light of the sales information collected.

Establishing System Requirement

Having analyzed the business's information needs and collected relevant sales literature, management's next step is to establish system requirements. This does not mean that hospitality managers must become experts in technology system design. Instead, management must be able to identify critical elements such as:

- Determining what data needs to be processed
- Establishing how that data will be processed
- Indentifying how processed data will be stored and reported.

Determining what data to process involves identifying the information tasks that can best be performed by the automated system. Management must carefully weigh what is to be gained through technology. Will automation improve guest services? Will it increase operational efficiency? Will it enhance management's decision-making effectiveness? Other factors to consider when determining which data to process include the ease of identifying, collecting, entering, and coding data. These factors are essential to the timely processing and output of information.

Determining how data is to be processed is a matter of ensuring that the algorithmic design of the software programs corresponds to the formulas management prefers. The term "algorithm" refers to a prescribed set of welldefined, unambiguous rules or procedures leading to the solution of a problem. Too often, management assumes that hospitality industry jargon, such as "occupancy percentage" and "food cost percentage," means the same thing to all system designers. The truth is that hospitality properties differ in terms of the variables incorporated into these calculations.

In order to ensure that the selected system will process data according to the property's standards, management should survey individual operating departments seeking detailed explanation of how formula variables are to be handled. This master list of formulas and the accompanying explanations identify major system requirements that vendors need to address when submitting a proposal to management.

Determining the formats in which processed data will be output as information involves decisions that may change the structure and style of current business forms, guest folios, guest checks, management reports, and other materials. The information needs of the business and the format preferences of managers should dictate the choice of the system's output capabilities.

Request For Proposal

After translating information needs into system requirements, management is ready to request a property specific proposal from industry suppliers. A request for proposal (RFP) is typically made up of three major sections. One section informs the vendor about hospitality business operations; a second section establishes bidding requirements for vendor proposals; and a third section deals specifically with user application requirements.

The first section of the RFP should contain an overview of the hospitality business, list objectives and broad operational requirements for the system, and briefly outline the scope of vendor relations and support services. The overview of the hospitality business should include a detailed property profile based on its information needs. Listing objectives and operational requirements for the system offers management the opportunity to identify and designate particular system features as mandatory or optional, thus assisting vendors in the preparation of responsive proposals. An outline of the vendor's responsibilities should include the proposal submission deadline and should encourage vendors to submit as much information as possible relative to such areas as:

- Network configurations.
- Application descriptions.
- Maintenance and support services. Installation and training programs.
- Guarantees and warranties.
- Payment plan options.
- Future expandability of the proposed system.

The second section of the RFP establishes bidding requirements for vendor proposals. Allowing vendors to formulate bids using a proprietary or arbitrary format will force management into using an unstructured evaluation process. All proposals should be submitted in a standardized response form supplied by management to facilitate price and performance comparisons. Note that structured formatting enables management to conduct comparisons between proposals using a common set of dimensions. Vendors should also be required to include a statement of financial history and stability.

The final section of the RFP needs to address specific system application requirements. RFP form that structures vendors' responses to application requirements. Since all vendors are required to use the identical response format, management will be more efficient in evaluating competing proposals.

Once created, the RFP (printed, electronic, or online) is distributed to the vendor community for response. After receiving an RFP, most vendors will contact management and conduct a site survey.

Site Survey

After receiving an RFP, vendors typically contact the property to perform a site survey. The purpose of a site survey is to allow the vendor to better understand the specific business operations of the property that may affect system design. The physical parameters of a property help determine appropriate types of hardware and network configurations.

Evaluating Proposals

After conducting a site survey, the vendor completes a system proposal and submits it for consideration. While there are many ways to evaluate a proposal, a multiple rating system can be an efficient and effective method.

A multiple rating system applies the same criteria to judge the worth of each vendor's proposal. Generally, the criteria consist of several issues that management considers critical to the business. Management then rates the vendor's response to each issue on a scale from 1 to 100. The higher the rating, the better the proposal is deemed to address the issue. Since some issues will always be considered more important than others, simply totaling the ratings on key issues may not necessarily identify the best system proposal. In order to identify the best proposal, management must rank the issues in the order of their importance. This can be accomplished by assigning a percentage value (or weight) to each criterion, denoting its relative importance within the overall evaluation scheme. The ratings for each issue are multiplied by their appropriate percentage values and then totaled to yield an overall score for each vendor proposal. The proposals receiving the highest overall score identify the vendors with whom management should seriously consider scheduling product demonstrations. The following example illustrates how a multiple rating system can be used to evaluate proposals from three different vendors.

	Vendor A	Vendor B	Vendor C
Product Performance	80 x .45 = 36	70 x .45 = 32	50 x .45 = 23
Vendor Reputation	60 x .30 = 18	95 x .30 = 29	80 x .30 = 24
System Cost	90 x .25 = 23	70 x .25 = 18	80 x .25 = 20
Overall Score	77	79	67

Vendor Product Demonstration

A product presentation is intended to allow management to view, first-hand, how the proposed system components operate to achieve the promised results. In order to control this process, management should consider using a scripted demonstration format.

Scripted product demonstrations (scripted demos) prevent vendor presentations from becoming a confusing show of "neat system tricks." With scripted demos, management provides each vendor with a script indicating which applications to demonstrate, ensuring that the session addresses features relevant to the business. This approach also provides a standard to ensure that every demonstration covers the same functionality.

Contract Negotiations

Before entering into contract negotiations with a vendor, management should secure copies of several standard contracts used by vendors of hospitality technology applications. These standard contracts are typically written in favor of the vendors and may not provide the kind of protection that the business may require. Management should examine these contracts carefully and obtain legal advice from a qualified attorney. If the attorney has no working knowledge of technology applications, management may also need assistance from an experienced technology applications consultant. In any case, the standard contract offered by a vendor serves as the starting point for contract negotiations. Since the actual sale has not yet been completed, management (the buyer) maintains a great deal of leverage in negotiating changes to the vendor's standard contract.

Contractual Arrangements

In relation to hospitality technology, there are several types of contractual arrangements. Three common agreements are:

- **Single-vendor contracts.**
- **Multi-vendor contracts.**
- **Other equipment manufacturer (OEM) contracts.**

A single-vendor contract refers to an agreement to purchase hardware software, and netware from the same vendor. In most cases, the vendor makes the necessary hardware, software, and netware modifications before system implementation. A single-vendor contract clearly identifies the vendor's responsibilities in relation to system performance and security and avoids the kind of confusion that may arise in other contractual arrangements when the lines of responsibility are not so clearly defined.

A multi-vendor contract refers to an agreement to purchase system components from more than one vendor. The hardware components may be purchased directly from the manufacturer or purchased through a software

vendor, who serves as a value-added reseller. In either case, the hardware components or the accompanying operating system may require modifications by the software provider in order to perform effectively. Similarly, network features may require modification based on hardware and software specifications.

An other equipment manufacturer (OEM) contract refers to a situation in which a business agrees to purchase hardware, software and netware from a single source, and the single source takes responsibility for the

performance of the technology application. OEM contracts generally involve purchasing a complete system that arrives at the property ready for installation. This kind of contractual arrangement provides a business with the equivalent of a single-vendor contract, as all hardware, software, and netware customization is performed by the OEM.

Installation Factors

After completing contract negotiations, management must make final decisions on such installation factors as:

- Training.
- Site preparation.
- Design of materials.
- Initial entry of database elements.
- Acceptance testing. System conversion. Documentation.
- Contingency planning.
- System security and data privacy.

The following sections discuss each of these installation factors.

Training

Training should begin before installation and continue throughout the implementation process. The primary users of the system will be those individuals responsible for data entry, report generation, and system maintenance. These persons should begin active (hands-on) training with hardware components and software applications before installation. Training sessions are normally conducted by vendor staff members or vendor representatives using manuals, books, CDs, DVDs, video, web, and other media.

Site Preparation

Site preparation refers to architectural or engineering changes that must occur before an automated system can be installed. The extent of these changes depends on the size of the property and the kind of technology being installed.

Design of Materials

Details regarding any printed materials output or used by various applications must be resolved before implementation. This is also true of guest-related touch point applications (a touch point being any area of the business with which the guest interacts). Lodging properties may choose to design both printed and electronic formats for reservation confirmations, website interfacing,

broadcast mailings, guest folios, may be redesigned for food services businesses include guest checks, broadcast, mailings, menus, promotional materials, and management reports.

Data Entry

Before system installation, management and vendor representatives must develop a plan for data entry that will populate the application database. This is a critical area of technology planning that often is overlooked. Once the system is installed and implemented, the content of the database is necessary to define the scope of potential applications.

Acceptance Testing

Before adopting or upgrading an application, management should conduct extensive acceptance testing of the candidate technology. Acceptance testing involves more than simply checking whether the application works. Tests should be developed to determine whether automated operations function according to standards defined by management. Fundamental areas of acceptance testing include:

- Hardware efficiency.
- Software reliability.
- Data integrity.
- Network security.

System Conversion

System conversion is the process of transitioning from an installed (legacy) system to a new system. System conversion within a hospitality operation can be difficult and trying. Two commonly used conversion strategies are parallel conversion and direct cutover conversion.

Documentation

Adequate system documentation for each component is critical to the success of system operations beyond the initial training period. Documentation is essential for ongoing training of staff and for identifying underused system capabilities and possible weaknesses within the system design. The three most important forms of documentation, whether they be available in printed, electronic, or online format, are the operator's guide, technical manuals, and system flowcharts.

Contingency Planning

The purpose of contingency planning is to define procedures that are to be followed when an automated application does not function properly. Contingency planning is an important aspect of technology implementation.

System Security and Data Privacy

Proprietary guest information and operational statistics are among the most valuable assets that a hospitality property can possess. Paper and electronic records are subject to physical damage from fire, flood, and so forth. Electronic records may also be vulnerable to threats that aren't as visible, but can be just as devastating as physical threats. The flexibility and interconnectedness that make networked systems so valuable also make them subject to internal and external threats, both deliberate and random.

RESERVATION SYSTEM

Definition
Sources of Reservations
Central Reservation Systems (CRS)
Global Distribution Systems (GDS)
Internet Distribution System (IDS)
Property Level Reservation Systems
Affiliate Reservation Systems
Non-affiliate Reservation systems
PMS Reservation

Front – Office Applications

The Front – Office area in a hotel is where the front-office staff assists arriving and departing guests. Front-office employees are very critical to a hotel's success as they may sometimes be the only people that the guests actually see when they arrive or depart. The main function of the front-office is to make guest reservation, an essentials and complex job.

A hotel with departments that take care of various guest needs requires an arrangements by which information can be passed from one system at particular location to another at different location in hotel. To meet this purpose, a PMS has been put in place. Although the components of a PMS vary, the term is generally used to describe a set of computer programs that directly relate to front-office and back-office activities.

Computerized front-office applications consists of series of software programs (or modules) that include Hotel Reservations, Room Management, and Guest Accounting Functions. A variety of stand-alone applications may also be interfaced with PMS.

1. **Sources of Reservations:** Request for room reservation may come from number of sources by a prospective guest. Commonly, the sources of reservation are as follows:
    a. Personal approach: If the guests are free individual traveler or chance guests, they may directly give their reservation to the hotel.
    b. Travel agent: Travel agent may make reservation for groups at a hotel
    c. Companies: The companies may book rooms or other services for their visitors or clients in a hotel.
    d. Airlines: Various Airlines may book a hotel for their regular crews or clients in case of cancellation of onward flights.
    e. Embassies: The embassies also provide a large business to a hotel booking for the delegations.
    f. NGO/INGO: These organisations also book a hotel directly.
    g. Government offices: They can be a good source of income to a hotel as they conduct conference and seminars hosted by the government.

Central Reservation Systems

Vacation travelers, business travelers, corporate travel offices, and international visitors are all able to use the web to arrange for their own travel and accommodation needs. The variety of potential guests accessing Internet sites to place reservations has prompted travel and hospitality companies to develop simple, user-friendly reservation procedures. Large and small hotels alike have a presence on the Inter- net. One of their most important tools is the central reservation system.

Increased online interaction between hotel property management systems, central reservation systems, and electronic distribution channels decentralizes the reservation function but centralizes marketing and sales efforts in relation to the reservations process. This results in greater control of reservations handling at the property level and increased sales efforts across various distribution channels on behalf of the participating properties.

CRS Function and Services:

Fully flexible and scalable for growing business. Platform which is easier to use. Manageability of rates, availability and content or information from single point of entry. Central reservation system is a computerized system that revolves around storage and distribution of information concerning resorts, hotels and host of lodging facilities. Hotel CRS as a tool is used to reach the global distribution system or GDS along with internet distribution system from a single point system. Hotel managers use this tool to manage their online sales and marketing avenues. They also project their rates and availabilities which are easily viewable by the sales channel i.e. the online travel agencies team aligned with CRS.
Connectivity of hotels to GDS, online travel agents as well as mobile booking engines. Multiple distribution channels emphasized with channel manager usage.
Information is stored in Hotel CRS. Information includes room types, room rates, conditions, inventories, plan rate architecture, reservation information, graphical information in the form of video, pictures and detailed hotel information like address, phone and fax numbers and geographical code information.
Hotel CRS reporting module is very important and calls for a number of standard reports. System reports are those reports which can be run daily, weekly, monthly or yearly and sometimes on need based request. Some of the basic reports include for expected arrivals, reservation, property forecasting, property details, agent activity and daily booking activity summary

Central reservation services are provided by the central reservation office (CRO). The CRO manages room rate and availability information from participating properties. Information from connected properties is typically sent over communication lines and enters the database directly. In a CRS network configuration, the responsibility and control of room and rate information lies at the property level. The key to successful central reservation management is that the individual properties and the central system have access to the same room and rate availability information in real time. When this is the case, the system is able to confirm room rates and availability at the time of reservation.

The timely transfer of reservation confirmations from a CRS to individual properties is vital. Many chain systems provide multiple delivery alternatives to ensure that properties receive all new reservations, modifications, or cancelations. For example, most central reservation systems relay processed transactions to member properties

through online interfaces. Although online interfacing between central reservation offices and property-level systems is fast and effective, some networks may also e-mail or fax the information to properties to ensure successful completion of the reservation process.
The goals of a CRS are to improve guest service while enhancing profitability and operating efficiency. A CRS accomplishes these goals by:

- Providing access to special room rates and promotional packages.
- Instantly confirming reservations.
- Communicating with major airline, travel, and car rental agencies.
- Creating comprehensive reservation records.

Electronic Distribution Channels

Electronic distribution, or **e-distribution,** is the means by which hotels make their products and services available via electronic channels, including travel agents, wholesalers, consolidators, and consumers. Such channels are widely viewed as mare convenient far those constituents that have online access and are often a less expensive source of bookings than traditional channels. Electronic distribution includes the following two' major categories:

- Global distribution systems (GDS)
- Internet distribution systems (IDS)

Competing hotel companies may participate in the same global or Internet distribution systems. Therefore, e-distribution channels must provide a security system that protects the proprietary nature of roam and rate availability data. Security is usually maintained through passwords, data encryption. firewalls, and other security methods. Users of a system may be issued passwords that restrict access to' proprietary data. Although passwords may need to' be changed frequently, they can offer effective measures of security.

Global Distribution System

Global distribution systems **(GDSs)** are often formed as joint ventures linking a number of diverse businesses. By directly linking the reservation systems of hotel, airline, car rental, and travel agency companies and a worldwide basis, global distribution systems provide access to' travel and tourism inventories around the world. A global distribution system can represent a significant portion of reservations business far many airport and resort properties.

Selling hotel rooms is usually accomplished by connecting the hotel company reservation system with the GDSs. Most travel agents around the world have terminals connected to one or more of the many airline reservation systems to book airline travel. By having hotel accommodations and automobile rentals available in the reservation system at the same time, most GDSs provide single-source access to most of the travel agent's selling requirements. In one transaction, a travel agent can sell an airline ticket, hotel room, and automobile rental.

Internet Distribution Systems

Internet distribution systems (IDSs) are consumer-oriented reservation systems that have become one of the fastest growing e-distribution channels. In contrast to CDSs, consumers themselves typically use these systems to book airline, hotel, car, and cruise ship reservations. The wealth of information available to consumers has never been greater, and consumers expect and shop hard to find adequate accommodations online. As a consequence, the environment has become very competitive. "Name your own price" sites and last-minute Internet-based bargain notifications have provided an outlet for hotels to dispose of distressed or otherwise underutilized inventory.

Typically, IDSs are operated by independent website sponsors that implement an online hotel reservation booking engine. IDS sites can connect to a hotel property in at least three ways:

1. Connection to the hotel company's central reservation system
2. Connection to a switching company that connects to the hotel's central reservation system
3. Connection to a CDS that connects to the hotel's central reservation system

Intersell Agencies

Domestic competition for hotel reservation commissions is intense since other segments of the travel industry (consolidators, wholesalers, booking agencies, etc.) may also operate reservation systems. Airline carriers, travel agencies, car rental companies, and chain hotels offer stiff competition to independent central reservation systems entering the reservations marketplace.

The term intersell agency refers to a reservation network that handles more than one product line. Intersell agencies typically handle reservations for airline flights, car rentals, and hotel rooms. The spirit of an intersell promotion is captured
by the expression "one call does it all." Although intersell agencies may channel reservation requests directly to individual hotels, some elect to communicate with central reservation systems or electronic distribution channels.

It is important to note that a local, regional, or national intersell arrangement does not preclude a hotel property from participating in a GDS or IDS or from processing reservations directly from its own website or via contact with the hotel's
reservation department.

Affiliate and Non-Affiliate Systems

There are two types of central reservation systems: affiliate (chain operated) and non-affiliate (independent) systems. An affiliate reservation system is a hotel chain's central reservation system in which all participating properties are contractually related. Each property is represented in the system database and is required to provide room availability and inventory data to the central reservation system on a timely basis. Chain hotels link their operations in order to streamline reservations processing and reduce total system costs. Typically, a central reservation system of an affiliate system performs the following functions:

- Deals directly with public access
- Advertises a website address or contact information
- Provides participating properties with network technology

- Communicates individual property room rate and availability data to e-distribution channels and non-affiliate reservation systems based on information supplied by individual properties

- Performs data entry services for remotely located or non-automated properties

- Transmits reservations and related information to individual properties quickly and cost-effectively

- Maintains statistical information on the volume of contacts, conversion rates, denial rates, and other statistics (conversion rate is the ratio of booked business to total number of inquiries; and denial rate refers to reservation requests
  that were turned away)

- Performs customer relations management functions for guest recognition and loyalty programs
- Maintains a property profile of statistical information about online viewers

- Manages a commission or payment exchange for reservation transaction

A non-affiliate reservation system is a subscription system linking independent properties. A hotel subscribes to the system's services and takes responsibility for updating the system with accurate room rate and availability data. Examples of non-affiliate reservation systems are Leading Hotels of the World, Preferred Hotels, and Distinguished Hotels. Non-affiliate systems generally provide the same services as affiliate systems, thus enabling independent hotel operators to gain benefits otherwise available only to chain operators. However, many non-affiliate systems process reservations solely on the basis of the availability of room types. With this method, room types are classified as either "open" or "closed." Most affiliate systems process reservations on the basis of a declining inventory of both room types and room rates. This method helps participating properties to maximize revenue potential and occupancy.

Affiliate and non-affiliate central reservation systems often provide a variety of services in addition to managing reservations processing and communications. A CRS may also serve as an inter-property communications network, an accounting transfer system, or a destination information center. For instance, a CRS is used

as an accounting transfer system when a chain hotel communicates operating data to company headquarters for processing. When a CRS communicates reports on local weather, special events, and seasonal room rates, it serves as a destination information center.

Property-level Reservation Systems

Prospective guests will sometimes contact a property directly to make reservations. This contact may involve the property's own website (property online reservations) or it may involve a phone call or other direct communication with a person in the reservations department (property direct reservations). Online reservations booked at an individual hotel's website rely on a simple interchange operation. Interactive script at the website is used to capture reservation and guest information used in creation of a reservation record. Once the record exists, the system takes responsibility for placing the record in the reservations database. By comparison, hotel websites will have the lowest associated cost per online transaction. Unlike other online formats, property online reservations incur expenses associated only with maintaining current room rate and inventory updating at the site. There are no transactional fees or commissions paid for bookings at a property online application.

Property direct reservations involve a guest contacting the hotel's reservation department to ascertain room rate and availability information. An on-site staff member processes the reservation inquiry through the hotel's property management system (PMS) and completes the transaction locally.

Reservation System Elements and Procedures

Property-level reservation systems are designed to meet a property's particular needs. A PMS typically supports a reservation module designed to streamline reservations handling and distribution channel management. The specific needs and requirements of individual properties determine whether stand-alone reservation management software is operated separately or as a part of an overall reservation system network.

A PMS carries out a number of front- and back-office functions, including property direct reservations processing. Once the data is captured, a property level application can streamline operations by enabling the reservations module to rapidly process room requests and generate timely and accurate rooms, revenue, and forecasting reports. Electronic reservation files can be reformatted into pre-registration and registration records capable of monitoring guest cycle transactions. Interfacing an external reservation network to an in-house application provides an enhanced data handling procedure.

A PMS reservation module enables a reservationist to respond quickly and accurately to callers requesting future accommodations. This module can also connect to the CRS for seamless reservation processing. The module significantly reduces paperwork, physical filing, and other clerical procedures, providing the reservationist with more time for personal attention to callers and marketing various services the hotel offers. Stored information can be accessed quickly, and many of the procedures for processing requests, updating information, and generating confirmations are simplified.

The reservationist's initial inquiry procedures create a reservation record that initiates the hotel guest cycle. Reservation records identify guests and their needs before their arrival at the property and enable the hotel to personalize guest service and appropriately schedule needed staff and resources. In addition, reservation modules can generate a number of important reports for management's use. The following sections describe typical activities associated with the 'use of a PMS reservation module.

These activities also apply to a majority of the booking engines used in e-distribution channels. These activities include:

- Reservation inquiry.
- Determination of availability.
- Creation of the reservation record.
- Confirmation of the reservation.
- Maintenance of the reservation record.
- Generation of reports.

Reservation Inquiry. A reservation request can be received in person; over the telephone; via postal delivery, facsimile, or e-mail; or through an interface with an external reservation distribution channel. Regardless of its origin, the reservation request is formulated into a reservation inquiry by the reservationist or automatically by the software application. This inquiry typically contains the following data:

 Date of arrival
 Type and number of rooms requested
 Number of room nights
 Room rate code (standard, special, package, etc.)
 Number of persons in party

The reservationist enters the preliminary data through a software template according to rigidly defined inquiry procedures. Simultaneous processing occurs in real time, meaning that the reservationist receives the necessary feedback horn the system in order to respond immediately to the inquiry. The real time capability of many reservation modules is designed to provide instant responses (less than three seconds) and, therefore, enables the reservationist to edit, alter, or amend the inquiry. Once the inquiry is matched with rooms availability data, the PMS can be programmed to automatically block a room, thus removing it from the room availability database.

Determination of Availability. Once entered, the reservation inquiry is compared to rooms availability data according to a predetermined inventory algorithm. The algorithm may be an automated formula designed to sell rooms in a specified pat- tern (by zone, floor, block, etc.). Processing a reservation request may result in one of several system-generated responses, including:

 Acceptance or rejection of the reservation request.
 Suggestions of alternative room types or rates.
 Suggestions of alternative hotel properties.

Creation of the Reservation Record. Once the reservation request has been processed and the room blocked, the system requires that the reservationist complete the reservation record by collecting and entering necessary data, such as:

 Guest's contact data (name, address, e-mail address, and telephone number).
 Time of arrival.

 Reservation classification (advance, confirmed, guaranteed).
 Confirmation number.
 Caller data (agency or secretary).
 Special requirements (handicapper, crib, no smoking, etc.).

A major benefit of automated processing is the streamlining of the initial inquiry and the collection of secondary reservation record data. For example, if all data were collected at the outset and the system denied the reservation request, the data collection would be an avoidable waste of time.

Confirmation of the Reservation. Property management systems can automatically generate reservation confirmation notification following reservation processing.

Information can be retrieved from the reservation record and placed in a template designed for mailing, mailing, or faxing. While there are many formats and styles of confirmation letters, acknowledgments within confirmation letters generally include:
 Guest's name and address.
 Date and time of arrival.
 Type, number, and rates of rooms.
 Number of nights.
 Number of persons in party.
 Reservation classification (advance, confirmed, guaranteed).
 Special services requested by the guest.
 Confirmation number.
 Request for deposit or prepayment.
 Update of original reservation (reconfirmation, modification, or cancellation).
 Cancellation policy.
 Transportation directions or options.

Reservation confirmations may be distributed immediately as part of placement of the reservation into the database. This process is often part of the system update. A system update performs many of the same functions as those performed by the night audit routine in non-automated properties. System updates are run daily to allow for report production, system file reorganization and system maintenance

ROOMS MANAGEMENT AND GUEST ACCOUNTING APPLICATIONS

An AUTOMATED PROPERTY MANAGEMENT SYSTEM (PMS) monitors and controls a number of front office and back office functions. A rooms management module is always an essential component of front office software. A rooms management module maintains current information on the status of rooms, assists in the assignment of rooms during registration, and helps coordinate many guest services. Similarly, a guest accounting module processes and monitors financial transactions that occur between guests and the hotel. When remote point-of-sale devices, situated at various revenue centers throughout the hotel, are interfaced with a guest accounting module, guest charges are communicated to the front desk and automatically posted to the appropriate electronic guest folios.

Rooms Management Module

The rooms management module is an important information and communications branch within a PMS. It is primarily designed to strengthen the communication links between the front office and the housekeeping department. Most rooms management modules perform the following functions:

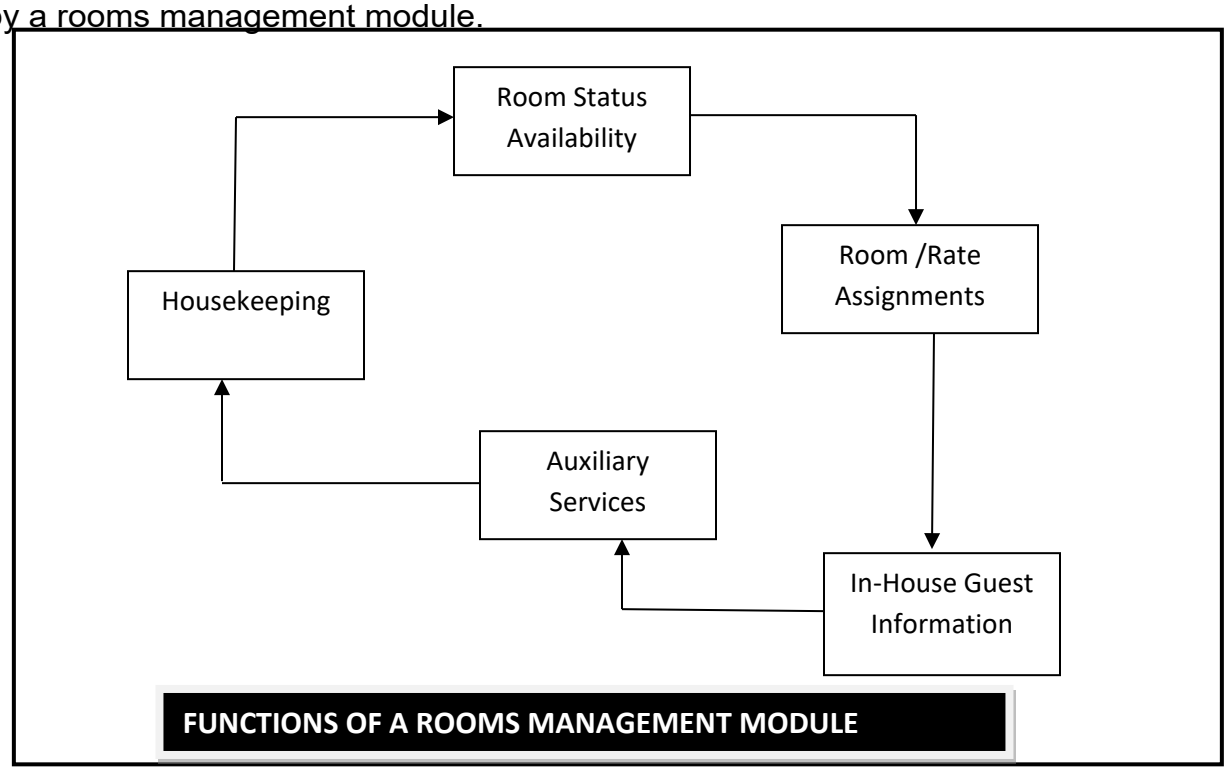
- Identify current room status.
- Assist in assigning rooms to guests at check-in.
- Provide in-house guest information.
- Organize housekeeping activities.
- Provide auxiliary services.
- Generate timely reports for management.

ROOM STATUS REPORT - KELLOGG CENTER
18:56
RU-PAGE 1 FLOOR(S) 2, 3, 4, 5, 6, 7

201 OOO	202 *OID*	203 CO	204 *V/C*	*205 V/C*	*206 O/C*
207 V/C	208 *V/C*	209 *V/C*	215 *O/C*	*216 V/C*	*217 V/C*
219 OOO	220 *V/C*	222 *OID*	223 OOO	224 OOO	225 OOO
227 V/C	230 OOO	231 *V/C*	232 *V/C*	*233 O/C*	*301 V/C*
302 OID	303 *OID*	304 *OID*	305 *OID*	*306 OID*	*307 O/C*
308 O/C	309 *OID*	311 *O/C*	312 *OID*	313 *O/C*	*314 V/C*
316 VIO	317 *OID*	319 OOO	320 *V/C*	*322 V/C*	*323 V/C*
325 OOO	327 *V/C*	328 *V/C*	329 *OID*	*330 OID*	331 *OID*
332 OID	333 *OID*	401 *V/C*	402 *V/C*	*403 V/C*	*404 V/C*

A rooms management module alerts front desk employees of the status of each room, just as room racks used to do in non-automated operations. A front desk employee simply enters the room's number into the PMS to retrieve and display the current status of the room on the screen. Once a room becomes clean and

ready for occupancy, housekeeping staff may change the room's status through a workstation terminal in the housekeeping department, a guestroom phone, or a wireless handheld device. The updated room status information is in turn communicated to the front desk. Rooms status reports may be generated at any time for use by management. Exhibit below illustrates one type of rooms status report. Rooms management modules may also automatically assign room and rate at check-in. In addition, their ability to display guest data on screens at the front desk, switchboard, concierge station, and other guest service locations eliminates the need for traditional front office equipment such as room racks and information racks. A rooms management module also enables management to efficiently schedule housekeeping staff and to review detailed housekeeping productivity reports. In addition, automated wake-up systems and message-waiting systems can be interfaced with the rooms management module to provide greater control over these auxiliary guest services. Exhibit below summarizes functions performed by a rooms management module.



Room Status

Before assigning rooms to guests, front desk employees must have access to current, accurate information on the status of rooms in the property. The current status of a room can be affected by information about future availability (determined through reservations data) and information about current availability (determined through housekeeping data). Information about future availability is important because it may affect the length of stay of in-house guests. Access to rooms availability data that extend several days into the future gives front desk employees reliable **room** status information and enhances their ability to satisfy the needs of guests while maximizing occupancy. Consider the following example:

Mr. Gregory checks in on Thursday for a one-night stay. However, during the course of his work on Friday, he finds it necessary to stay over through the weekend. The front desk employee may be inclined to approve this extension based on the fact that Friday night's business is light. Later, upon checking reservations data, the employee learns that although the hotel has a low occupancy forecasted for Friday evening, all rooms are reserved on Saturday night. This obviously poses a problem that needs to be resolved according to hotel policy, but it is better for the problem to surface Friday than on Saturday night when all guestrooms are expected to be occupied.

The housekeeping description of the current status of a room is crucial to the immediate, short-run selling position of that room. Common room status definitions are presented in Exhibit below

- **Occupied:** A guest is currently registered to the room.
- **Complimentary:** The room is occupied, but the guest is assessed no charge for its use.
- **Stayover:** The guest is not checking out today and will remain at least one more night.
- **On-Change:** The guest has departed, but the room has not yet been cleaned and readied for resale.
- **Do not disturb:** The guest has requested not to be disturbed.
- **Sleep-out:** A guest is registered to the room, but the bed has not been used.
- **Skipper:** The guest has left the hotel without making arrangements to settle his or her account.
- **Sleeper:** The guest has settled his or her account and left the hotel, but the front office staff has failed to properly update the room's status.
- **Vacant and ready:** The room has been cleaned and inspected and is ready for an arriving guest.
- **Out-of-order:** The room cannot be assigned to a guest. A room may be out-of-order for a variety of reasons, including the need for maintenance, refurbishing, and extensive cleaning.
- **Lock-out:** The room has been locked so that the guest cannot reenter until he or she is cleared by a hotel official.
- **DNCO (did not check out):** The guest made arrangements to settle his or her account (and thus is not a skipper) but has left without informing the front office
- **Due out:** The room is expected to become vacant after the following day's check-out time.
- **Check-out:** The guest has settled his or her account, returned the room keys, and left the hotel.
- **Late check-out:** The guest has requested and is being allowed to check out later than the hotel's standard checkout time.

Information about current availability is absolutely essential in order for front

desk employees to properly assign rooms to guests at the time of check-in. In the past, non-automated front office systems often experienced problems because of a breakdown in communication between housekeeping staff and front desk employees. Automated front office applications, on the other hand, ensure timely communications by converting data input by front desk employees, housekeepers, or guest services personnel into messages that are available at several locations throughout the lodging operation.

In addition to traditional front desk check-in procedures some hotels are placing kiosks in the lobby area enabling self check-in. When kiosks are used, they rely on the same information that the front desk employee would use. Self check- in depends on efficient room status reporting.

The hotel PMS routes data through the rooms management module and thereby helps coordinate the sale of rooms. Hotel technology is capable of instantly updating the housekeeping status of rooms, which enables front desk employees to make quick and accurate room assignments to guests at the time of check-in. For example, when a housekeeping attendant informs the PMS that a room's status has been changed from on-change to vacant and ready, notification is automatically relayed within the rooms management module.

Room status discrepancy is a term that refers to situations in which the housekeeping department's description of a room's status differs from the room status information that guides front desk employees in assigning rooms to guests.
Room status discrepancies can seriously affect a property’s ability to satisfy guests and maximize rooms revenue. Non-automated properties experiences room status discrepancies not only because of time delays in communicating room status information from the housekeeping department to the front desk, but also because of the cumbersome nature of comparing housekeeping and front desk room status information. Consider the following scenario.

Mr. Gregory checks out of a non-automated hotel and the desk clerk forgets to change his room's status in the room rack - giving the impression that Mr. Gregory remains an in-house guest. When housekeeping attendants clean the room, they may notice that Mr. Gregory's luggage and belongings have been removed (since the room has been vacated). However, if the housekeeping report does not indicate that Mr. Gregory is a check-out and not a stayover, the actual status of the room may go undetected. As long as this room status discrepancy exists, the hotel will not sell Mr. Gregory's vacated room because the room rack at the front desk will erroneously continue to indicate that the room is occupied. Unfortunately, this situation, termed a sleeper, arises all too often in non-automated hotels. Why is it called a sleeper? Since the guest's registration card remains undisturbed in the room rack, it is described as being asleep.

An automated PMS operates without a room rack. Instead, the rooms management module generates a rooms discrepancy **report** that signals to management the specific rooms whose status must be investigated to resolve discrepancies.

The report notes any variances between front desk and housekeeping room status updates. This is an important dimension of the rooms management module and provides an aspect of control that may otherwise be difficult to achieve.

Room and Rate Assignment

Rooms management modules may be programmed to assist front desk employees in assigning rooms and rates to guests at the time of check-in. Modules may make automatic assignments or require front desk personnel to input data to initiate room assignments.

Automatic room and rate assignments are made according to parameters specified by hotel management. Rooms may be selected according to predetermined floor zones (similar to the way in which guests are seated in a dining room) or according to an index of room usage and depreciation schedules. The system may track room histories (frequency of use) and rank rooms according to usage data. The system may then use this information to assign rooms on a basis that evenly distributes occupancy loads across the full inventory of rooms.

Interactive room and rate assignments are popular automated applications in the lodging industry. Such applications provide front desk personnel direction in decision-making situations while increasing control over actual room assignments. For example, in a property with 800 rooms, a front desk employee can narrow the search routine by clarifying the guest's needs through a series of room and rate category queries. In addition, the front desk employee may use the rooms management module to display an abbreviated list of available rooms selected by type and rate. This abbreviated list enables the front desk employee to quickly select or suggest a room to a guest at check-in. This ensures a more efficient and quicker check-in process than would a less-directed search through an extensive rooms availability listing.

To accommodate guest preferences and to ensure smooth check-in procedures, rooms management modules typically feature an override function that front desk employees can use to bypass the room or rate assignments automatically generated by the system. An override function is often a useful feature, since guest preferences may be difficult to anticipate. For example, most automatic room-and-rate assignment programs will assign guests only to rooms whose status is "clean and available for occupancy." However, many times it may be necessary to assign a particular guest to a room whose status is on-change. For example, a guest may arrive in advance of the hotel's check-in time and have to leave immediately to attend a lunch meeting. An override function permits the front desk employee to complete the necessary check-in procedures while informing the guest that the room won't be available for occupancy until later in the day.

Guest Data

The rooms management module is also designed to provide a limited review of guest data. Guest data can be displayed on workstation screens, handheld devices, or other media, enabling a guest services coordinator, front desk employee, or concierge to quickly identify the name and room number of a particular guest. This function of the rooms management module also contributes to the elimination of such traditional information sources as information racks, room racks, and telephone lists. Workstation terminals may also be located at room service order stations, parking garage outlets, and other high-guest-contact areas to enhance employees' recognition of guests, thereby creating opportunities to personalize services.

Guest data may also be transferred from a rooms management module to a point-of-sale (POS) area to expedite the verification and authorization of guest charge purchases. When a POS terminal is interfaced with the hotel's PMS, guest data can be reviewed before charges are accepted. This capability allows cashiers to verify that a particular room is occupied and that the correct guest name is on the room folio. Access to this data minimizes the likelihood of charges being accepted for the wrong guest folios, for guests who have vacated their rooms, or for guests who have been denied charge privileges.

Housekeeping Functions

Important housekeeping functions performed by the rooms management module include:

- Forecasting the number of rooms to be cleaned.
- Identifying rooms to be cleaned.
- Scheduling room attendants.
- Assigning workloads.
- Measuring productivity.

A rooms management module forecasts the number of rooms that will require cleaning by processing current house counts and the expected number of arrivals. After identifying rooms that will require cleaning, the rooms management module may generate schedules for individual room attendants and assign a specific number of rooms to each attendant on the basis of property-defined standards.

Upon first entering a room to clean it, a room attendant may use a handheld device or room telephone interface to the PMS to enter an employee identification code, room number (not always necessary), and a housekeeping status code number to communicate the room's current status. The system may automatically log the time of the call. When the room is clean and ready for inspection, the room attendant may again use a handheld device or room telephone interface to notify the PMS that the room is now ready for inspection. The system may once again

record the time of the call. The log of room attendants' times in and out enables the rooms management module to determine productivity rates. Productivity rates are determined by calculating the average length of time an attendant spends in a room and the number of rooms attended during a work shift. Productivity reports keep management apprised of potential inefficiencies while also tracking the whereabouts of housekeeping personnel throughout a work shift.

Generation of Reports

The number and types of reports that can be generated by a rooms management module are functions of the property's needs, software capacity, and the contents of the rooms management database. A wide variety of reports are possible because the rooms management module overlaps several key areas, such as the rooms department, the housekeeping department, and auxiliary services. Most rooms management modules are designed to generate reports that focus primarily on near-term room availability, room status, and room availability forecasting. These reports are designed to assist management in scheduling staff and distributing workloads.

A **rooms allotment report** summarizes rooms committed (booked or blocked) by future date. One type of **expected arrival/departure report** is shown in Exhibit below. A **registration progress report** provides the rooms department with a summary of current house information. The report may list present check-ins, the number of occupied rooms, names of guests with reservations who have not yet registered, and the number of rooms available for sale. A registration progress report may also profile room status, rooms revenue, and average room rate. A **rooms activity forecast** provides information on anticipated arrivals, departures, stayovers, and vacancies. This report assists managers in staffing front desk and housekeeping areas. An actual departures report lists the names of guests who have checked out and their room numbers, billing addresses, and folio numbers.

A **housekeeper assignment report** is used to assign floor and room numbers to room attendants and to list room status. This report may also provide space for special messages from the housekeeping department. System-generated **housekeeper productivity** reports provide productivity information for each housekeeper by listing the number of rooms cleaned and the amount of time taken to clean each room.

Sample Expected Arrival / Departure Report

ARRIVALS, STAYOVERS, DEPARTURE REPORT

DA-PAGE 001

05/13 8:40

DATE	ARRIVE	STAYON	DEPART	GUESTS	SOLD	UNSOLD	REVENUE
05/13	27	112	23	143	139	7	6,435.00
05/14	27	117	22	151	144	2	6,593.00
05/15	20	126	18	162	146	0	6,806.00
05/16	72	21	125	143	93	53	4,907.00
05/17	35	16	77	62	51	95	2,460.00
05/18	43	41	10	100	84	62	3,995.00
05/19	27	33	51	72	60	86	2,837.00
OS/20	53	21	39	86	74	72	3,874.34
OS/21	14	26	48	49	40	106	2,002.00

At the end of each month, quarter, and year, rooms management modules are capable of generating rooms productivity reports that rank room types by percentage of occupancy and/or by percentage of total rooms revenue. Rooms management modules may also produce a rooms history report depicting the revenue history and use of each room by room type. This report is especially useful to those properties using an automatic room-assignment function based on a rotational usage of rooms

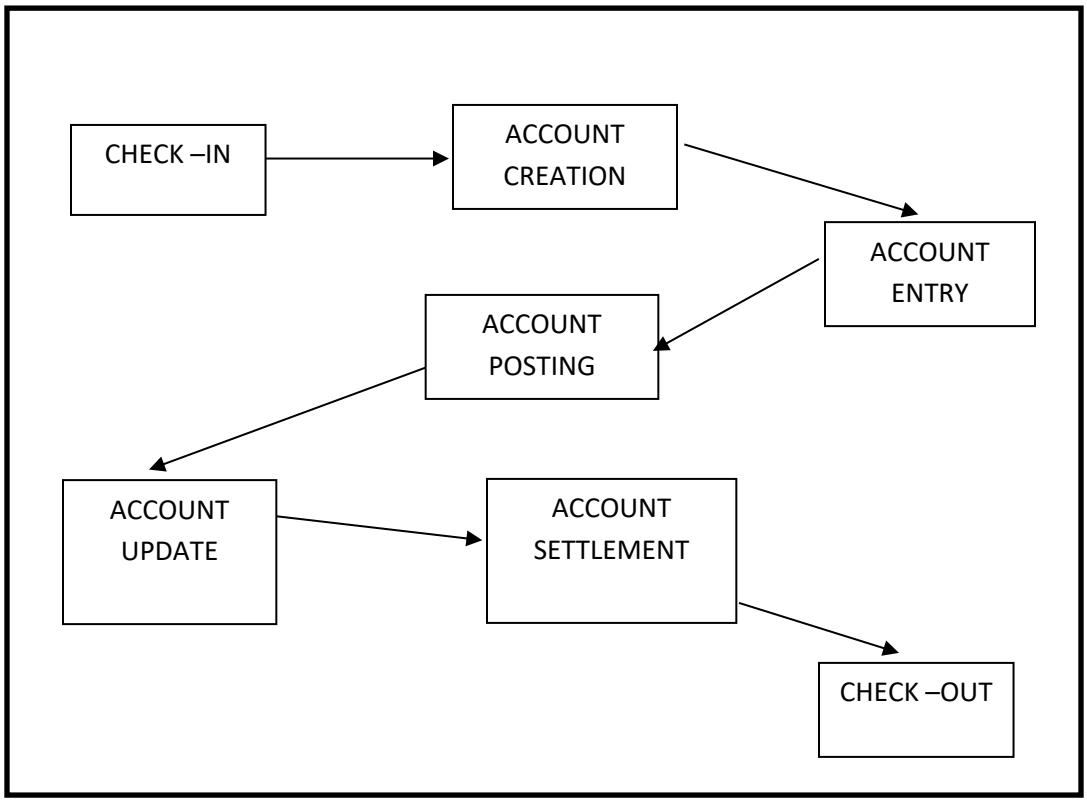
Guest Accounting Module

The most critical component of a hotel front office system is the guest accounting module. The creation of electronic folios enables remote POS terminals to post charges directly to guest and non-guest accounts. The guest accounting module gives management considerable control over financial aspects of the hotel guest cycle. This front office module is primarily responsible for automatic charge postings, file updating (auditing), maintenance, and folio display/printing upon demand. In addition, guest accounting modules may provide electronic controls over such areas as folio handling, account balances, cashier reconciliation, outlet guest-check control, account auditing, and accounts receivable. Exhibit below shows the sequence of activities involved in the process of guest accounting. The following sections discuss guest accounting modules in relation to:

- Types of accounts (also referred to as folios).
- Account postings.
- Account auditing.
- Account settlement.

- System update and reports.

GUEST ACCOUNTING ACTIVITIES



Types of Accounts

A PMS ensures that preregistration folios are prepared for guests arriving with reservations. Preregistration folios are typically produced by the PMS reservations module when a reservation record is created. When guests arrive without reservations, front desk employees capture and enter the necessary data into the PMS at check-in. The PMS uses select registration data to create an individual or group folio. Data elements needed to create a folio are referred to as header information. Common header elements include:

- Guest
- Street
- E-mail
- Room
- Folio

If self-check-in kiosks are available at the property, guests may enter the necessary data themselves by responding to system-generated cues. Information collected by kiosks will be transmitted to the PMS and used in folio creation.

While not all hotel guest accounting modules offer the same folio formats, common types of electronic folios include:

- Individual folios.
- Master folios.
- Non-guest folios (city accounts).
- Employee folio
- Control folios.
- Semipermanent folios.
- Permanent folios.

Individual folios (also referred to as "room folios" or "guest folios") are assigned to in-house guests for the purpose of charting their financial transactions with the hotel. Master folios (also referred to as "group folios") generally apply to more than one guest or room and contain a record of transactions that are not posted to individual folios of group members. Master folios are commonly created to provide the kind of billing service required by most groups and conventions. For example, consider the needs of the International Gymnastics Conference. While attendees at this conference are responsible for their own food and beverage expenses, the sponsoring organization has agreed to pay room and room tax charges. As participants dine at various food and beverage outlets in the hotel, their deferred payments are posted to their individual folios. Each night's room and room tax charges, however, are posted to the group's master folio. At check .. out, each guest receives a folio documenting only the charges for which he or she is responsible. The conference administrator is responsible for settling the master folio containing the room and room tax charges.
Non-guest folios are created for individuals who have in-house charge privileges but are not registered guests in the hotel. These individuals may include health club members, corporate clients, recreation club members, political leaders, or local celebrities. Non-guest account numbers are assigned at the time that the accounts are created and may be printed (or imprinted) on specially prepared paper or plastic account cards. When purchases are charged to non-guest accounts, cashiers may request to see the account card as a verification that a valid posting status exists.

Procedures for posting transactions to non-guest folios are similar to those required for automatic posting of transactions to individual folios. Instead of inputting a room number, the cashier, front desk employee, concierge, or auditor inputs the non-guest's account number. The use of a unique billing number alerts the guest accounting module to the type of account being processed. For example, a six-digit account number may signal a non-guest account, while a four-digit number may signal an in-house guest account. A major difference between accounting for non-guest and in-house guest transactions lies in the area of account settlement. Individual folios are settled at check-out; terms for settlement of non-guest accounts are usually defined at the time of account creation. The term "settlement" refers to bringing an active outstanding folio to a zero balance either

by posting cash received or by transferring the outstanding folio balance to the city ledger or credit/debit card company for eventual settlement.

When properties offer charge privileges to employees, transactions may be processed in a manner similar to non-guest accounts. **Employee folios** can be used to record employee purchases, compute discounts, register expense account activity, and separate authorized business charges from personal expenditures.

The efficiency of a guest accounting module in carrying out continuous posting and auditing procedures often depends on the existence of control folios. **Control folios** may be constructed for each revenue center and used to track all transactions posted to other folios (individual, master, non-guest, or employee). Control folios provide a basis for double-entry accounting and for cross-checking the balances of all electronic folios. For example, as an in-house guest charges a purchase in the hotel's restaurant, the amount is posted (debited) to the appropriate individual folio, and the same amount is simultaneously posted (credited) as a deferred payment to the control folio of the restaurant. Control folios serve as powerful internal control documents and represent ongoing auditing functions.

A **semi permanent folio** is used to track "bill to" accounts receivable. A guest who establishes credit privileges before check-in may be allowed to settle his or her folio balance by billing a sponsoring organization or individual. The front desk agent will reconcile the account by transferring the guest's folio balance to a semi permanent folio, thereby enabling the back office to track the billing and subsequent collection of payment from the approved third party (bill-to agency). Once the outstanding balance is paid, the semi permanent folio is closed. It is for this reason it is referred to as sem ipermanent. A **permanent folio** can be used to track guest folio balances that are settled to credit card and debit card accounts. A permanent folio is established for each external entity with which the hotel has a contractual payment program. For example, a hotel could establish a permanent folio for American Express, Discover, Visa, Diner's Club, and MasterCard. When the guest charges a folio balance to an acceptable account, the guest accounting module transfers the balance to the appropriate permanent folio for monitoring. A permanent folio enables the monitoring of receivables beyond the guest's stay. Permanent folios exist as long as the hotel continues to maintain a business relationship with the outside entity.

Account entries can be made from workstation terminals at the front desk or from remote pas terminals that interface with the PMS guest accounting module. Account entries can also be made internally-that is, from within the guest accounting module itself. For example, during the system update routine, room rates and room taxes may automatically be posted to all in-house guest folios. Although guest accounting modules vary in operation, most modules rely on specific data entry requirements to ensure that amounts are properly posted to appropriate folios. Data entry requirements may consist of the following sequence:

- Room number (or account number for non-guest transactions).
- Identification code.
- Reference code.
- Charge total.

After a room number (or account number) is entered in a posting routine, the guest accounting module may require that an identification code also be entered.

This is generally done by inputting the first few letters of the guest's last name. An identification code enables the guest accounting module to post a charge to the correct folio when multiple accounts exist under the same room number. In these situations, simply inputting a room number does not guarantee that the correct folio is accessed for transactional posting. To help ensure proper posting, an identification code may be part of the required data entry sequence.
Before a charge can be posted to a folio, the guest accounting module may also require that a reference code be entered. This is typically done by inputting the serial number of a departmental source document or a unique departmental identifier. Departmental source documents may be serially numbered for internal control purposes. This numbering system helps the guest accounting module maintain precise records should it become necessary to conduct investigative searches or analyze account entries made through remote pas terminals.

The final data entry requirement in an account posting procedure is to input the amount of the charge. However, before accepting a charge and posting it to a folio, the guest accounting module may initiate a credit monitoring routine. This routine compares the current folio balance with a predetermined credit limit (also called a house limit) that is determined by hotel management. Although most guest accounting modules allow managers to specify a single house limit, some provide for further options based on guest history information, such as whether the guest is a repeat customer or a known business associate. Other options may include setting a house limit on the basis of the type of reservation or the credit authorization limits established by individual credit card and debit card companies. Regardless of how a guest’s credit limit is established, an attempt to post a charge to an account initiates a credit monitoring routine, thus ensuring that the outstanding balances during a guest’s stay do not exceed the account’s credit limit. When hotel policy dictates that a line of credit is not to be extended to a guest, a folio can be set at a no-post status. The guest accounting module will not permit charges to be posted to a folio with a no-post status.

When in-house guests make charge purchases during a hotel stay, they are typically asked to present a room keycard as verification that a valid posting status exists. Some PMS procedures allow for keycard swiping to authorize the posting of charges to the guest's folio from POS terminals. If a guest presents a keycard for an unoccupied room (an account with a no-post status) or a guest account that already has been closed (settled), the system will not permit the cashier to post the charge. Entering the guest's identification code (the first few letters of the purchaser's last name) may provide further evidence that the person making the charge may not be authorized to do so.

PROPERTY MANAGEMENT SYSTEM INTERFACE

1.1 5 C's of Interfacing
1.2 Call Account System
1.3 Electronic Locking System
1.4 EMS Controls (Energy Management Systems)
1.5 Guest Operated Devices

A FULLY INTEGRATED property management system (PMS) provides management with an effective means with which to monitor and control many front office and back office activities. Other areas of a lodging operation may also benefit from automation. Rather than function as part of a PMS, some automated systems may perform more effectively as independent, stand-alone devices that can be interfaced with the PMS. Interfacing permits the PMS to access data and information processed by stand-alone systems, without affecting the primary structure of the PMS. This approach is often referred to as "best in breed" since each application area employs the most appropriate solution while maintaining connectivity with the overall PMS.

This chapter presents a detailed discussion of PMS interfaces. Important interfaces for hotel operations include:

- Call accounting systems (CAS)
- Electronic locking systems (ELS)
- Energy management systems (EMS)
- Auxiliary guest services
- Guest-operated devices

Some hotels have gone beyond installing basic property management systems by offering a variety of automated guest-operated devices. These devices are described in the final sections of this chapter. As the traveling public becomes more familiar with and skilled in using technology, there will be additional growth in many lodging service applications.

System Interface Issues

While it may seem logical to interconnect all hospitality technology applications at property but connecting separate applications to a PMS is not without risk. If unsuccessful, data may be lost, application capabilities may be compromised, functionality may be slowed or lost, and overall confidence in the system may be shaken. Connecting two hardware components is not as troubling as software and networking issues. Running a serial cable or establishing a wireless connection is relatively easy; getting the devices to share information is more complex. The five C's of interfacing may help managers minimize risks associated with interfacing hospitality technologies:

Confidence. Before interconnecting two stand-alone applications (for example, a POS system and a PMS), be sure to test each system separately. There should be a high level of confidence in each system's operational capabilities before attempting to link them together. If there should subsequently be an interface problem and the components were not tested before being connected, troubleshooting the problem will be more difficult.

Contracts. Before attempting to connect separate systems, management should commission a legal review of all involved product vendor contracts. There may be contractual interface restrictions requiring direct involvement of the original product vendor when attempting an interface. By analyzing existing contract provisions, management may avoid actions that will violate existing contracts and possibly void warranties or cause other significant problems.

Communications. When contemplating an interface, determine the content, frequency, and format of the information to be exchanged. In addition, determine whether a copy of transmitted data should remain at the original source system or whether it should be permanently moved to the receiving system. Knowing what, when, and how interfaced data streaming is to occur is important to effective interface design. For example, in the case of pas interfacing, how much order entry detail should be transmitted to the PMS? The details of order entry are important to the food and beverage department, but not the accounts receivable module of a guest accounting system. Hence, perhaps only total revenue amounts from the food and beverage outlet should be exchanged. When should the POS data be sent to the PMS? Since the revenue center is going to bill its guests following service, there is probably no need to transmit POS data as it occurs (real time). Instead, it makes more sense to wait until a guest check is closed, or, if feasible, consider batching the POS data until the end of a meal period or some later time. What about data format? A workable data transmission format will be dictated by the requirements of the receiving system in the interface.

Comparisons. One of the biggest mistakes hospitality managers can make is not contacting current users to determine the best means by which to accomplish an interface. Product vendors normally have a detailed list of installed users and are usually aware of successful (and failed) interfaces to and from their product line. By contacting properties of a similar size and scope, managers can gain invaluable

insight into interface solutions. For example, when considering interfacing a POS system with a PMS, the most efficient approach would be to ask the PMS vendor which of its installed users currently have successful POS interfaces.

Contingencies. Managers must be sure that staff members are trained to operate the lodging operation efficiently should the interface fail. In addition, it is wise to stock spare parts for components most likely to wear out or be troublesome. For example, when interfacing a POS system to a PMS, there needs to be a set of provisions governing backup procedures so that proper processing can be accomplished even if the interface is not operational.

Call Accounting Systems

Since 1981, it has been legal for lodging properties to resell telephone service to guests. This resale capability has enabled the hotel's telephone department, traditionally a loss leader, to potentially earn a profit. In recent years, however, guest use of property telephones has significantly declined as more and more guests have started carrying their own cellular phones or personal digital assistants (PDAs).
Despite the overall decline in guest use, many guests continue to expect lodging properties to provide telephone services. It is therefore still important to provide those services and to control the associated expenses. A call accounting system (CAS) enhances management's control of expenses relating to local and long-distance telephone services. While a CAS may operate as a stand-alone system, it is typically interfaced with a hotel's PMS. Generally, a CAS is able to handle **direct-distance dialing**, distribute calls through a **least-cost routing network**, and **price outgoing calls**. When a CAS is interfaced to the PMS, the PMS receives telephone all charges emanating from the CAS and posts the charges to the proper guest folio. Posting detail typically includes the phone number called, the duration of the call, and the charge for the call. Since there is no way for the PMS to know which guest registered in a room made the call, the CAS charge is normally posted to the folio of the guest who checked in first. This is referred to as ***prime folio posting.***

Call accounting systems conserve valuable space and often reduce maintenance and labor costs associated with traditional telephone systems. CAS hardware takes up less space and requires less maintenance than the bulky switch-board equipment it replaces. Labor costs decrease since a telephone operator is not involved in CAS call placement and distribution functions. Similarly, the automatic pricing of calls eliminates the need for manually calculating and posting telephone charges.

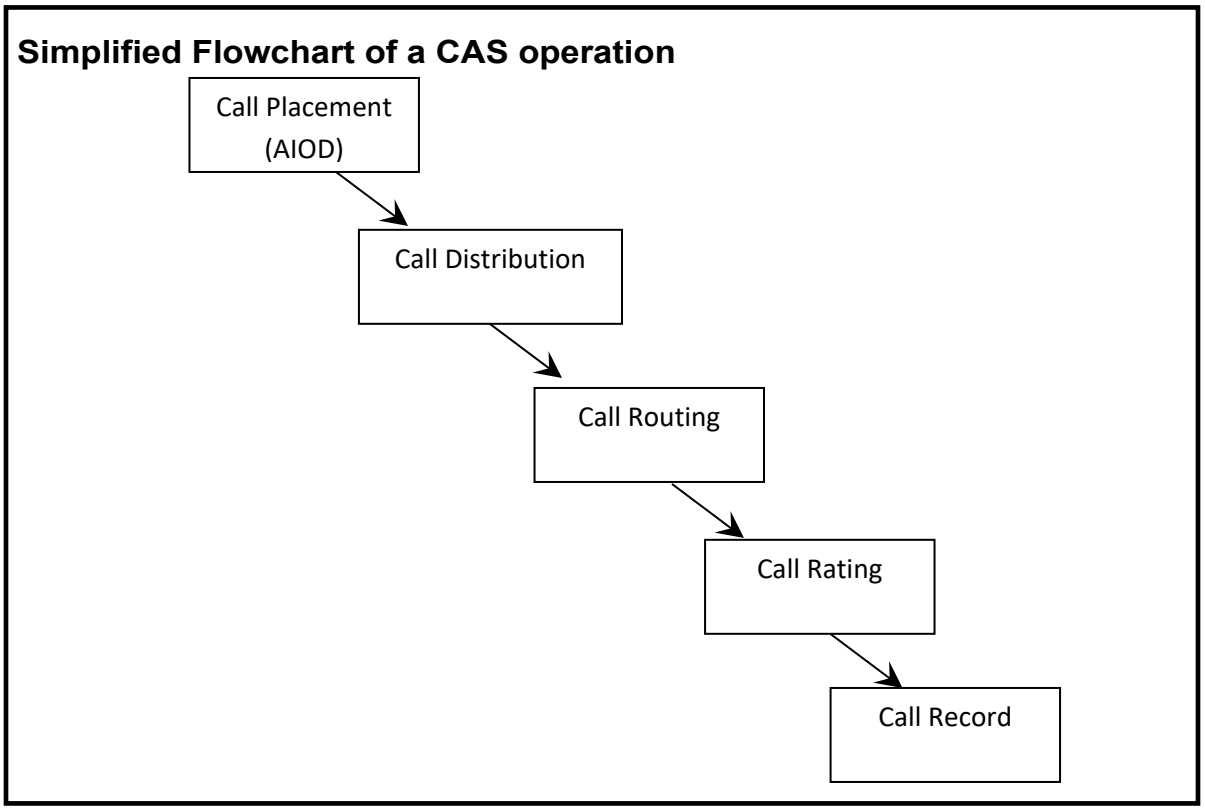
Features of Call Accounting System

Exhibit below presents a simplified flowchart of the operation of a call accounting system. CAS functions may include:

- Call placement or automatic identification of outward dialing (AIOD).
- Call distribution or automatic route selection (ARS).
- Least-cost routing (LCR).
- Call rating program (CRP).
- Call record.

Call accounting systems have significantly simplified the sequence involved in call placement. Guests can direct-distance dial, eliminating operator intervention. The **automatic identification of outward dialing** (AIOD) feature of a CAS immediately identifies the extension from which a call is placed.

As an outgoing *call* is *placed,* the CAS's *call* distribution equipment is engaged. How and where a specific call is routed are essential in determining its cost. With a **passive call accounting system**, there are no options available to the call distribution network. Selection of a route is based on convenience rather than on minimizing expense. An **active call accounting system**, on the other hand, employs an automatic route selection switch with a least-cost routing device. The **automatic route selection** (ARS) feature has become an essential CAS component and is usually capable of connecting with a variety of common carriers.



A **common carrier** is any recognized entity that transmits messages or other communication for general use at accepted rates. The least-cost routing (LCR) capability directs calls over the least-cost available line, regardless of carrier. When the least-cost line is busy, the LCR automatically prompts the CAS to seek the next least expensive line. This search procedure is performed at high speed and with *remarkable* precision.
The manner by which a call is priced or rated will vary in relation to vendors, equipment packages, and electronic switches. A **station message detail record** (**SMDR**) is used to chart and monitor telephone traffic. The data collected by the SMDR is used to rate calls. Some systems base calls on a ringback mechanism; others incorporate a timeout feature. With a **ringback mechanism** or auto-answer detection software, the guest is charged only for calls that are answered. With a timeout feature, callers begin paying for calls after a predetermined amount of placement time. After a call is rated, it is entered into a call record file.

A call record is used to monitor details regarding calls processed by the CAS. This file may include

- Date.
- Guestroom extension number.
- Telephone number dialed.
- Time *call* was placed.
- Duration of call.
- Cost of call (per carrier charges).
- Tax and markup charges.
- Amounts posted to guest folio.

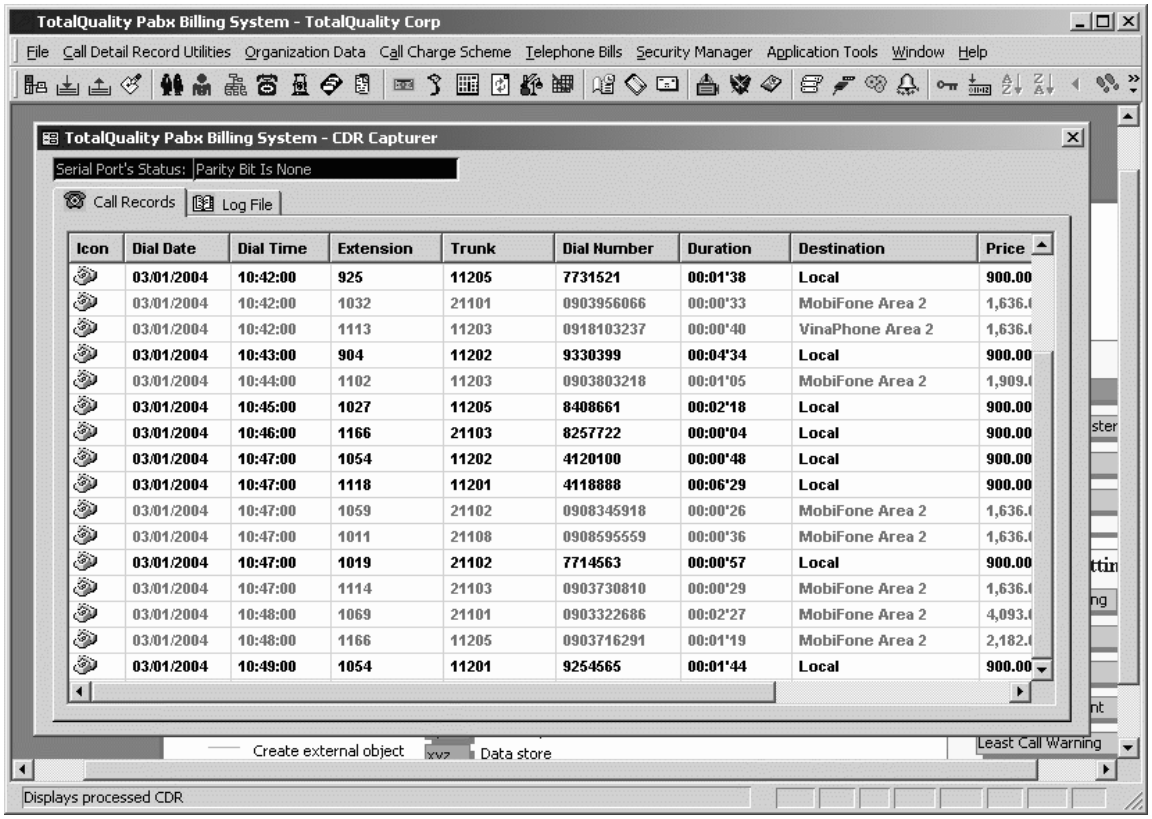
Most call rating systems calculate the price and tax of a call and automatically post the necessary data to appropriate call records. A call record is electronic or hard-copy documentation containing essential transactional support data for individually placed and rated telephone calls. Call records are referenced on a guest folio and provide a means for resolving guest discrepancies relating to telephone charges.
Call records are automatically logged in a traffic transaction file. The traffic transaction file maintains data necessary for generating reports for management.

Typically, records are organized by time of call placement (chronological file) or room extension number (sorted file). The extent of report detail is a function of management needs.

Telephone activity reports can be generated by date and/or time covering the entire company, a specific division, an individual property, a particular revenue center, or even individual extensions or specific call destinations.

Call details can be seen in order of extension, date and/or time, phone number called, etc. Exhibit shows some of the detail that can be accessed regarding a

specific call placed through a CAS. In addition, statistical reports and "real time" alerts (by pager or e-mail) can inform managers of potential abuses of the phone system by indicating most expensive calls, longest calls, most frequently called



numbers, etc.

A *CAS/PMS* interface offers lodging properties a number of significant advantages, such as: .

- Enhanced guest services and guest satisfaction.
- *Improved* communications networking.
- Improved *call* pricing methods.
- Minimized *telephone* traffic expenses.
- Automatic charge posting to guest folios.
- Automatic call detail records.
- Detailed daily reports of telephone transactions

Since the CAS reduces operator intervention, the hotel telephone department can become more efficient with less labor. Eliminating telephone meter readings and reducing guest telephone charge discrepancies can also contribute to faster check-out times and more effective front desk operations.

Contingency backup procedures are a major concern when a CAS is interfaced with a PMS. Energy backup concerns for the CAS usually mandate access to

an uninterruptible power supply. Another important CAS concern is the storage and distribution capacity of the system. Before purchasing and installing a CAS, management must be sure that telephone traffic throughout the hotel has been properly evaluated so that the proposed CAS will have adequate storage and distribution capacity for processing and storing telephone traffic data. Management may also wish to ensure that the proposed system is able to distinguish administrative (non-guest) calls from guest calls. Other important concerns focus on system maintenance, service, and vendor support. In many cases, management officials may need to initiate new telephone maintenance programs.

Electronic locking Systems

An electronic locking system (ELS) replaces traditional brass keys and mechanical locks with sophisticated guestroom access devices. Installing electronic locks on existing guestroom doors may be a minor job or it could involve a major reconstruction effort. Some systems require only the drilling of a small hole for wires to pass from the outside to the inside portion of the lock. In some cases, existing deadbolt and latch hardware are retained as part of the new lock. Other systems require all new hardware, or even new doors.

In an ELS/PMS interface, the check-in procedure requires the PMS to transmit the room number and number of keys requested, as well as the dates and times for which the keycards will be valid, to a keycard encoder. The encoder, in turn, will record data onto the magnetic stripe (or other storage medium) contained on the keycard. There are a variety of electronic locking systems available to lodging properties. These systems are either hard-wired or micro-fitted locking systems, depending on the property's age and/or management preference.

Hard-Wired locks

Hard-wired locks operate through a centralized master code console interfaced to every controlled guestroom door. The console may be a slotted switching device centrally located at the front desk. With this type of **hard-wired electronic locking system**, a front desk employee follows a prescribed check-in procedure and creates a new key card. The console immediately transmits the keycard’s code to the remote guestroom access key. Keycards issued to previous guests who occupied the same room become invalid.

Since, with a hard-wired configuration, every controlled door must be cabled to the master console, hard-wired systems present both a challenge (expensive design) and an opportunity (improved security). Before such a system is installed, management should identify emergency procedures and energy backup sources.

Hard-wired locking systems use AC (house current) as their primary energy source, with DC (battery pack) serving as emergency backup. Management must also determine when keycards are to be created (initially encoded) and how they are to be created, re-issued, recycled, and maintained.

Micro-Fitted locks

Micro-fitted locks operate as individually configured stand-alone units, thus avoiding the complex dedicated circuitry required by hard-wired locking systems. Each door has its own microprocessor that contains a unique, predetermined sequence of codes. A terminal at the front desk contains a database of code sequences for each door and is connected to a key encoding device. With a micro fitted electronic locking system, the front desk employee completes guest check-in by encoding a key card with the next code in the predetermined sequence of codes for an assigned room

With hard-wired systems, codes are directly communicated from the master code console to the controlled doors. Micro-fitted systems do not possess this kind of communications capability. The front desk terminal and the microprocessors of controlled doors are separate units. What connects them is the predetermined sequence of codes. This means not only that the front desk terminal must be programmed with the same predetermined sequence of codes that is contained within each door's microprocessor, but also that the terminal and each microprocessor must agree on which code in the sequence is currently valid. If the units are out of synchronization, the locking mechanism will need to be reset.

For example, assume that at check-in a family requests two rooms with an inside connecting door. The parents plan to stay in one of the rooms while their children stay in the other. Upon reaching the rooms, the family enters the first room and finds the connecting door to the other room already open. The next morning, the family checks out of both rooms, having never used the second room's keycard. The locking mechanism in the second room's door will not advance to the next code in the predetermined sequence because the key card was never used. The terminal at the front desk, however, will automatically advance to the next code in the sequence when another guest checks into that room because it assumes that the last issued keycard was used. Should this happen, the new guest (receiving the next keycard) will find that the issued keycard fails to activate the lock. A hotel employee must then use a specially designed keycard to reprogram the room door's microprocessor so that the current code synchronizes with the front desk control console.

An important energy feature of micro-fitted electronic locking systems is that the microchips in each door are powered by battery packs and therefore do not require wiring to an external energy source. Some systems employ penlight size batteries, some D-size cells, while others use special battery units.

ELS Features

Electronic locking systems may produce various levels of master keys. Most systems provide several distinct levels of security. One level may be established for housekeeping personnel, another for hotel security officers, and yet another for property management. Some ELS designs provide a "do not disturb" option for guests. This option typically employs an indicator that displays a notice when the guest wants privacy. The notice is often given by a flashing red light located within the locking mechanism. This indicator may be triggered when a room attendant inserts a keycard into the locking mechanism. No longer must the housekeeping staff knock on the door or test the door's chain to realize that the guest is still in the room.

A safety feature built into some electronic locking systems prevents the door from opening while the keycard remains in the lock. This prevents a guest from entering a guestroom while forgetting to take the keycard from the lock. One system permits entry without key card removal; however, it tracks the length of time the keycard is in the door. If the key card remains in the locking mechanism beyond a predetermined time interval, the system destroys the keycard by scrambling its code. The reason for scrambling a keycard's code relates to guestroom security. A keycard that remains in a lock may be taken by someone other than the room's occupant. To avoid problems, hotel staff must inform guests that failure to promptly remove the keycard will cause it to become invalid.

Other types of electronic locks do not require guests to possess keys or keycards at all. With an alternative system, guests may set the locking mechanism by programming a personal four-digit code number or recording biometric data (fingerprint, palm-print, or face geometry). These systems have not been widely adopted and guest acceptance may be an overwhelming factor in determining the future success of such systems. In the past, some electronic locking system vendors provided additional technology that enabled guests to use a credit card for room entry. At the time of check-in, the guest's credit card would be swiped through a magnetic strip reader. The reader would then encode the information contained on the card's magnetic strip and send it as the access code for the appropriate guestroom door. When the guest arrived at the assigned room, the credit card would then operate as the room key. This idea has not received much support.

ELS Reports

One of the most significant advantages of an electronic locking system is that management can find out which keycards opened which doors, by date and time. Merely informing hotel staff and guests that this is possible has helped reduce the number of guestroom incidents.
An ELS typically maintains an audit trail of all activities involving the use of system-issued keycards. Some systems print reports detailing activities in chronological sequence. A system that records events as they occur generally

does so because of limited memory, not because the resulting printouts are intrinsically more useful or effective. Other systems record and store activity data that can be formatted to provide printed reports on demand. The creation of reports, as well as other system functions, should be controlled by operator identification password security codes.

Energy Management Systems

Heating, lighting, ventilating, and air-conditioning equipment are essential to a hotel's existence. Efficient equipment better serves the needs of the hotel and its guests. Energy management systems may conserve energy, contain energy costs, and tighten operational controls over guestroom and public space environments. An important feature of these systems is their ability to minimize the building's energy needs while not significantly affecting the hotel's comfort conditions.

An energy management system may be a central feature of the rooms management module or operate as a stand-alone application. Historically, these systems were marketed as stand-alone systems and connectivity to the rooms management module was not very common.

An energy management system (EMS) is an automated system designed to manage the operation of mechanical equipment in a lodging property. The programming of this system enables management to determine when equipment is to be turned on or off or otherwise regulated. For *example,* if the meeting rooms of a property will be used from 10 A.M. to 2 P.M., the system controller can be programmed to automatically conserve energy during the hours the rooms will not be in use, while ensuring that by 10 A.M. the rooms reach a satisfactory comfort level for guests. This programming technique can usually be applied to equipment affecting various spaces throughout the property. Similarly, when the EMS is interfaced to the PMS, the PMS can send an electronic message to the EMS at time of check-in to change the guestroom thermostat to a predefined setting for occupancy. At check-out, the message directs the EMS to set the thermostat to the unoccupied setting.

Although actual operating features of energy management systems vary, common energy control designs include:

- Demand Control
- Duty Cycling
- Room Occupancy Sensors..

Demand control maintains usage levels below a given limit by shedding energy loads in an orderly fashion. Equipment units assigned to demand control programs are those that can be turned off for varying periods without adversely affecting environmental comfort conditions. Unfortunately, hotels and motels do not have very many equipment units that can be shed without adversely affecting the overall operation of the property and the comfort of its guests

Duty cycling turns off equipment sequentially for a predetermined period

of time each work cycle. Heating, ventilating, and air conditioning systems may be duty-cycled to reduce energy consumption while maintaining space comfort conditions. Duty cycling is not normally applied to large horsepower motors that cannot be stopped and started on a frequent basis without overheating.
Room occupancy sensors use either infrared light or ultrasonic waves to register the physical occupancy of a room or zone. Whenever a guest enters a monitored space, sensors turn on whatever devices are under their control, such as lights, air conditioning equipment, heating equipment, and so on.

When a guest leaves a monitored room, sensors react and, after a short delay, turn off or dim the lights and/or automatically reset the temperature. An EMS/PMS interface offers a number of opportunities for energy control. For example, assume that, on a particular night, a 50 percent occupancy is forecasted for a 300-room property. Minimizing the hotel's energy consumption on this night becomes a factor in determining which rooms to sell. One approach would be to assign guests only to the lower floors of the property and significantly reduce the energy demands of rooms on the upper floors. By interfacing an energy management system to a front office rooms management module, it is possible to automatically control room assignments and achieve desired energy cost savings. In many cases, energy cost savings are tracked through specially created databases or electronic spreadsheets.
Comfort conditions in guestrooms, meeting and function rooms, public spaces, administrative offices, and other EMS-monitored areas can be controlled through a centralized system console. Energy management systems typically provide rapid access to heat, ventilating, and air conditioning levels at remote locations and display these readings on the console screen.
No matter how sophisticated an energy management system may be, energy controls are virtually worthless if they are operating an energy system that is poorly designed or inadequately maintained.

Guest-Operated Devices
The adoption of self-service technologies is changing the high-touch tradition of the lodging industry. Guest-operated devices can be located in a public area of the hotel or in private guestrooms. In-room guest-operated devices are designed to be user-friendly. An assortment of devices provides concierge-level service with in-room convenience. Guest-operated devices discussed in the following sections include:

- Self-check-in/self-check-out systems
- In-room entertainment systems
- In-room vending systems.
- Guest information services

Self-check-in/self-check-out functionality exists in various formats. Some hotels use self-service kiosks placed in hotel lobby areas. Some allow guests to access their accounts through guestroom televisions or telephones. Some even allow for online check-in before arrival. Regardless of which kind of guest-operated device is used, self-check-in/self-check-out terminals and in-room interfaces can significantly

reduce the time it takes to process guest registrations, check-ins, and check-outs. In addition, some automated terminals have enhanced video capability that enables the property to introduce guests to the facilities and amenities available. Automated check-in and check-out devices can free front office employees to spend more time with those guests who require personal attention

Kiosks. Many hotel companies use self-service kiosks. Some kiosks resemble automatic bank teller machines, while others are unique in design. All possess audiovisual capability. Some are part of a wireless network that allows the hotel to move them easily as needed.

One type of system has a secured face plate that mounts on an interior or exterior wall. For the convenience of guests, step-by-step instructions are printed on the face plate. The only way to access the machine's contents (such as cash) is from the rear of the machine, which generally opens into the manager's office or another secure area. As a security precaution, the system does not disburse cash. If a late-arriving guest uses the system and a credit is due from a cash overpayment, the guest is instructed to receive the change at the front desk in the morning. When a guest pays by credit or debit card, authorization is secured by telecommunications capability. If the guest's use of a credit or debit card is declined, special instructions can be displayed asking the guest to use another card or to pay by cash.

A fully functional kiosk can handle guest identification, room and rate assignment, keycard dispensing, and account reconciliation. Two additional kiosk-based application extensions will soon be introduced. One involves providing departing guests access to their preferred airline website to print a boarding pass, while the second involves using the kiosk to access the guest's frequent-guest account for profile update and account review functions.

Kiosk-based applications are designed to be intuitive and user-friendly. In order to use self-check-in, a guest typically must arrive at the hotel with an advance reservation and possess a valid credit (or debit) card. The guest initiates the self-registration process by inserting the credit card into the terminal. The terminal then prompts the guest to use a keypad or touchscreen display to enter necessary information. After collecting registration data, the kiosk may display room types and rates. Since most kiosks are interfaced to a PMS rooms management module, automatic room and rate assignment is possible. Once a room and rate have been selected, the kiosk may automatically dispense an electronic key card (or tell the guest how to obtain a room key) long with a welcome letter and a map to the assigned room.

Lobby kiosks may also handle self-check-out procedures. Typically, the guest uses the credit or debit card used at check-in to access the appropriate folio and review its contents. After the guest completes the designated check-out procedures, the system automatically posts the account balance to the credit or debit card for billing and dispenses an itemized statement for the guest or requests an e-mail address for distribution.

The two most frequently cited reasons for using kiosks are reduced check-in time for guests and lower cost per transaction for hotels. Since a high percentage of frequent travelers have been using self-service technology, such as bank

ATMs, for several years, the products tend to be well accepted as an effective alternative to traditional hotel registration. In addition to providing check-in and check-out services, some self-service kiosks are able to print guest messages (communications), upgrade an assigned guestroom (upselling), or print in-house promotional coupons (marketing).
Despite the use of lead-through technology, hotel kiosks may present usability problems to guests that are technologically challenged or disabled. For this reason, some hotel companies are placing a kiosk service agent (KSA), or kiosk concierge, nearby to ensure smooth and accurate transactions. This is similar to a supermarket assigning an experienced cashier to oversee customer-operated self-check-out scanners. The emphasis is on maintaining functionality and operational efficiency.

In-Room Check-Out. In many properties, guests have the opportunity for both in-room folio review and **in-room check-out.** These systems may use in-room terminals, the property's television cable station, or guestroom telephones to access and display guest folio data on the guestroom television screen. When in-room terminals are interfaced with a PMS guest accounting module, they are able to access folio data and provide guests with a means to approve and settle their accounts. Some in-room folio review technology uses a guestroom telephone interface with the PMS to provide computer-synthesized voice responses. This system provides guests with folio totals (or details) and directs a self-cheek-out procedure. Folio copies are typically available for guests to pick up at the front desk or can be faxed or e-mailed to the departing guest.

Web-Based Check-In. Although wireless lobby kiosks have proven successful, often handling a significant percentage of check-in volume, the high cost of development and installation are often major concerns. The next step in hotel self-service applications, and a comparatively low-cost alternative to kiosks, is web-hosted check-in (similar to airline check-in). Hotel companies offering website check-in configure the application to allow online, remote check-in from several hours to several days before the destination property's check-in time on the day of arrival. Since online check-in has been effective for the airline industry, hotels are hopeful a similar application will help reduce the number of no-shows (as commitment is firm before arrival) and accelerate the on-premises arrival and room allocation process at the front desk (the guest exchanges web-generated paperwork for a room keycard and hotel information packet). Web-based hotel check-in, described as "online, not *in* line," could be available within the next several months.

In-room entertainment systems can be interfaced with a hotel's PMS or can function as independent systems. When interfaced with the PMS, in-room movie systems provide guestroom entertainment either through synchronous programming with specific start and end times) or asynchronous programming (on demand). The interface includes a timing device. After a special programming channel has been tuned in for a predetermined amount of time (usually several minutes), the device triggers an automatic charge posting to the appropriate guest folio.

Guest-disputed charges have plagued in-room entertainment systems since their inception. A guest may inadvertently turn on a special programming channel for background entertainment, only to discover at check-out that the set was tuned to a pay channel. Incorporating a free preview channel introducing the special programming offered can significantly reduce the number of disputed charges resulting from guests unknowingly selecting a pay-to-view channel. The preview channel permits a guest to view a small segment of each special program. In order to view an actual program, the guest must then physically switch the television from normal viewing to a pay-to-view mode.

In addition to movies, in-room entertainment systems may include:

- On-screen controls (offering DVD/CD functionality).
- CD library.
- Digital music channels.
- Music video library.
- Video
- Games.

In-Room Vending Systems

In-room vending systems are able to monitor sales transactions and determine inventory replenishment quantities. A popular in-room vending system is an in-room beverage system. There are two types of in-room beverage service systems: non-automated honor bars and microprocessor-based beverage devices.

Non-automated honor bars typically involve stocks of items that are held in both dry and cold storage areas within a guestroom. Changes in the bar's beginning inventory level are noted either by housekeeping room attendants during their normal rounds or by designated room service employees. In either case, the employee typically uses a hand-held portable computer terminal or the touch tone telephone in the guestroom to connect with the remote dedicated bar computer. Once connection has been made, the employee enters the product code numbers of items that have been consumed. The bar system's CPU relays guestroom information and charges for consumed items to the PMS for proper folio posting and issues a stock replacement report.

Although non-automated honor bar systems are extremely convenient for guests, they may pose several problems for the hotel. For example, since the bar is always open, consumption is almost impossible to regulate. This service problem could result in underage access to alcohol or frequent late charges. Another potential problem is the high labor costs associated with taking the necessary physical inventory of each in-room bar.

Microprocessor-based beverage devices contain beverage items in see-through closed compartments. The compartment doors may be equipped with fiber optic sensors that record the removal of stored products. Once triggered, the sensors relay the transaction to a built-in microprocessor for recording. Individual room microprocessors are typically cabled to a remote CPU, which stores recorded transactions. This CPU converts transactions into accounting entries, and relays them to the property management system guest accounting module for folio posting. The bar system's CPU also maintains perpetual inventory replenishment data, which directs the restocking of vending units.

Microprocessor-based systems avoid some of the problems associated with honor bars. For example, hotel managers may use a remote central console to lock in-room vending units. Some systems enable guests to lock their in-room bar units with their guestroom keys. In addition, PMS interfacing minimizes late charges. Also, since microprocessor-based devices maintain a perpetual inventory record, labor costs associated with manual inventory tracking are reduced.

Guest Information Services

Just as shopping malls have installed information terminals, so too have many hotels. Automated guest information services include kiosks in public hotel areas and on in-room televisions and PCs that allow guests to inquire about in-house events and local activities. Transient guests, conference attendees, and casual observers alike can access information about the hotel, its outlets, and surrounding attractions.

Guest information systems, also called in-room electronic services, have evolved into an important guest amenity. These systems may connect to cable broadcast systems, wire news services, transportation schedules, flash graphic files, and restaurant and room service menus, as well as providing Internet access. Through access devices, guests are able to connect to the following:

- Airline Schedules
- Local restaurant guides
- Entertainment guides and ticketing
- Stock market reports
- News and sports updates
- Shopping catalogs and transaction
- Video games and casino games
- Weather reports

Such connectivity enables the property to keep in-house guests and convention attendees informed about events and functions, provide tourists with information about local attractions, and inform business travelers about support services provided by the property.

POINT OF SALE TECHNOLOGY

- POS order entry units
- POS Terminal Keys
- POS Printers
- Accounts Settlement
- Managing Guest Accounts
- POS Reports
- Automated Beverage Control Systems

WHILE AUTOMATED PROPERTY MANAGEMENT SYSTEMS tend to consist of modules, restaurant management systems often involve specialty hardware and a wide variety of application software. This chapter focuses on service-oriented applications that rely upon point-of-sale (POS) technology to monitor service area transactions through remote workstation printers, displays, and network controllers.

This chapter begins by identifying the necessary order entry units of a restaurant-wide POS system. Input/output devices such as keyboards, monitors, touch screen terminals, OCR terminals, and wireless terminals are discussed in detail. POS printers-guest check printers, receipt printers, workstation printers, and journal printers-and POS account settlement devices-electronic payment systems-are also discussed. In addition, guest checks are examined in relation to enhancing management's control of operations.

The chapter closes with a section on automated beverage control systems. The discussion focuses on order entry devices, delivery networks, and dispensing units.

POS ORDER ENTRY UNITS

In this chapter, the term cashier terminal refers to a POS device that is connected to a cash drawer. A terminal without a cash drawer is commonly called a precheck terminal. Precheck terminals are used primarily to enter orders, not to settle accounts. For example, a server can use a precheck terminal located in a dining room service station to relay orders to the appropriate kitchen and/or bar production areas, but can only use the terminal to settle electronic payments. Only cashier terminals should be used for cash settlement.
Since POS devices are generally sold as modular units, everything but the basic terminal is considered optional equipment. The cash drawer is no exception. Management may connect several cash drawers to a single cashier terminal. Multiple cash drawers may enhance management's cash control system when several cashiers work at the same cashier terminal during the same shift. Each ca
several cashiers work at the same cashier terminal during the same shift. Each

cashier can be assigned a separate cash drawer so that, at the end of the shift, cash drawer receipts are individually reconciled.
A POS device with a cash drawer normally supports both prechecking and cashiering functions. For example, an employee at a cashier stand in a hotel restaurant may serve as the cashier for the food service outlet and as an order entry person for room service. When answering room service calls, the employee uses the cashier terminal as a precheck terminal. The terminal relays the room service orders to the appropriate kitchen and/or bar production areas. Before delivering the room service order, a room service employee may need to stop at the cashier station and pick up the printed guest check from the cashier. After delivering the order, the room service employee presents the settled or signed guest check to the cashier, who then uses the cashier terminal to close the guest check or transfer the folio charge within the system.

POS order entry units may be touch screen or composed of keyboards and monitors. The following sections discuss these components. Keyboards are examined in relation to keyboard design, types of keys, and keyboard overlays. Touchscreen terminals are examined from an efficiency perspective. The section on monitors addresses important concerns, such as the size and function of operator displays and handheld devices. Touchscreen POS devices, multimedia readers, and handheld devices are traditional order entry devices. These devices are described in detail later in the chapter.

Keyboard and Monitors

The two primary types of keyboard surfaces are micro-motion and reed style. The micro-motion keyboard design has a flat, wet-proof surface. The reed keyboard design contains wet-proof keys raised above the surface of the keyboard. More important than the physical design of the device's surface is the number of hard and soft keys the keyboard or screen provides. **Hard keys** are dedicated to specific functions assigned by the manufacturer. **Soft keys** can be programmed by users to meet specific needs.

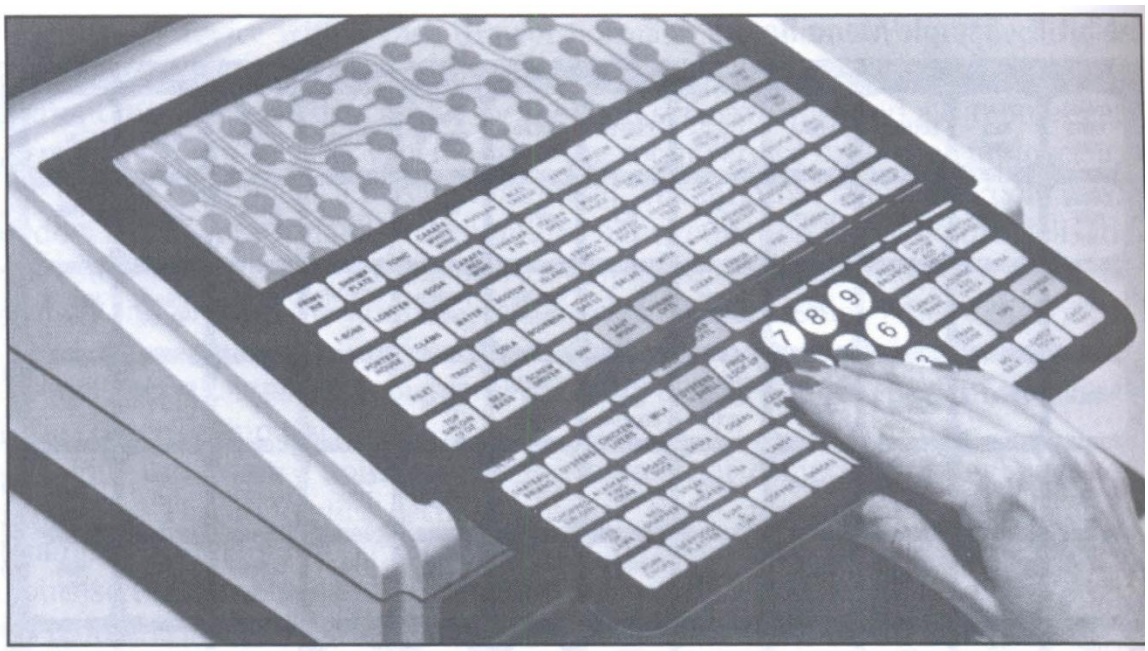
Keyboard designs can usually support interchangeable menu boards. A **menu board** overlays the keyboard surface and identifies the function performed by each key during a specific meal period. Menu boards can be developed to meet the specific needs of individual properties. Exhibit 1 shows a sample menu board for a dinner period. Menu boards for both micro-motion and reed style keyboard designs can identify a number of different types of key functions. Key types may include:

- Preset Keys (or Screen Icons)
- Price look-up Keys (or Screen Icons)
- Functions Keys
- Settlement Keys
- Modifier Keys
- Numeric Keypad

Servers enter orders by using preset keys and price look-up (PLU) keys. Modifier keys may be used in combination with preset and PLU keys to detail preparation instructions (such as rare, medium, well-done) for food production areas. Modifier keys may also be used to alter prices according to portion sizes (such as small, medium, and large). A numeric keypad facilitates various data-entry operations and enables cashiers to enter items by price when prices for items are not identified by preset keys or PLU numbers. Function keys and settlement keys are used to correct and complete transactions.

Generally, restaurant managers determine the positioning of most keys on a keyboard overlay. By positioning keys for similar items and functions together and arranging groups logically, managers can improve system performance and enhance operational controls. **The following sections briefly discuss the types of keys commonly found on pas system keyboards**

Preset Keys/Screen Icons. These keys are programmed to maintain the price, descriptor, department, tax, and inventory status for a select group of menu items. Automatic menu pricing speeds guest service, eliminates pricing errors, and permits greater menu flexibility. An item descriptor refers to the abbreviated description of a menu item, such as "SHRMPCKT" for shrimp cocktail or "PRIME" for prime rib. Although systems vary in the number of descriptor characters they can accommodate, most support descriptors of at least 8 to 10 characters long.



Each preset key (or screen icon) is normally associated with a department code and a printer routing code. A department code is used to describe the menu category to which the preset item belongs-appetizer, entree, dessert, and so on. A printer routing code, also used in conjunction with a remote monitor or kitchen display unit (KDU), is used to direct preparation instructions to the proper production area. For example, the porterhouse steak on the keyboard in Exhibit 1 would have a department code associated with entree items and a printer routing code designating it as an item prepared at the hot food production area of the kitchen. Other items on the same keyboard (salad, wine, etc.) can be assigned different department and printer routing codes.

Once a preset key is selected, a description of the item and its price are retrieved from memory and may be displayed on a monitor. This data may also be relayed (along with preparation instructions) to the appropriate production station and may be printed (or retained for later printing) on a guest check. In addition, the dollars represented by this transaction are retained for revenue reporting. Sales data for individual items are important for guest check totaling and management reports.

Price Look-Up Keys. Since terminals have a limited number of preset keys, price look-up keys (or screen icons) are used to supplement transaction entries. PLU keys operate like preset keys, except that they require the user to identify a menu item by a unique reference code number (up to five digits) rather than by its name or descriptor. A server entering an order for prime rib on a preset keyboard would merely press the item's preset key or use the designated PLU keys. In the absence of a prime rib preset key, the server might enter the item's code number (e.g., 7807) and then press the PLU key. PLU keys perform the same functions as preset keys but require more keystrokes. Preset keys and PLU keys enable the system to maintain a large inventory of menu items in terms of price, descriptor, tax, department, and inventory status.

Function Keys. While preset and PLU keys are used for order entry purposes, function keys assist the user in processing transactions. Sample function keys include: clear, discount, void, and no-sale. Function keys are important for error correction (clear and void), legitimate price alteration (discount), and proper transaction pricing and handling (no-sale). For example, a restaurant may attempt to increase weekly lunch sales by issuing coupons to nearby local businesses. When a coupon is used at the time of settlement, the cashier typically enters the value of the coupon and then presses the "discount" key. The value of the coupon is credited to the guest check and the remainder of the bill is settled through standard settlement procedures. The success of the promotion can be tracked if the POS system is capable of retaining itemized discounts and daily discount totals.

Settlement Keys. These keys are used to record the methods with which accounts are settled: by cash, credit card, house account, charge transfer, debit card, paykey, smart card, or other payment method. Settlement keys enhance revenue accounting controls because they classify transactions at the time of settlement. Although restaurants may use a number of revenue accounting methods, most operations use cashier banking or server banking. Server banking places the responsibility for guest check settlement on the server. Cashier banking involves a non-server handling account settlement. In either case, tracking the identification of the banker and the transaction settlement method facilitates a fast and accurate sales reconciliation.

Modifier Keys. Modifier keys allow servers to relay preparation instructions (such as rare, medium, or well-done) to remote workstation printers or monitors located in food and beverage production departments. Typically, a server enters the item ordered and then presses the appropriate preparation modifier. Modifier keys may also be used to legitimately alter menu item prices. For example, modifier keys may be useful to a restaurant that sells house wine by the carafe and half-carafe. Instead of tying up two preset keys (one for carafe, the other for half- carafe), a single preset key can be designated for house wine by the carafe and a modifier key can be programmed as a half-portion modifier. When a half-carafe is sold, the server simply presses both the carafe preset key and half-portion modifier key to register a half-carafe sale. The system will post wine revenue by adding the dollar amount for the half-carafe sale only. In addition, a countdown feature can be used to enable the pas system to accurately track inventory. A forced modifier may be built into the system. A forced modifier requires the server to respond to a specific cue before processing the order further. By requiring the server to respond, the system is intended to provide enhanced guest service.

Numeric Keypad. Numeric keys can be used to ring up menu items by price,

access PLU data by menu item code number, access open guest check accounts by serial or transaction reference number, record the number of items sold, and perform other data entry operations. For example, if the cashier terminal is used to record and store payroll data, employee identification numbers can be entered as employees begin and end their work shifts. In addition, menu item code numbers may be entered through the numeric keypad to access various files in order to make adjustments approved by management. The numeric keypad may also be used to enter report codes that initiate the production of management reports

Monitors. A micro-motion or reed style POS terminal typically contains an **operator monitor** and may also support a customer display unit. An operator monitor is generally a standard system component that enables the operator to view and edit transaction entries. The unit allows a server to monitor transactions in progress and also may serve as a prompt for various system procedures. The length and number of lines displayed are often an important consideration when selecting pas devices. Historically, line lengths have ranged from 7 to 80 characters, and the number of lines available have varied from 1 to 24 or more. Graphic icons and color-coded tones are popular menu item format options. An operator monitor is typically encased in the primary housing of the pas device. This is not always the case for customer display units.

The designs of **customer display units** include those that rest atop, inside, or alongside the pas device. Although customer display units are more restricted in size and scope than operator monitors, they permit a guest to observe the operator's entries. In many table service restaurants, settlement activities often take place outside the view of guests; therefore, a customer display unit may not be warranted. In restaurants where guests can view settlement transactions, the use of a customer display monitor is often recommended.

Customer display units also permit management to spot-check cashier activities. For example, an employee operating a cashier terminal without a customer display unit might ring up a $5 transaction as 50 cents. Later, to balance the cashier terminal’s cash, the employee might take the $4.50 difference for personal use. This kind of theft is riskier when the terminal contains a customer display unit because a manager or the customer might observe the bogus 50-cent entry and are often more important for management control purposes than for the assurance they offer guests.

The importance of practical, easy-to-use, fast, and reliable input devices has prompted the development of touchscreen terminals and handheld wireless server terminals. The following sections discuss each of these devices.

Touchscreen Terminals

There is perhaps no area of *pas* hardware that has received more attention than touchscreen technology. Color touchscreen terminals dominate the marketplace across all types of food service operations, including those that allow customers to use self-service order entry kiosks.

A touchscreen terminal contains a unique adaptation of a screen and a special microprocessor to control it. The self-contained microprocessor displays data on areas of the screen that are sensitive to touch. Touching one of the sensitized areas produces an electronic charge that is translated into digital signals for transmission to the microprocessor. This signal also instructs the microprocessor to display the next screen.

Although terminal design varies by vendor, a touchscreen terminal requires significantly less counter space than the traditional *pas* terminals it replaces. Many touchscreen devices measure only a few inches thick and can be mounted from walls, ceilings, counters, or shelving units. Flat screens offer restaurants additional flexibility in determining where to locate the terminals.

Touchscreens simplify data entry and are often selected over traditional screens and POS keyboards. A touchscreen provides prompts to guide servers through order entry or settlement procedures. For example, after a server enters an order for a menu item that needs preparation instructions (such as a New York strip steak), the screen shifts to display the appropriate modifiers (rare, medium rare, medium, medium well done, well done) or forced modifiers. Forced modifiers will not allow the user to proceed with order entry until a response is indicated. This reduces the possibility of servers sending incomplete orders to production areas. The interactive nature of a *pas* system also decreases the time it takes to train new employees.

Self-Service Order Entry. Some restaurant operations have installed countertop recessed or lobby stand-up touchscreen terminals that enable customers to place their orders without interacting with staff members. This self-service option is intended to reduce labor costs and provide more efficient customer service. Some systems have highly attractive graphic components that help simplify order entry. For example, icons (graphic images) or photographs can be used along with logos representing specific beverage choices. Condiments can also be creatively displayed-with a lasso indicating French salad dressing, the Eiffel Tower indicating French salad dressing, and so on.

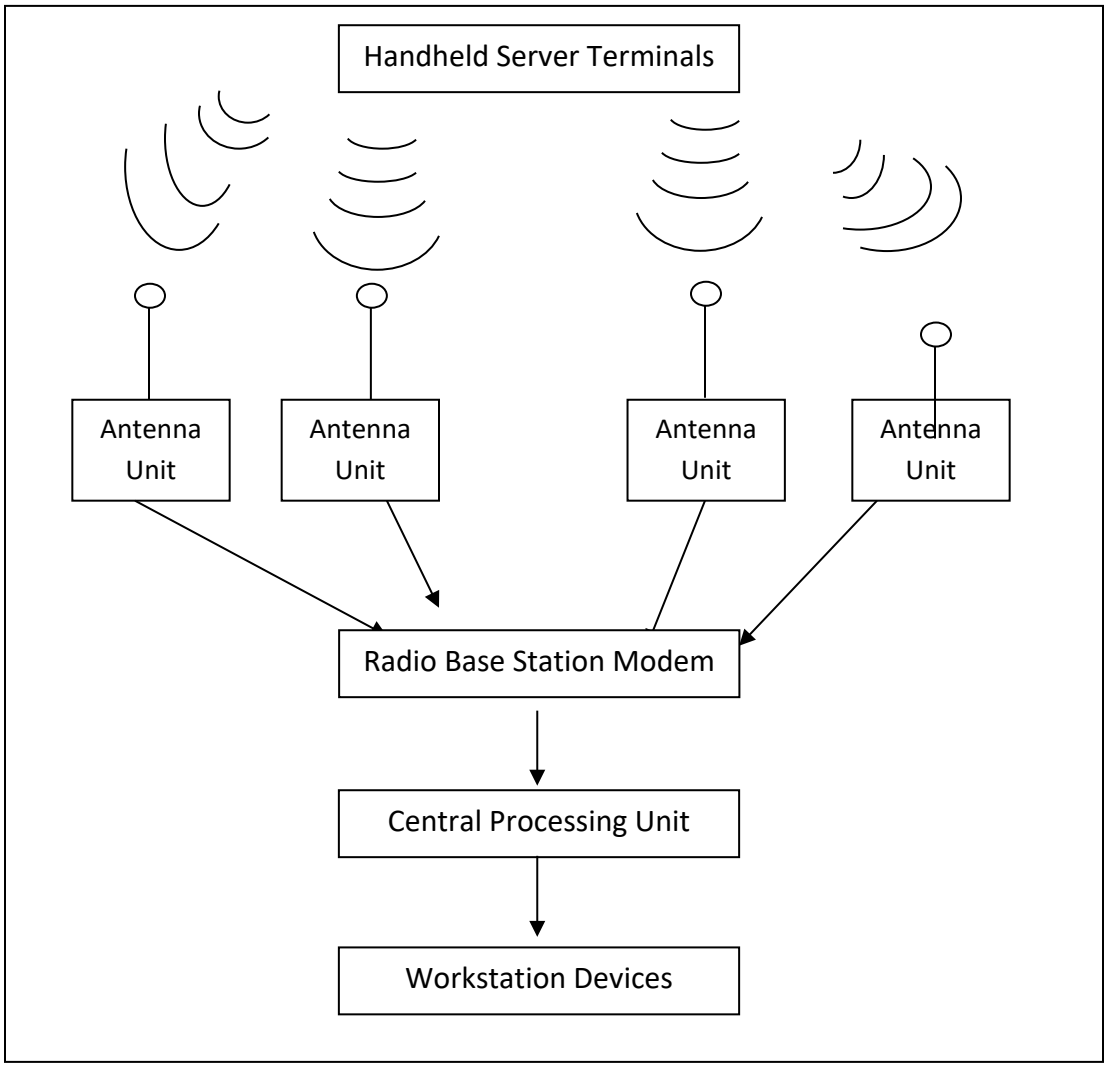
A quick-service system may allow the customer to activate the touchscreen terminal by pressing a start feature on the screen. The screen then shifts to a display asking the customer to indicate whether the order will be taken out or eaten on premises. Next, the screen shifts to display menu opinions. To order, the customer simply touches the desired item on the screen. As Items are touched, a video receipt" appears on the right side of the screen that maintains a running total during the ordering process. When the order is complete, the customer touches a "finished" box on the screen. At this point, a suggestive selling display may appear,

asking the customer if he or she would like additional items or desserts (if not ordered). The final screen displays the total amount due and settlement options and instructions.

Handheld Terminals

Wireless order entry terminals offer unique pas opportunities. Since these units are palm-sized, they are labeled **handheld terminals** (HHTs). Through skillful programming, an HHT is able to perform most of the functions of a precheck terminal. Wireless technology can be a major advantage for establishments with drive-through facilities, long distances between service stations, outdoor dining areas, or in athletic stadiums or anywhere a pre check terminal would be impractical. Service may be greatly enhanced, since servers do not have to wait to use a precheck terminal during busy times and orders can be entered tableside.

Exhibit 2: Sample Hardware Configuration for Wireless Handheld Server Terminals



HHTs with two-way communications not only allow a server to include special instructions, such as "no salt" or "medium rare" as part of an order, but also enable production staff or management to immediately alert a server if an item is out of stock or ready for pick-up. Typically, when an order is ready for pick-up, the server receives a page and/or displayed message.

Since all menu items must be entered through a server's handheld unit, the frequent problem of beverages or desserts inadvertently left off guest checks may be eliminated. Some wireless configurations enable managers to monitor all parts of service through a more powerful handheld device. Exhibit 2 diagrams one type of hardware configuration for handheld server terminals. The handheld units have low-frequency FM radio transmitters and receivers. As orders are entered, signals are sent to **antenna units** (access **points)** located within the service area. These antenna units relay transmitted signals to a **radio base station** where the information is digitized and sent to remote workstation printers or monitors. A charged battery pack powers each handheld terminal. Fully charged, these battery packs may last for hours. It is recommended that two fully charged battery packs be available for each handheld unit to maintain service continuity.
Several antenna units may be connected to a radio base station. Before installation, a site survey should be conducted to determine the optimum locations for each access point. The location of interference structures within the restaurant is an important installation concern.

POS Printers

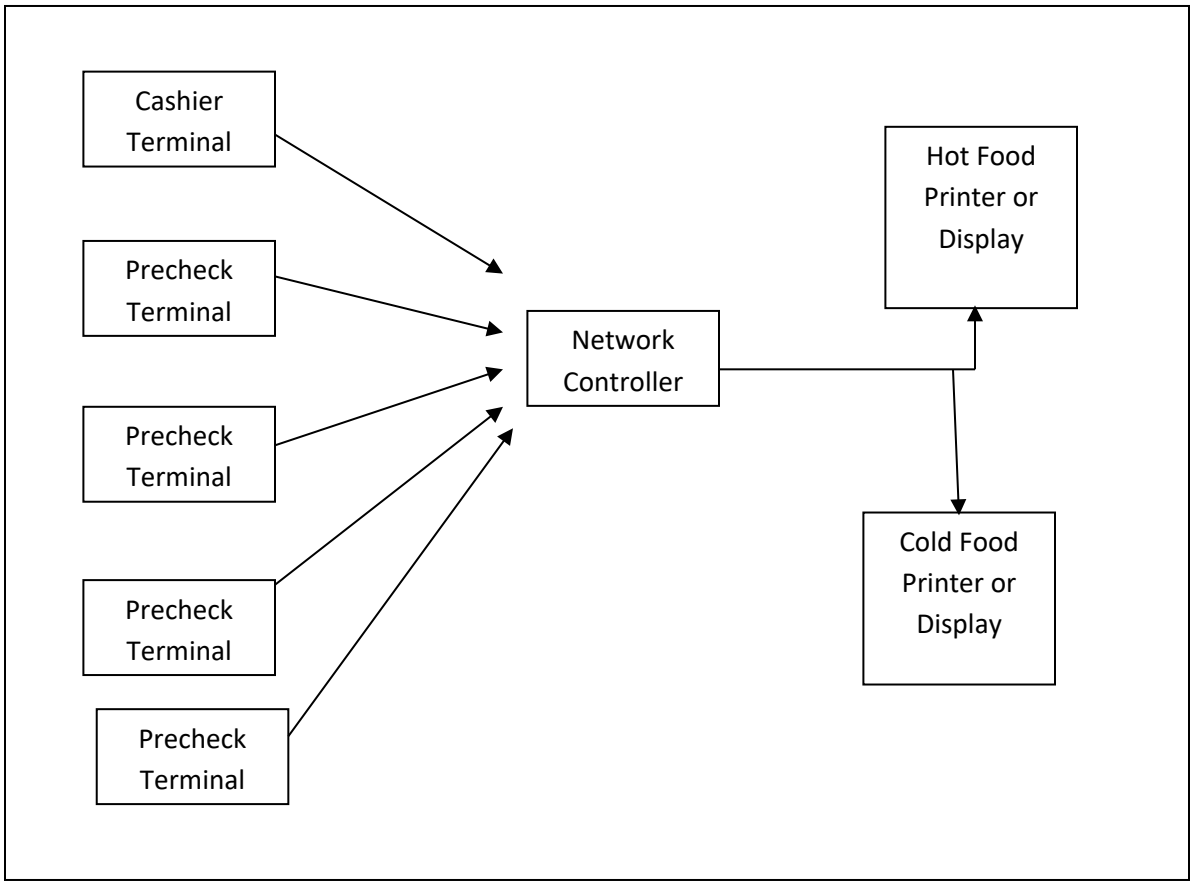
Cashier terminal printers are sometimes described as either on-board or remote printing devices. On-board printing devices are normally located with six feet of the terminal they serve. These devices include guest check-printers and receipt printers. Remote printing devices include workstation printer journal printers located more than six feet from the terminal they support. Each remote printing device will likely require separate cabling or wireless connectivity.

One of the most important peripheral devices in a POS system with remote workstation devices is the **network controller,** also called a printer controller. A network controller coordinates communications between cashier or precheck terminals and workstation printers or remote monitors, while ensuring that servers need only enter orders once. Exhibit 3 diagrams the function of a network controller.
When several precheck terminals send data to the same workstation printer or monitor simultaneously, the network controller processes data from one of the terminals immediately and temporarily stores (buffers) other communications until the remote device becomes available. As the remote printer or monitor outputs data sent from one terminal, the network controller sends the next set of data, and so on, until all orders are printed or displayed. Since remote workstation units tend to move quickly, the time delay between order entry and printout or display is

minimal-even for those orders temporarily buffered by the network controller.

Without a network controller, a remote workstation unit would be able to receive and print only one set of data at a time. When the remote unit is receiving data from one POS terminal, servers entering orders at other precheck terminals might encounter a "bottleneck" situation, much like a telephone busy signal. Without an effective network controller, orders likely would have to be re-input, since the original orders would not have been stored anywhere in the POS system

Exhibit 3 The Function of a Network Controller



Guest Check Printer

The on-board printing devices are sometime called slip printers. The guest check printers of most ECR/POS systems are capable of the following:

- Immediate check printing
- Delayed check printing
- Retained check printing

Immediate check printing refers to the ability of the system to print items as soon as it is fed into the terminal; delayed check printing prints items after the whole order has been entered in the system whereas, retained bill printing prints the guest bills at any time following order entry and before the settlement of guest bills. Sophisticated guest check printers can be equipped with an **automatic format number reader (AFNR)** and possess **automatic slip feed (ASF)** capabilities also.

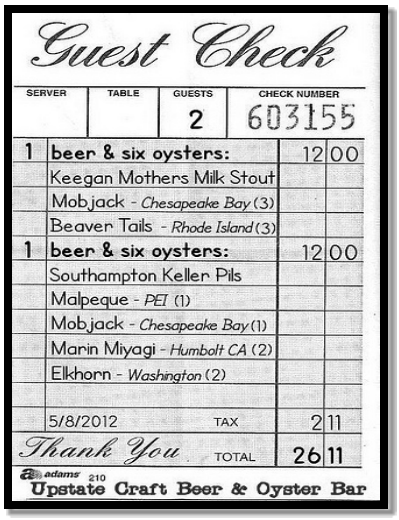
An **automatic slip feed (ASF)** capability prevents overprinting of items and amount on guest bills. ECR/POS systems without an ASF capability require a waiter or cashier to manually insert a guest bill into printer's slot and then align the printer's ribbon with the next blank printing line on the guest bill. This could be an unpleasant procedure for waiters to follow during a busy lunch or dinner period. If the alignment is improper, the guest bill would appear disorganized and messy with the items or amount printed over one another or with gaps between the lines. A system with ASF capability retains the number of the last line printed for each open guest check with the top edge of the printers slot, and the terminal automatically moves the check/bill to the next available printing line and prints the order entry data. Since the guest bills are placed within the printers slot the same way every time, the waiters may spend lesser time manipulating machinery and more time meeting the guest requirements.

Receipt Printers.

A **receipt printer** produces copy on narrow, flimsy paper tape. In addition to printing soft checks, a receipt printer may help control the production and accounting of menu items not prepared at departments receiving orders through remote display or printing devices. For example, when servers prepare desserts and the pantry area is not equipped with a remote communication device, desserts could be served without ever being entered into the system. When this happens, it is also possible that desserts could be served without amounts ever being posted to guest checks. This situation can be avoided with a receipt printer. Servers preparing desserts can be required to deliver a receipt tape to the dessert pantry area as proof that the items are properly posted to guest checks for eventual settlement. This procedure ensures that every menu item served is printed somewhere in the system, enhancing management's internal control.

Workstation Units

Remote printers or monitors are usually placed at kitchen preparation areas and service bars. As orders are entered at pre-check terminals, they are sent to a designated remote **workstation printer** or **KDU (Kitchen Display Unit)** to initiate production. The printouts correspond to items appearing on the sample guest check illustrated in Exhibit 4. This communication system enables servers to spend more time meeting guests' needs while significantly reducing traffic between the dining room and both the kitchen and the service bar. If the need for hard copy output in production areas is not critical to an operation's internal control system, a remote display unit (also called a kitchen display unit or KDU) may be a viable alternative. Since these units display several orders on a single screen, kitchen employees do not have to handle numerous pieces of paper. An accompanying cursor control device enables kitchen employees to easily review previously submitted orders by scrolling partial or full screens at a time



Guest Check

SERVER	TABLE	GUESTS	CHECK NUMBER
		2	603155

1	beer & six oysters:	12 00
	Keegan Mothers Milk Stout	
	Mobjack - *Chesapeake Bay* (3)	
	Beaver Tails - *Rhode Island* (3)	
1	beer & six oysters:	12 00
	Southampton Keller Pils	
	Malpeque - *PEI* (1)	
	Mobjack - *Chesapeake Bay* (1)	
	Marin Miyagi - *Humbolt CA* (2)	
	Elkhorn - *Washington* (2)	
	5/8/2012 TAX	2 11
	Thank You TOTAL	26 11

adams 210 Upstate Craft Beer & Oyster Bar

Journal Printers.

These remote printers produce a continuous detailed record of all transactions entered anywhere in the system. **Journal printers** are usually located in secure areas away from service and production areas. Hard copy is produced on narrow register tape (usually 20 columns wide) or printed on letter-sized paper and provides management with a thorough system audit. In addition to providing an audit trail, journal printers also print a variety of operational reports. Management routinely reviews journal printouts to verify that the system is being used properly.

Account Settlement

Magnetic strip readers and radio frequency identification (RFID) readers are optional data capture devices that connect to a cashier terminal to facilitate select forms of settlement. Magnetic strip readers do not replace keyboards, touchscreen devices, or optical character recognition terminals. Instead, they extend system capabilities. Magnetic strip readers are capable of collecting data stored on a magnetized film strip typically located on the back of a credit card, debit card, gift card, smart card, or loyalty or proprietary card. Terminals equipped with magnetic strip readers can also be used by employees with compatible identification cards to sign into the system. With magnetic strip readers, credit card, debit card, and related account transactions can be handled directly within a pas system. The connection of a magnetic strip reader to a cashier terminal allows rapid data entry and efficient settlement processing. It is also possible to add an RFID reader to a pos terminal.

Power Platforms

Processing credit, debit, and gift card transactions can be greatly simplified when a

power platform is used to consolidate electronic communications between a hospitality establishment and a remote authorization application. A pos power platform can connect all pas terminals at a location to a single processor for transaction reconciliation. This eliminates the need for redundant or individual pas terminal connectivity. Power platforms can capture transaction authorizations in seconds, and this swift data retrieval helps reduce the time, cost, and risk associated with deferred settlement.

Smart Cards

Smart cards are made of plastic and usually are in a shape and size of a credit card. Microchips embedded in smart cards store information that can be accessed by a specially designed reader. Smart cards can store information in several storage locations on the chip that can be accessed for different functions. For example, a smart card could store a person's vital health statistics, dietary restrictions, credit card number, frequent diner number, and bank account information. The security of information stored in smart cards is usually controlled through a personal identification number (PIN) or a biometric characteristic that must be used to access files.

Since smart cards contain the necessary information for completing electronic purchases, a specially designed reader may process a transaction and reduce the cash value stored on the chip by a corresponding amount. With a proprietary smart card, no bank or credit card company authorizations are required.

Debit Cards

Debit cards differ from credit cards in that the cardholder must have money deposited into a linked bank account in order to establish settlement value. The cardholder deposits money in advance of purchases through a debit card center, bank, online financial outlet, or ATM. As purchases are made, the balance in the debit account is reduced accordingly. For example, a cardholder who has deposited $300 to a debit card account has $300 available for transaction settlement. As the cardholder makes purchases, the value of the debit account decreases to reflect the use of funds. To settle a transaction, the money is electronically transferred from the customer's account to the business account. There are two types of debit card transactions: online and offline. In an online debit transaction, the cardholder uses a PIN code to authorize the transaction. In an offline debit transaction, the cardholder provides a signature to complete the transaction. An offline transaction is processed in a time frame similar to a credit card transaction.

Contactless Payments

Contactless payments, also referred to as proximity payment technology, involve settlement of a cashless transaction initiated and completed without physical contact between the payment media and payment reader. Purchase transactions are conducted with a wave or tap of an RFID chip embedded in a plastic card, tag, mini-card, or keychain fob, not with the swipe of a magnetic stripe. Settlement data is exchanged through contactless linkage using a passive RFID reader. It is the transmission and receipt of radio signals between a POS-based reader and the RFID payment medium that automatically initiates and completes the transaction. Near field communication (NFC) technology is also an effective contactless payment processing approach.

Managing Guest Accounts

Managing guest accounts is important regardless of whether a hard check or soft check POS system is used. Before entering an order, the server may" open" a guest check within the system by inputting a unique identification number or biometric.
Once the system has recognized the server and opened a new guest check, menu items can be entered and relayed to remote devices in production areas. The same items (along with selling prices) are printed or stored on the guest check.

Once a guest check has been opened, it becomes part of the system's **open** check file. For each opened guest check, this file may contain the following data:

- Terminal number where guest check was initialized
- Guest check serial number (if appropriate)
- Server identification number
- Time guest check was created
- Menu item ordered
- Selling price of items ordered
- Applicable tax
- Total amount due

A server adds subsequent menu item requests to the guest check by accessing the check through serial number (or other identifier) matching at the POS terminal, and then entering the additional items.

There are many variations of this automated sequencing. Some systems are hard checks (guest checks with bar codes) with pre-printed serial numbers. Bar coding eliminates needs for server to manually input the guest check's serial number when opening a guest check or when adding items to guest checks already in use. When the guest check is placed in the guest check printer, the system reads the bar code and immediately accesses the appropriate file and line number.
Soft check systems eliminate the traditional externally stored guest check altogether. Soft check systems maintain only an electronic file for each open guest check. A receipt-like guest check can be printed at any time during service, but is usually not printed until after the meal when the server presents a final version of the check to the guest for settlement. Since no paper forms are used during service, the table number often is the tracking identifier for the order. With some systems, seat numbers can also be used for tracking multiple checks per table. When presenting soft checks to guests for settlement, the receipt-like guest checks can be inserted in high-quality cardboard, vinyl, or leather presentation jackets.
Most POS systems feature a soft guest check that can also be formatted to include a section for printing a credit card, debit card, smart card, or gift card receipt. This often reduces the time it takes servers to settle guest checks and assures customers of actual charges. Instead of presenting the guest check, collecting the guest's cashless payment media, printing an invoice, transferring information from the guest check to the invoice, and then presenting the invoice to the guest to sign, servers are able to present the guest check and a receipt simultaneously.

POS technology simplifies guest check control functions and eliminates the need for time-consuming manual audit procedures. Automated prechecking functions eliminate mistakes servers make in pricing items or calculating guest check totals. When items must be voided, a supervisor (with authorization) can access the guest check and delete the items. Generally, automated systems can produce a report that lists all guest checks with voided or discounted items. It is important for automated systems to distinguish voided from discounted items because discounted items will appear in inventory usage reports, while voided items may not. If an item is voided after it has been prepared, the item typically is classified as "returned."
The status of a guest check changes from open to closed when payment is received from the guest and is recorded in the POS system. Most automated systems produce an **outstanding checks report** that lists all guest checks (by server)
that have been opened but not settled. The report may list guest check number, server identification number, time guest check was opened, number of guests, table number, and revenue check total. This feature can help management determine responsibility for unsettled guest checks.
At any point, managers and supervisors can access the POS system and monitor the status of an open or closed guest check. This check-tracking capability can help identify potential walkouts, reduce server fraud, and tighten guest check and sales income control.

Consolidated Reports

POS systems may access data contained in several files to produce consolidated reports for management use. Such reports typically include daily revenue reports, sales analysis reports, summary activity reports, and productivity reports. Data captured by a POS system can be exported to a back office software package for more extensive report generation.
A POS sales and payment summary report provides managers with a complete statement of daily or monthly sales (by shift and/or by food and beverage category). The report may also summarize settlement methods.

A POS sales by time of day report enables management to measure the sales performance of individual menu items by department or product category within certain time intervals (often called "day parts"). Time intervals may vary in relation to the type of food service operation. Quick-service restaurants may desire sales analysis reports segmented by IS-minute intervals, table-service restaurants in hourly sections, and institutional food service operators by meal period. A sales analysis report allows management to track individual item sales, analyze product sales movement, and monitor advertising and sales promotional efforts.
POS **daily transactions report** that provides an in- depth analysis of sales transactions by individual server. pas **productivity reports** typically detail sales activity for all active food service servers. Daily productivity reports may be generated for each server on a guest count, total revenue, and average revenue per guest basis.

Automated Beverage Control Systems

Automated beverage control systems reduce many of the time-consuming management tasks associated with controlling beverage operations. While automated beverage systems vary, most systems can dispense drinks according to the operation's standard drink recipes, monitor the number of drinks poured, and report the associated revenues.

Automated beverage systems can be programmed to dispense both alcoholic and non-alcoholic products with varying portion sizes. An automated beverage control system can also generate projected sales information based on different pricing period forecasts. With many systems, the station at which drinks are prepared is connected to a guest check printer that records transaction data as drink orders are dispensed. As a control technique, systems may require that a hard guest check be inserted into the printer before a drink can be dispensed. With a soft guest check system, there must be a roll of paper in the printing unit. The goal is to automatically track all sales generated through automated beverage dispensing equipment.

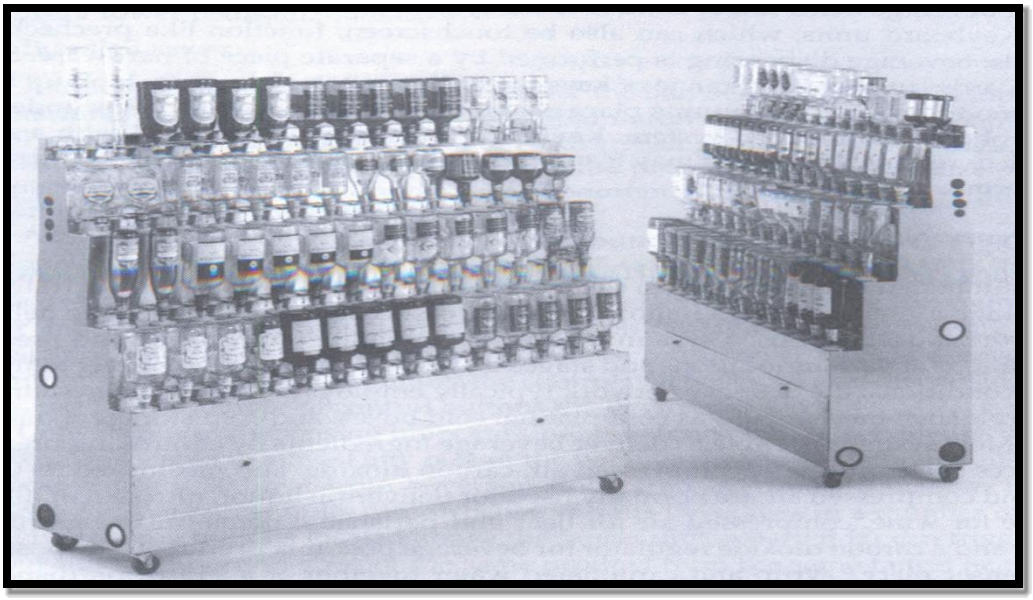
With one type of automated beverage system, liquor is stored at the bar. Price-coded pourers (special nozzles) are inserted into each bottle. These pourers cannot dispense liquor without a special activator ring. The bartender slips the ring over the neck of a liquor bottle (with the price-coded pourer already inserted) and prepares the drink with a conventional hand-pouring motion. A cord connects the activator ring to a master control panel that measures the liquid flow and converts and records the number of drinks poured at each price level. The master control panel is typically connected to a pas terminal for transaction control. Reports indicate the number of drinks poured at different price levels and the total expected revenue from each dispensing station.

With another type of automated beverage system, liquor is stored in racks in a locked storage room located away from the bar area. The bartender prepares a drink by pushing the appropriate key on a dispensing device. The liquor and associated mixes required by the drink recipe travel to a dispensing location at the bar through separate, high-quality plastic tubing. The system pours the drink when the bartender holds a glass under the dispensing device. The drink may then be manually garnished and served to the guest.

Automated beverage control systems may employ several types of sensing devices to increase operational controls while maintaining data integrity within the system. Three common sensing devices are glass sensors, guest check sensors, and empty bottle sensors. A glass sensor is an electronic mechanism located in a bar dispensing unit that will not permit liquid to flow from the dispensing unit unless there is a glass in place to catch the liquid below the dispensing head. Guest check sensors prevent the system from fulfilling beverage orders unless first recorded on an open guest check. When a server places a beverage order whose ingredients are close to becoming out-of-stock, an empty bottle sensor relays a signal to the

order entry device that product inventory needs replenishment.

Automated beverage control systems can enhance production and service capabilities while improving accounting and operational controls. Systems can record data input through order entry devices, transport beverage ingredients through a controlled delivery network, dispense ingredients for ordered items, and track important service and sales data. The following sections examine the basic components of an automated beverage control system: order entry devices,



delivery networks, and dispensing units.

Order Entry Devices

In an automated beverage control system, the primary function of an order entry device is to initiate activities involved with recording, producing, and pricing beverage items requested by guests. There are two basic order entry devices: preset keys on a dispensing unit and keyboard units that function as precheck POS terminals.

A group of preset buttons on a dispensing unit is a popular order entry device format. Preset key devices may operate at a lower overall level of cost, since the dispensing unit serves as both an order entry device and a delivery unit. However, since dispensing units may support a limited number of preset buttons, the number of beverage items under control of the system is severely limited.

Keyboard units, which can also be touchscreen, function like precheck terminals; beverage dispensing is performed by a separate piece of hardware. Since keyboards support a full range of keys (including preset keys, price look-up keys, and modifier keys), these units place a large number of beverage items under the control of the automated system. Keyboard units may be equipped with a guest check or receipt printer and may feature a colorful array of keys or icons in graphical form.

Delivery Networks
An automated beverage control system relies on a delivery network to transport beverage ingredients from remote storage areas to dispensing units. The delivery network must be a closed system capable of regulating temperature and pressure conditions at various locations and stages of delivery. To maintain proper temperature conditions, the delivery network typically employs a cooling sub-system that controls such mechanisms as cold plating, cold boxes, and cold storage rooms.

Most systems are able to deliver beverage ingredients by controlling pressure sources such as gravity, compressed air, carbon dioxide, and nitrous oxide. Gravity and compressed air are normally used for delivering liquor, nitrogen or nitrous oxide for wine, compressed air for beer and perishable items (mixes, garnishes, etc.), and a carbon dioxide regulator for beverage post-mix products. The post-mix dispenser places syrup and carbonated water together at a soft drink dispenser instead of storing, transporting, and distributing the drink as a finished product.

The particular pressure source selected to transport a specific ingredient is a function of its effect on the taste and wholesomeness of the beverage item. For example, if carbon dioxide were attached to a wine dispenser, the wine would become carbonated and spoiled. Similarly, if compressed air were connected to a post-mix soft drink dispenser, the dispensed beverage would not have any carbonation. Pressure sources not only affect the quality of finished beverage items, but may also affect the timing, flow of mixture, portion size, and desired foaming. Almost any brand of liquor and accompanying liquid ingredient can be stored, transported, and dispensed by an automated beverage control system. Portion sizes can be specified with remarkable accuracy. Typically, systems can be calibrated to maintain portion sizes ranging from one-half ounce to three and one-half ounces.

Dispensing Units
Once beverage item ingredients are removed from storage and transported by the *delivery* network to a service area, they are ready to be dispensed. Automated beverage control systems may be configured with a variety of dispensing units. Common dispensing units include:

- Touch-bar faucet
- Hose and gun
- Console faucet
- Mini-tower pedestal
- Bundled tower

- A touch-bar faucet can be located under the bar, behind the bar, on top of an ice machine, or on a pedestal stand. Touch-bar faucet devices do not have the versatility, flexibility, or expandability of other dispensing units. Typically, these units are dedicated to a single beverage type and are preset to one portion size output per push on the bar lever. A double shot of bourbon, for example, will require the bartender to push twice on the bar lever.

- A hose and gun device features control buttons on the handle of a gun-like device that can be connected to liquors, carbonated beverages, water, and wine tanks. A hose and gun dispenser can be installed anywhere along the counter of a bar and is considered standard equipment on portable bars and service bars. Pressing a control button produces a pre-measured flow of a desired beverage. The number of beverage items under the control of a hose and gun dispensing unit is limited to the number of control buttons the device supports.

- Console faucet dispensing units are similar to touch-bar faucet devices in that they can be located in almost any part of the bar area. In addition, these units may be located up to 300 feet from beverage storage areas. Unlike touch-bar faucet devices, console faucet units can dispense various beverages in a number of portion sizes. Using buttons located above the faucet unit, a bartender can trigger up to four different portion sizes of the same product from the same faucet head. An optional feature of a console faucet device is a double hose faucet unit that provides the capability to transport larger quantities of liquids in shorter amounts of time.

- The mini-tower pedestal dispensing unit combines the button selection of a hose and gun device with the portion size capabilities of a console faucet unit. In addition, the mini-tower concept offers increased operational controls of bar procedures. In order for a beverage to be dispensed, the mini-tower unit requires that a preset key be pressed and a glass placed directly under the dispensing head. This automated dispensing unit is designed for dispensing beverage items that need no additional ingredients (items like wine, beer, and call brand liquors). A mini-tower unit can also be located on a wall, ice machine, or pedestal base in the bar area.

- The most sophisticated and flexible dispensing unit is the bundled tower unit, also referred to as a tube tower unit. The bundled tower unit is designed to dispense a variety of beverage items. Beverage orders must be entered on an interfaced POS device, not on the tower unit. Bundled tower units may support in excess of 110 beverage products and contain a glass-sensing element. Each liquor has its own transportation line to the tower unit, and a variety of pressurized systems can be used to enhance delivery from distant storage areas. While other units sequentially dispense beverage item ingredients, the bundled tower unit simultaneously dispenses all ingredients required for a specific drink recipe. The bartenders merely garnish the finished product. Like the console faucet unit, this dispensing unit can be located up to 300 feet from beverage storage areas.

FOOD AND BEVERAGE MANAGEMENT APPLICATIONS

CHAPTER 7 FOOD AMD BEVERAGE MANAGEMENT APPLICATIONS

- Recipe Management
- Sales Analysis
- Menu Management
- Pre costing / Post Costing
- Automated Beverage Systems Reports

RESTAURANT MANAGERS are constantly challenged to find new ways to increase revenues while controlling and reducing costs. A major stumbling block for many managers is the lack of detailed, current information about restaurant operations. Managers need timely feedback to measure effectiveness and plan business strategies. The cost of collecting information manually is often prohibitive. In contrast, an automated food service management system can quickly provide reports that help improve productivity and enhance managerial control.

Food and beverage management applications process data related to back- of-the-house food service activities. This chapter examines popular food service management applications such as:

- Recipe management.
- Sales analysis.
- Menu management.

This chapter also discusses the importance of integrated food service software for precosting and postcosting applications, as well as reports generated by sophisticated automated beverage control systems.

Recipe Management

A recipe management software application maintains three of the most important files of an automated restaurant management system:

- Ingredient file
- Standard recipe file
- Menu item file

Most other food service applications access data contained within these basic files in order to effectively complete processing functions

Ingredient File

An **ingredient file** contains important purchase, storage, and usage data on each purchased ingredient. The ingredient file is often referred to as the food item data file (FIDF). Data may include:

- ❖ Ingredient code number.
- ❖ Ingredient description.
- ❖ Purchase unit (how a product arrives at the property).
- ❖ Purchase unit cost.
- ❖ Issue unit (how a product is tracked in the storeroom).
- ❖ Issue unit cost.
- ❖ Recipe unit (how a product is used in recipes).
- ❖ Recipe unit cost.

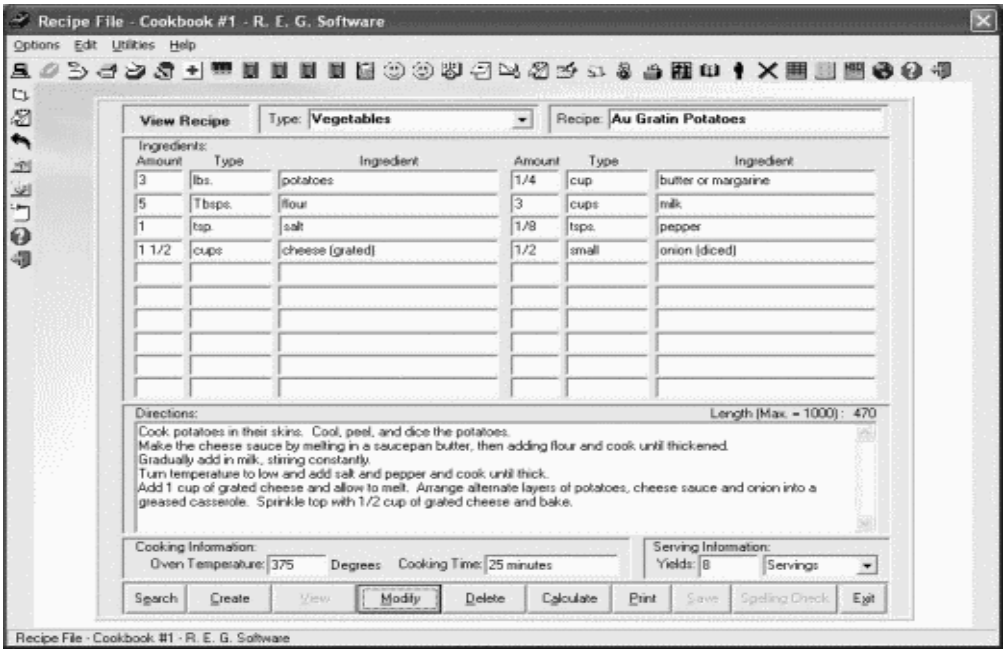
Some ingredient files may specify more than one recipe unit. For example, the recipe unit for bread used for French toast may be the slice; however, the recipe unit for bread used for stuffing may be the ounce. In addition, most restaurant operations enter non-food items into an ingredient file to ensure that the ingredient file contains a complete list of all purchased products.

This list becomes especially important when purchase orders are generated to replenish depleted inventory or used for online purchasing or e-procurement.

Additional data contained in the ingredient file may provide the basis for effective inventory control. **Conversion tables** can be maintained to track ingredients (by unit cost) moving through purchasing/receiving, storing/issuing, and production/service control points. In order to efficiently maintain a perpetual inventory record, a food service system must be able to automatically convert purchase units into issue units and recipe units (also called usable units).

The system should also track the costs associated with these various ingredient units. Given information regarding the purchase unit's net weight and cost, the system should extend costs for issue and recipe unit(s).

Standard Recipe File



A standard recipe file contains recipe for all menu items. The recipe file is often referred to as the recipe item data file (RIDF). Important data maintained but the standard recipe file may include:

- Recipe code number
- Recipe name
- Number of portion (batch size)
- Portion size
- Recipe unit (ingredient metric)
- Recipe unit cost
- Menu selling price
- Food cost percentage
- Contribution margin

A limited number of ingredients can be listed for each standard recipe. A popular feature of a recipe record is the ***"high warning flag,"*** which signals when the current food cost exceeds a predetermined level of concern as set by management. Recipe records are integral to purchase order systems, because stored recipes can indicate needed quantities for projected production and provide an index of perpetual inventory replenishment following production.

Some data in the standard recipe file may overlap data within the ingredient file. This simplifies the creation and maintenance of recipe records, because data will not have to be manually re-entered. Recipe management applications can access specific elements of data contained in ingredient and recipe files and

generate a host of management reports.

Few restaurants purchase all menu item ingredients in ready-to-use or pre-portioned form. Some ingredients are made on the premises. This means that the ingredients within a standard recipe record may be either inventory items or references to other recipe files. Recipes included as ingredients within a standard recipe record are called **sub-recipes**. Including sub-recipes as ingredients for a particular standard recipe is called ***"recipe chaining"*****.** Chaining recipes enables the system to maintain an efficient record for a particular menu item that requires an unusually large number of ingredients. When ingredient costs change, automated recipe management applications must be capable of updating the costs of standard

Menu Item File

A **menu item file** contains data for all meal period offerings and menu items sold. The menu file is often referred to as the menu item data file (MIDF). Important data maintained by this file may include:

- Identification number (meal period index)
- Descriptor (meal period)
- Recipe Code Number
- Selling price
- Portion quantities for inventory reporting
- Sales totals

A menu file may also store historical information on the actual number of menu items sold by meal period and date. This data can be accessed by management or by sophisticated forecasting programs to project sales, determine the amount of ingredient quantities needed, and schedule needed production and service personnel.

Sales Analysis

A POS system can store files that contain important data regarding daily food service operations. When a pas system is interfaced to an integrated management system, data maintained by POS system files can be accessed and applied in an automated process. A POS interface enables a sales analysis application to merge data from the pas files with data from files maintained within a recipe management application. The sales analysis software can then process this combined data into numerous reports to help management monitor and control operations in such specific areas as:

- Menu planning.
- Sales forecasting.
- Menu item pricing.
- Ingredient purchasing.
- Inventory control.
- Labor scheduling.
- Payroll accounting.

Sales figures can be entered manually or imported from a pas system. The program calculates food cost and depletes inventory amounts accordingly. Food service management systems typically produce a variety of sales reports. A daily sales report summarizes all sales revenue activity for a day. Revenue is itemized by the following categories:

- Net sales
- Tax
- Number of covers (customer served)
- Revenue per check
- Revenue per cover
- Sales category
- Day-part totals

In addition, affected general ledger accounts are listed, and associated food costs and sales percentage statistics are noted. A **weekly sales spreadsheet** provides a weekly summary of information contained in daily sales reports.

Menu Management

Most automated food service management applications sort and index data into timely, factual reports for management and help management answer such questions as:

- What is the most profitable price to assign to a menu item?
- At what price level and sales mix does a food service operation maximize its profits?
- Which current menu items require repricing, retention, replacement, or repositioning on the menu?
- How should daily specials and new menu items be priced?
- How can the success of a menu change be evaluated?

Menu engineering is a menu management application used for evaluating decisions regarding current and future menu pricing, design, and contents. This application requires management to focus on the number of dollars a menu contributes to profit and not simply on monitoring cost percentages.
Menu engineering begins with an interactive analysis of menu mix (MM) and contribution margin (CM) data. Competing menu items are categorized as either high or low.

MENU MIX – Determining how much each product receives from the gross sales in your restaurant. The percentage of sales volume each item in your restaurant represents in a given week.

SALES AND CATERING APPLICATIONS

- Hotel Sales Office Automation
- Revenue Management
- Catering Software

A TYPICAL HOTEL sales or food service catering operation relies on a large amount of paperwork, with a significant portion of each day spent managing the information collected through prospecting, selling, booking, and reporting. With the development of specialty application software, many of these time-consuming and expensive procedures are handled with automation. Sales and catering application software can:

- Accomplish manually tedious tasks quickly and efficiently.
- Access sales information rapidly.
- Facilitate personalized mailings through database marketing.
- Reduce data-handling errors.
- Decrease staff training costs by implementing standardized procedures.
- Access customer profile information for targeted promotions.
- Enhance communication linkages among affiliated properties.

The following sections explore hotel sales office automation, as well as banquet and catering software

Sales Office Automation

Sales records are a vital part of sales office communications. Records can be helpful in establishing new accounts, servicing existing accounts, and generating repeat business. In a non-automated sales office, it is necessary that salespeople familiarize themselves with sales form preparation and filing in accordance with office
procedures.

Group Guestroom Sales

In most non-automated sales offices, a **guestroom control book** is used to monitor the number of guestrooms committed to groups. Since front desk, reservations, and sales office employees are capable of booking guestroom business, it is important that all personnel be aware of timely and accurate group allotments to avoid overbooking.

Properties often implement revenue management strategies designed to maximize

rooms revenue by establishing a desired mix of group, tour and travel, and individual guest business for specific time periods. Typically, a guestroom control book is used to guide guestroom booking activity by providing the sales office with the maximum number of guestrooms it can sell to groups on a given day. This quota is usually set by hotel management in consultation with the hotel's marketing and sales department. The remaining guestrooms (and any unsold guestrooms allotted to groups) become available for individual guests. In general, these guestrooms will be sold by front desk and reservations staff at higher rates than they would be sold to groups.

A major challenge of non-automated sales offices is maintaining a current and accurate guestroom control book. Difficulties arise during busy periods when bookings or cancellations are not properly recorded as they occur. Therefore, before booking guestroom business, it is not unusual for a salesperson to double- check the reliability of guestroom control data by inquiring of other sales staff members.

Automated sales offices overcome many tedious operational problems simply because every salesperson with electronic access gains immediate access to guest-*room* control information. Bookings and cancellations can be quickly processed as they occur-even as the salesperson is in contact with the client. This helps ensure that every salesperson has access to exactly the same information, and that "definite" and "tentative" bookings are clearly identified to prevent errors.

Function Room Sales

In non-automated properties, the key to successful function and banquet space control is the function book. The function book indicates the occupancies and vacancies of specific function rooms and banquet rooms and is central to effective facility planning

Function books normally are divided into pages for each day of the year, with sections set aside for each meeting or function room. Information recorded in the function book includes the organization or group scheduling the space; the name, address, and telephone number of the group's contact person; the type of function; the duration of the function; the total time required for preparation, breakdown, and cleanup; the number of attendees expected; the type of setup(s) required; the rates quoted; the nature of the contract; and any pertinent remarks to help property personnel stage a successful function. Function book entries tend to be recorded in pencil because changes can occur even when a commitment seems firm. As with the guestroom control book, only one function book should be maintained to prevent mismatching of entries or double bookings. Information from the function book and other files for events involving food or beverage service is eventually transcribed onto a banquet event order (BEO) form. Since a BEO generally serves as a final contract for the client and as a work order for the catering department, problems may arise should the function book contain inaccurate or incomplete information.

Automated sales office systems generate a BEO record as information

is gathered and input into a client's account file. Advanced sales and catering software packages are generally able to supplement information contained in a BEO. For example, for a specific date or range of dates, an automated sales system can produce aggregated kitchen production reports (listing all menu items needed by preparation area), facility setup reports (listing all resource items requested for current events), and revenue forecast reports (based on anticipated revenue derived from business described on BEOs).

In an automated sales office application, a salesperson could respond much more quickly as rapid access processing is applied. Availability of both group guestrooms and function room space will be checked simultaneously. The sales person will initiate a special search function to match the meeting planner's needs with the hotel's offerings. If there is not an equation of availability and inquiry, the system may generate a list of best available dates to accommodate the group (based on projected occupancy). This approach allows a hotel salesperson to quickly check the status of the meeting planner's preferred dates and to suggest alternative days if the requested days are booked. If the property's revenue management strategies are programmed into the system, the system would also provide a range of rates that the salesperson could negotiate without authorization from department management.

Each function room is listed down the left side of the screen with each hour of a particular day listed across the top. Functions are blocked by room and time of day, with easy access to individual account information and room setup requirements. The program enables sales, banquets, and convention service managers to maximize function space and minimize room turns by attempting to schedule groups with similar or identical setup requirements in the same room at different times of the same day.

With sales office automation, a booking is entered into the system and is automatically integrated, tracked, and traced for management reports, contracts, proposals, and BEOs.

Sales Filing Systems

For maximum efficiency in the sales office, an effective filing system is required. Current information is essential for a successful sales effort, and information must be available quickly. Most non-automated systems use three separate files for client information: the trace file, the account file, and the master card file. The exact contents of these files may vary from property to property.

Trace Files

In non automated sales offices a trace file (also known as a tickler file, brink-up file or follow-up file) is used as an aid for following up an account. The system is designed to remind the users of correspondence, telephone calls or contacts that he/she must handle for that particular date.

In automated system all traces input within the system are activated on the appropriate dates and printed for each salesperson every morning. Those traces that have been completed will no longer appear on the report, while those traces awaiting action will continue to appear on future report until action is taken.

Account File.
In a non-automated sales office, client accounts are maintained in standard-size file folders. An account file is started at the time of initial contact with a prospective client and may include historical information related to previous conventions or meetings, convention bureau bulletins, or information relating to the organization that has appeared in the media. Sales reports and correspondence relating to previous sales efforts will also be placed in the file. All information in the account file should be in reverse chronological order, beginning with the newest paperwork first. Account files are usually filed alphabetically and color-coded by geographic location or market segment.

In an automated sales application, current account information is accessible by sales staff networked to account manager files. Typically, the salesperson accessing the files is able to determine the extent of the information displayed. From the main menu, an authorized salesperson can simply point and click to access current customer contact information (decision-makers, telephone numbers, etc.), account activity, past and future bookings, traces, and call reports

Master Card File. In non-automated sales offices, a master card is created for each potential new account. The card contains a summary of information needed for an effective sales effort: the organization's name, names and titles of key executives, addresses, phone numbers, months of business meetings or other events, size of group, group meeting history, the group's decision-maker, and other pertinent data. Master card files can also be used to create mailing lists and to index addresses and phone numbers.

In an automated sales application, the functions of a master card filing system are performed by search routines using select criteria. **For example**, a salesperson can access specific information needed for an account, whether it be the names of contacts, notes on follow-up calls, or remarks that can help other members of the sales team become knowledgeable about the account. In addition, a salesperson can use a search routine to search the database for accounts with specific characteristics or profiles. For example, a salesperson could search for only those accounts in northeast states that book in the month of July with a Sunday night arrival. If, on the

first run, the generated list is too long, the salesperson could run a subsequent search with more narrow criteria, such as rate range or meeting space requirements.

Sales Performance Reports

An automated sales office application can produce reports that provide information on accounts, bookings, market segments, sales staff productivity, average room rates, occupancy, revenue, service history, lost business, and marketing data.

Revenue Management

Revenue management, sometimes called yield management, is a set of demand-forecasting techniques used to determine whether room rates should be raised or lowered and whether a reservation request should be accepted or rejected in order to maximize revenue. The application of revenue management is based on factors related to supply and demand. Prices tend to rise when demand exceeds supply; prices tend to fall when supply exceeds demand. Pricing is a key to profitability. By increasing bookings on low-demand days and by selling rooms at higher prices on high-demand days, a hotel can significantly improve its profitability. In general, room rates should be higher when demand exceeds supply and lower (in order to increase occupancy) when supply exceeds demand.

One of the principal computations involved in revenue management is the yield statistic, which is the ratio of actual room revenue to potential room revenue. Actual revenue is the revenue generated by the number of rooms sold. Potential revenue is the amount of revenue the property would receive if all of its rooms were sold at full rack rates.

Catering Software

While catering is similar in many ways to traditional restaurant operations, there are unique characteristics that are addressed by targeted software applications. There are two types of catering for which software applications have been developed: off-premises catering and **finished product** (or home delivery) **catering.**

Off-Premises Catering

There are many details involved in the proposal, planning, and execution stages of an off-premises catering activity. Initially, the caterer suggests a standard menu or set of menus to a client for consideration. The client either selects from available offerings or requests a special meal plan. In either case, the caterer develops a proposal for the function.

Caterers are responsible for food and beverage service and may also be contracted

to provide furnishings, entertainment, decorations, and the like. Before an event, the caterer typically plans for necessary purchases, personnel, production, transportation, service, and rental equipment. Generally, the caterer arrives
at a catered event with all these requirements, because supplemental equipment, product replenishment, and additional staff are usually not available at the catered site.

Catering software monitors and controls the activities associated with each stage of off-premises catering service. Many of the files created through the use of catering software packages perform functions similar to automated restaurant management applications. Typical files contained in a catering software package include:

- Ingredient file (FIDF).
- Recipe file (RIDF).
- Menu item file (MIDF).
- Proposal/contract file.
- Inventory file.
- General accounting files.

In addition to containing data on all purchased food and beverage products, the **ingredient file** includes data on such non-food items as labor, serving utensils, production equipment, rental equipment, disposable items, and entertainment options. The more complete this file, the easier it becomes for the caterer to assemble an entire catering service package.

While standard recipes for food service operations list ingredients and a set of assembly instructions, an off-premises catering recipe generally contains "ingredients" for non-food items as well. A table that seats eight persons could be entered as a **recipe into the catering (RIDF)** file. The recipe for an eight-top table would have nine ingredients: a table and eight chairs. If the caterer were planning an off-premises catering activity for 240 persons, the table and chairs recipe would be automatically multiplied up to 30 tables and 240 chairs

The **menu item file** contains meal plans for specific catered activities. Catering menu Item files contain recipes for edible as well as non-food items. Some catering software packages allow users to create recipes for determining required gratu*ities, Insurance, and taxes. All* of these recipes are stored within a menu item file for the specific catered events.

A **proposal/contract file** accesses data contained in the menu item file, applies prices for menu items, and maintains a record of commitments. The inventory file and general accounting files perform functions similar to inventory and back office **accounting applications.**