Why are Transaction Processing Systems (TPS) important?

What are typical TPSs?

What are the typical requirements of a TPS?

How are batch-processing cycles and on-line processing cycles similar? How are they different?

How do we ensure data quality in a TPS?

How are TPS involved in e-commerce?

Enterprise Resource Planning (ERP)
Why are Transaction Processing Systems (TPS) important?

- Everyone uses TPS.
- Most TPSs are essential in business (Mission Critical) - some even user very expensive fault-tolerant systems.
- Many management reports depend on TPS data.
- A TPS involves lots of people and computing resources - it is expensive.
- Customer impressions of a business are influenced by its TPSs.
What are typical TPSs?

- General Ledger
- Accounts Receivable
- Accounts Payable
- Budget
- Payroll
- Invoicing
- Receiving
- Order Entry
- Inventory

Etc. (See figure 8.3)

Only skim material on pp 347-366
What are the typical requirements of a TPS?

Characteristics that are generally found in a TPS problem domain

- Requirements are well defined - most agree on what the requirements are (they agree what “order entry” means).
- Requirements are stable - the requirements of order entry do not change from day to day.
- Decision making is highly structured - it requires minimal human judgement.
How are batch-processing cycles and on-line processing cycles similar? How are they different?

The typical TPS cycle (generic)

See Figure 8.4

The batch-processing cycle (figure 8.2)

- Batches of transactions are collected
- These batches are processed against a master file periodically
- Implications
  - Batch cycle impacts currency of data
  - Recovery from failure not complex
  - Overall system not complex (inexpensive and reliable)

The on-line cycle (figure 8.2)

- “Update in place” main technology
- Implications
  - Databases more current
  - Easier to correct some types of errors (source data issue)
  - More expensive hardware and networks
  - Recovery difficult and complex
How do we ensure data quality in a TPS?

It is critical that data entered into a TPS be accurate and correct.

**Source Data Automation** (discussed in hardware lecture) important

- Goal is to improve efficiency and reduce errors
- Technology includes machine-readable data (bar codes, magnetic strips, MICR, etc.) and prerecorded data that does not change.
- Capture data as soon as possible after the event and as close to the source as possible.

**Application Controls**

**Control Totals** - generally apply only to batch systems

- Record Counts (batch totals) - simple document count
- Quantitative Totals - sum of a field across transactions where the sum has *some meaning* in the context of the application.
- Hash Totals - sum of a field across transactions where the sum has *no meaning* in the context of the application.

**Programmed Edit Checks** - not limited to batch systems

- Reasonableness Check - values must fall within certain pre-defined limits (they are reasonable).
- Format Check - is there are letter where a digit should be?
- Existence Check - does a particular code exist?
- Dependency Check - do several values that make sense alone make sense together?
Check Digits - used to verify accuracy of key fields. These help reduce transcription and transposition errors.

Modulas-11 check digit algorithm

X X X X X X X - X
8 7 6 5 4 3 2

1. Sum the products
2. Divide sum by 11
3. Subtract remainder from 11
4. Result is check digit (10 = X, 11 = 0)
How are TPS involved in e-commerce?

Options:

*Consumer focus – .com*
- Order entry
- Order tracking/shipping
- Customer service
- Technical support

*Intrabusiness focus – b2b*
- All of the above
- Most of the systems in figure 8.3 except payroll and accounting functions

“Bots” short for robots or autonomous agents.
- Small pieces of code sent out to scan the Internet to bring back information like lowest price.

Typical consumer call with “live agent” -- $33
Handling same call with a “bot” -- $1.17

Forrester Research

mySimon.com good example of “bot” technology
Some sites (eBay) have tried to block bots.
What is ERP and what are its benefits?

Enterprise Resource Planning (ERP)
A system that supports real-time monitoring of business functions. Facilitates real-time analysis of

- quality
- availability
- customer satisfaction
- performance
- profitability

Advantages
- Replaces inflexible and high maintenance legacy systems
- Improves work processes
- Supports integrated, enterprise-wide operational information for decision support
- Facilitates upgraded technology infrastructure (client/server)

Disadvantages
- Cost - both initial and ongoing
- Organizational turmoil (ERP defines operational procedures)
- Vendor dependency (too expensive to change vendors)