Chapter 6: Transaction Processing and Financial Reporting Systems Overview

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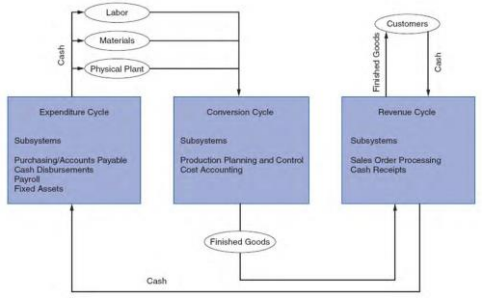
Learning Objectives

- Understand the components of data structures and how these are used to achieve data-processing operations.
- Be familiar with structures used in flat-file systems, including sequential, indexes, hashing, and pointer structures.
- Be familiar with relational database structures and the principle of normalization.
- Understand the features, advantages, and disadvantages of the embedded audit module approach to data extraction.
- Know the capabilities and primary features of GAS.
- Become familiar with the more commonly used features of audit command language.

A Financial Transaction is…

- an economic event that affects the assets and equities of the firm, is reflected in its accounts, and is measured in monetary terms.
- Similar types of transactions are grouped together into **three transaction cycles**:
  - the expenditure cycle.
  - the conversion cycle.
  - the revenue cycle.

Relationship Between Transaction Cycles



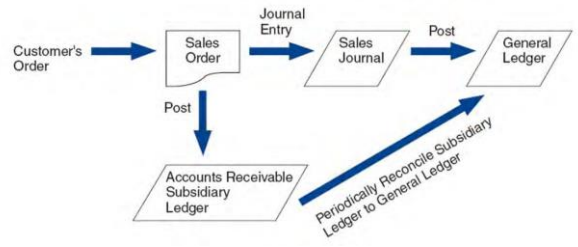
Manual System Accounting Records

- **Source Documents** are used to capture and formalize transaction data needed for transaction processing.
- **Product Documents** are the result of transaction processing.
- **Turnaround Documents** are product document of one system that becomes source documents for another system.

Manual System Accounting Records

- **Journal** is a record of chronological entry.
  - **Special journals** used to record specific classes of transactions that occur in high frequency.
  - **Register** used to denote certain types of special journals.
  - **General journal** used to record nonrecurring, infrequent, and dissimilar transactions.
- **Ledger** is a book of financial accounts.
  - **General ledger** summarizes activity for each account listed on the chart of accounts.
  - **Subsidiary ledger** shows activity by detail for each account type.

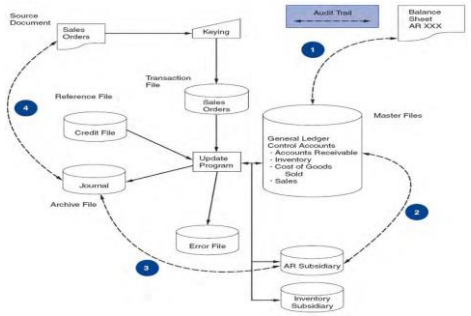
Flow of the Information from the Economic Event into the General Ledger



Computer-Based Systems

- Audit trail less observable in computer-based systems.
- Accounting records represented by four types of magnetic files:
  - Master File generally contains account data.
  - Transaction File is a temporary file containing transactions since the last update.
  - Reference File contains relatively constant information used in processing (e.g., tax tables, customer addresses).
  - Archive File contains past transactions for reference purposes.

Accounting Records in a Computer-Based System



Accounting Records in a Computer-Based System

- EXPLANATION OF STEPS IN THE FIGURE:
  - Compare the AR balance in the balance sheet with the master file AR control account balance.
  - Reconcile AR control figure with AR subsidiary account total.
  - Select a sample of update entries made to accounts in the AR subsidiary ledger and trace these to transactions in the sales journal (archive file).
  - From these journal entries, identify source documents that can be pulled from their files and verified. If necessary, confirm these source documents by contacting the customers.

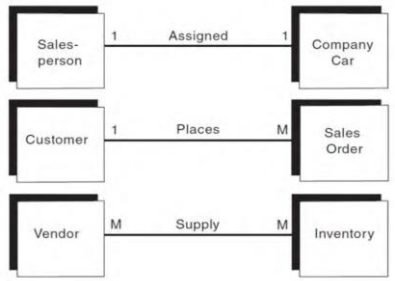
Documentation Techiques

- **Data flow diagram** uses symbols to represent entities, processes, data flows and data stores.
  - Used to represent logical elements of system.
  - Technique does not depict the physical system.
- **Entity relationship diagram** used to represent relationships between entities in a system.
  - **Entities** are physical resources, events and agents about which organization wants to capture data.
  - **Cardinality** is the degree of the relationship which can be one-to-one, one-to-many or many-to-many.
- DFDs and ER diagrams are related and can be reconciled.

Data Flow Diagram Symbol Set

Symbol	Description
	Input source or output destination of data
	A process that is triggered or supported by data
	A store of data such as a transaction file, a master file, or a reference file
	Direction of data flow

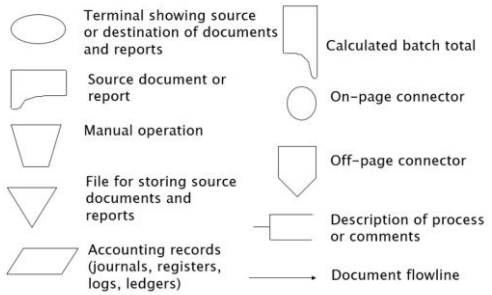
Entity Relationship Diagram Symbols



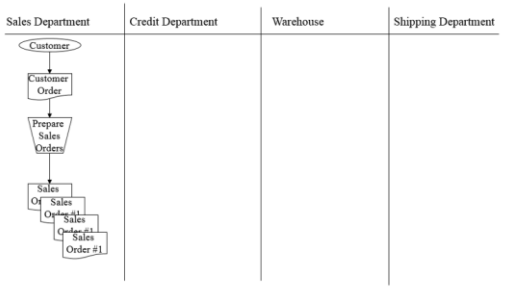
System Flowcharts

- Graphical representation of physical relationships among key system elements.
- May include departments, manual activities, computer programs, hard-copy accounting records and digital records.
- Also describes type of computer media being employed by the system.

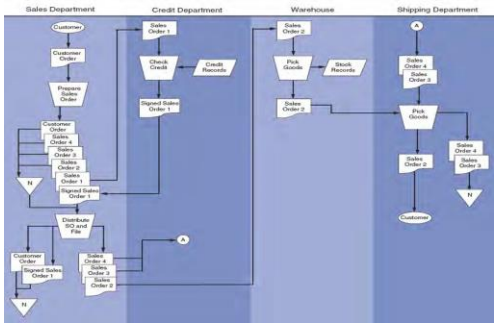
Symbol Set for Representing Manual Procedures



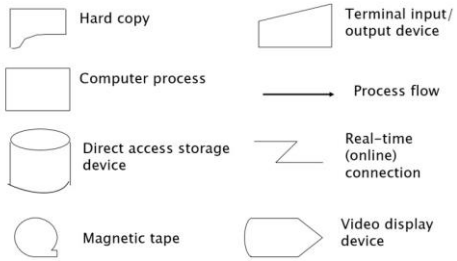
Flowchart Showing Stated Fact Translated into Visual Symbols



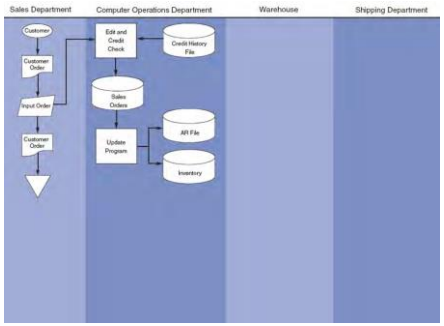
Flowchart Showing All Stated Facts Translated into Visual Symbols



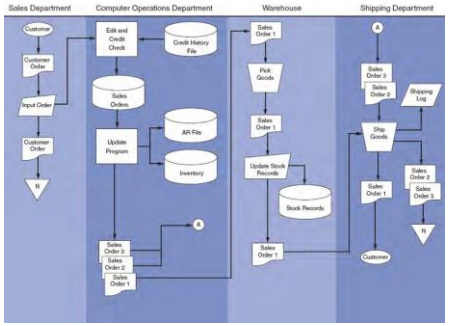
Symbol Set for Representing Computer Processes



Flowchart Showing Translation of Facts 1, 2, and 3 into Visual Symbols

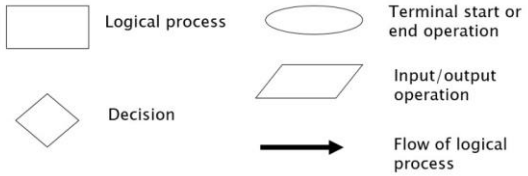


Flowchart Showing all Facts Translated into Visual Symbols



Program Flowcharts

Program Flowchart Symbols



Record Layout Diagrams

Customer File

Key

Customer Number	Customer Name	Street Address	City	State	Zip Code	Credit Limit

Characteristic Differences Between Batch and Real-Time Processing

	Data Processing Methods	
Distinguishing Feature	**Batch**	**Real Time**
Information time frame	Lag exists between time when the economic event occurs and when it is recorded.	Processing takes place when the economic event occurs.
Resources	Generally, fewer resources (e.g., hardware, programming, training, etc.) are required.	More resources are required than for batch processing.
Operational efficiency	Certain records are processed after the event to avoid operational delays.	All records pertaining to the event are processed immediately.

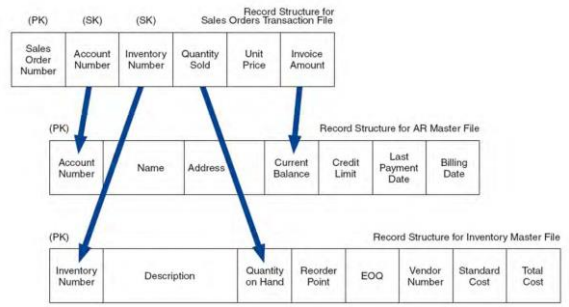
Legacy Systems Versus Modern Systems

- Legacy systems characteristics:
  - Mainframe-based applications that are batch oriented.
  - Early systems use flat files for data storage while later systems use hierarchical and network databases.
  - Highly structured and inflexible storage systems are efficient data processing tools but promote a single-user environment that discourages information integration.
  - Used by some firms for certain data processing aspects.
  - When used for financial transactions, auditors must know how to evaluate and test them.

Legacy Systems Versus Modern Systems

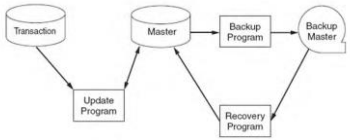
- Modern systems characteristics:
  - Client-server based and process transactions in real time.
  - Use relational database tables with a high degree of process integration and data sharing.
  - Some are mainframe based and use batch processing.

Record Structures for Sales, Inventory, and Accounts Receivable Files



Database Backup Procedures

- Destructive updates leave no backup.
- To preserve adequate records, backup procedures must be implemented, as shown below:
  - The master file being updated is copied as a backup.
  - A recovery program uses the backup to create a pre-update version of the master file.



Batch Processing Using Real-Time Data Collection vs. Real-Time Processing

- Popular data processing approach for large operations is to electronically capture transaction data at the source as they occur.
  - Prevents some transaction errors at their source.
  - Transaction file later processed in batch mode to achieve operational efficiency.
  - Master file records that are unique to a transaction can be updated in real time without causing operational delays.
- Real-time systems process entire transaction as it occurs.
  - Well suited for systems with lower transaction volumes and those that do not share common records.

Data Coding: A System with Codes

- Concisely represent large amounts of complex information that would otherwise be unmanageable.
- Provide a means of accountability over the completeness of the transactions processed.
- Identify unique transactions and accounts within a file.
- Support the audit function by providing an effective audit trail.

Numeric and Alphabetic Coding

- **Sequential codes** represent items in sequential order such as prenumbering source documents.
  - Supports batch transaction reconciliation and alerts management to possibility of missing transaction.
  - Disadvantage is codes carry no information content and coding schemes are difficult to change.
- **Block codes** represent whole classes by assigning each class a specific range within the coding scheme such as a chart of accounts.
  - Allows for the easy insertion of new codes within a block.
  - Information content of a block not readily apparent.

Group Codes

- Represent complex items involving two or more pieces of data using fields with specific meaning.
- For example, a coding scheme for tracking sales might be 04-09-476214-99, meaning:

Store Number	Dept. Number	Item Number	Salesperson
04	09	476214	99

- Facilitate the representation of large amounts of diverse data in a logical manner that permits analysis and reporting.
- Tends to be overused which can increase storage cost, clerical errors and processing time.

Alphabetic and Mnemonic Codes

- **Alphabetic codes** used for many of the same purposes as numeric codes.
  - Can be assigned sequentially or used in block and group coding techniques to represent large number of items.
  - Primary drawback is difficulty rationalizing the meaning of codes and difficulty with sorting records.
- **Mnemonic codes** are alphabetic characters in acronyms and other combinations.
  - Does not require users to memorize the meaning since the code itself is informative – and not arbitrary.
  - Limited ability to represent items within a class.

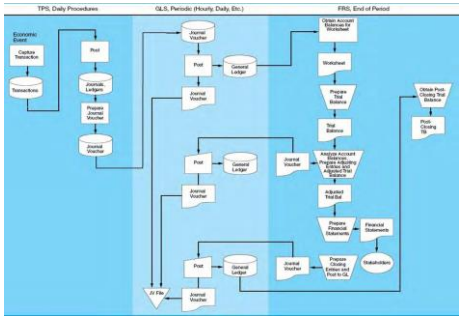
General Ledger System

- Hub connected to the other system of the firm.
- Source of input is the journal voucher.
- GLS database includes a variety of files:
  - **General ledger master file** is the principal file based on COA.
  - **General ledger history file** used for comparative financial support.
  - **Journal voucher file** is all vouchers of the current period.
  - **Journal voucher history file** is all vouchers of past periods for audit trail.
  - **Responsibility center file** contains financial data by responsibility center, used by the MRS.
  - **Budget master file** contains budget data by responsibility center.

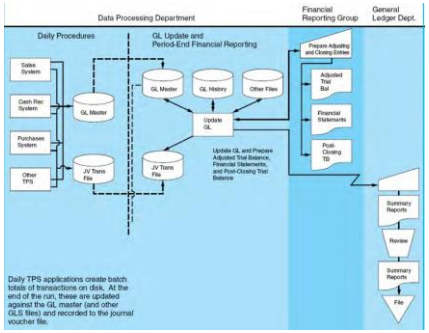
Financial Reporting Procedures

- Capture the transaction and record in special journals.
- Post to subsidiary and general ledgers.
- Prepare the unadjusted trial balance.
- Make, journalize and post adjusting entries.
- Prepare the adjusted trial balance.
- Prepare the financial statements.
- Journalize and post the closing entries.
- Prepare the post-closing trial balance.

Financial Reporting Process Flowchart



GL/FRS Using Database Technology



XBRL – Reengineering Financial Reporting

- Online reporting of financial data has become a competitive necessity for publicly traded companies.
- Most companies place reports on Web sites as hypertext markup language (HTML) documents which can be downloaded by interested parties.
  - Reports cannot be conveniently processed through IT automation.
  - Performing analysis requires user to manually enter the information into their system.
- Solution is **eXtensible business reporting language (XBRL)** which is the Internet standard for business reporting and information exchange.

XML: eXtensible Markup Language

- XML is a meta-language for describing markup languages.
- *Extensible* means that any markup language can be created using XML.
- Includes creation of markup languages capable of storing data in relational form, where tags (formatting commands) are mapped to data values.
- Can be used to model the data structure of an organization's internal database.

XBRL

- **XBRL** is an XML-based language for standardizing methods for preparing, publishing, and exchanging financial information, e.g., financial statements.
- **XBRL taxonomies** are classification schemes.
- **XBRL instance documents** can be published and made available to users.
  - Computer-readable for analysis and processing.
  - Can be presented in a visually appealing manner.
- Likely to be primary vehicle for delivering reports to investors and regulators in the near future.
- Facilitates legal requirements of SOX.

Controlling the FRS

- Potential risks to the FRS include:
  - Defective audit trail.
  - Unauthorized access to the general ledger.
  - GL accounts that are out of balance with subsidiary accounts.
  - Incorrect GL account balances due to unauthorized or incorrect journal vouchers.
- Uncontrolled risks may result in misstated financial statements with the potential of litigation, financial loss and SOX legislation sanctions.

COSO Internal Control Issues

- **Transaction authorization:**
  - Journal vouchers must be authorized by a manager at the source department.
- **Segregation of duties:**
  - GL clerks should not have recordkeeping responsibility for special journals or subsidiary ledgers, prepare journal vouchers or have custody of physical assets.
- **Access controls:**
  - Unauthorized access to GL can result in errors, fraud, and misrepresentations in financial statements.
  - Sarbanes-Oxley requires controls that limit database access to only authorized individuals.

COSO Internal Control Issues

- **Accounting records:**
  - Audit trail facilitates error prevention and correction.
  - GL and other files should: be able to answer inquiries, reconstruct files, provide historical data, fulfill government regulations and provide a means for preventing, detecting and correcting errors.
- **Independent verification:**
  - **Journal voucher listing** provides details of each journal voucher posted to the GL.
  - **General ledger change report** presents the effects of journal voucher postings on GL accounts.

Internal Control Implications of XBRL

- **Taxonomy creation:**
  - Incorrect taxonomy results in invalid mapping potentially causing material misrepresentation of financial data.
  - Controls must ensure correct generation of taxonomies.
- **Taxonomy mapping error:**
  - Process must be controlled to prevent material misrepresentation of financial data.
- **Validation of instance documents:**
  - Independent verification procedures need to be established to ensure that appropriate taxonomy and tags have been applied before posting to a Web server.