

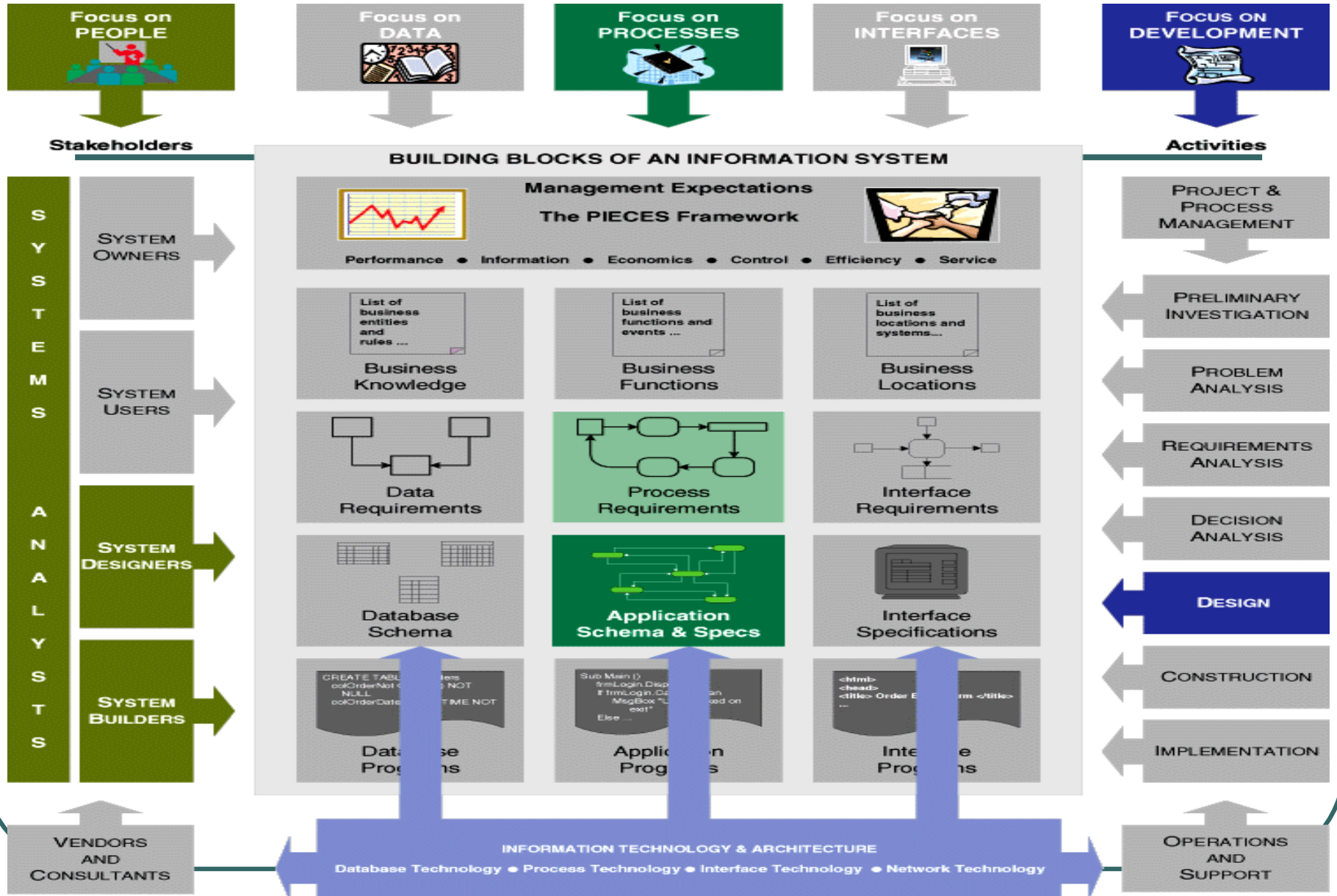
CHAPTER

---

# 11

**APPLICATION  
ARCHITECTURE  
AND MODELING**

# Chapter Map



# Application Architecture

---

An **application architecture** specifies the technologies to be used to implement one or more (and possibly all) information systems in terms of DATA, PROCESS, and INTERFACE, and **how these components interact across a network**.

It serves as an outline or **blueprint** for detailed design and implementation.

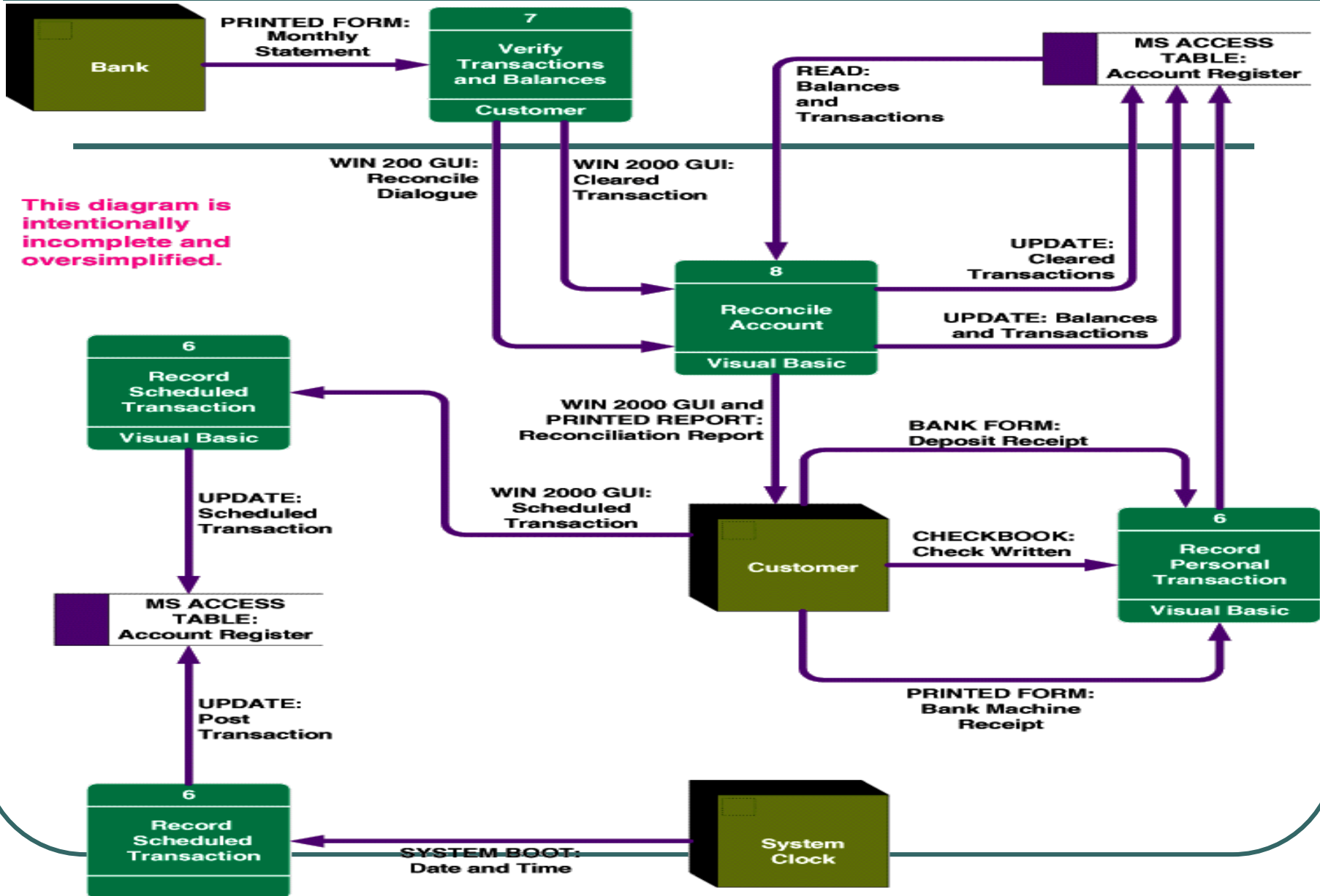
# Physical Data Flow Diagrams (DFDs)

---

**Physical data flow diagrams (DFDs)** model the technical and human decisions to be implemented as part of an information system. They communicate technical choices and other design decisions to those who will actually construct and implement the system.

- Recall from Chapter 8 that DFDs are a type of process model.

# Sample Physical Data Flow Diagram



# Physical Process Notation

---

**ID (optional)**

**Action Verb**

**+**

















**Noun or Object  
Phrase**

**Implementation**

# Samples of Physical Processes








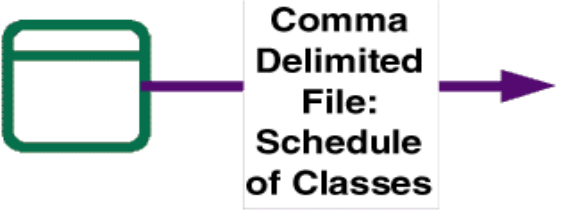




Logical Process	Sample Physical Process Implementations				
<div data-bbox="112 708 394 1053"> <p>4.3</p> <p>Check Customer Credit</p> </div>	<div data-bbox="455 708 738 1053"> <p>4.3</p> <p>Check Customer Credit</p> <p>Acct Clerk</p> </div>	<div data-bbox="778 708 1060 1053"> <p>4.3</p> <p>Check Customer Credit</p> <p>COBOL/CICS</p> </div>	<div data-bbox="1101 708 1383 1053"> <p>4.3</p> <p>Check Customer Credit</p> <p>Visual Basic</p> </div>	<div data-bbox="1423 708 1705 1053"> <p>4.3</p> <p>Check Customer Credit</p> <p>Quickbooks</p> </div>	

# Sample Physical Data Flows

Logical Data Flow	Implementation	Sample Physical Data Flow
	Computer Input (Keyboard)	
	Computer Input (Internet)	
	Computer Input (Keyless)	
	Computer Input (Batch File)	
	Computer Output (Printed)	
	Computer Output (On-Line)	
	Create a record in a database	
	Read records in a database	



# Sample Physical Data Flows (continued)

Logical Data Flow	Implementation	Sample Physical Data Flow
	Update a record in a database	
	Delete a record in a database	
	Import a data file	
	Export a data file	
	Pass data between modules of a program	
	Pass a manual form	

# Physical Data Store Notation

---



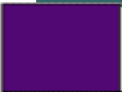
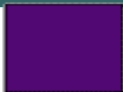














**ID  
(opt)**

**Implementation Method:  
Data Store Name**

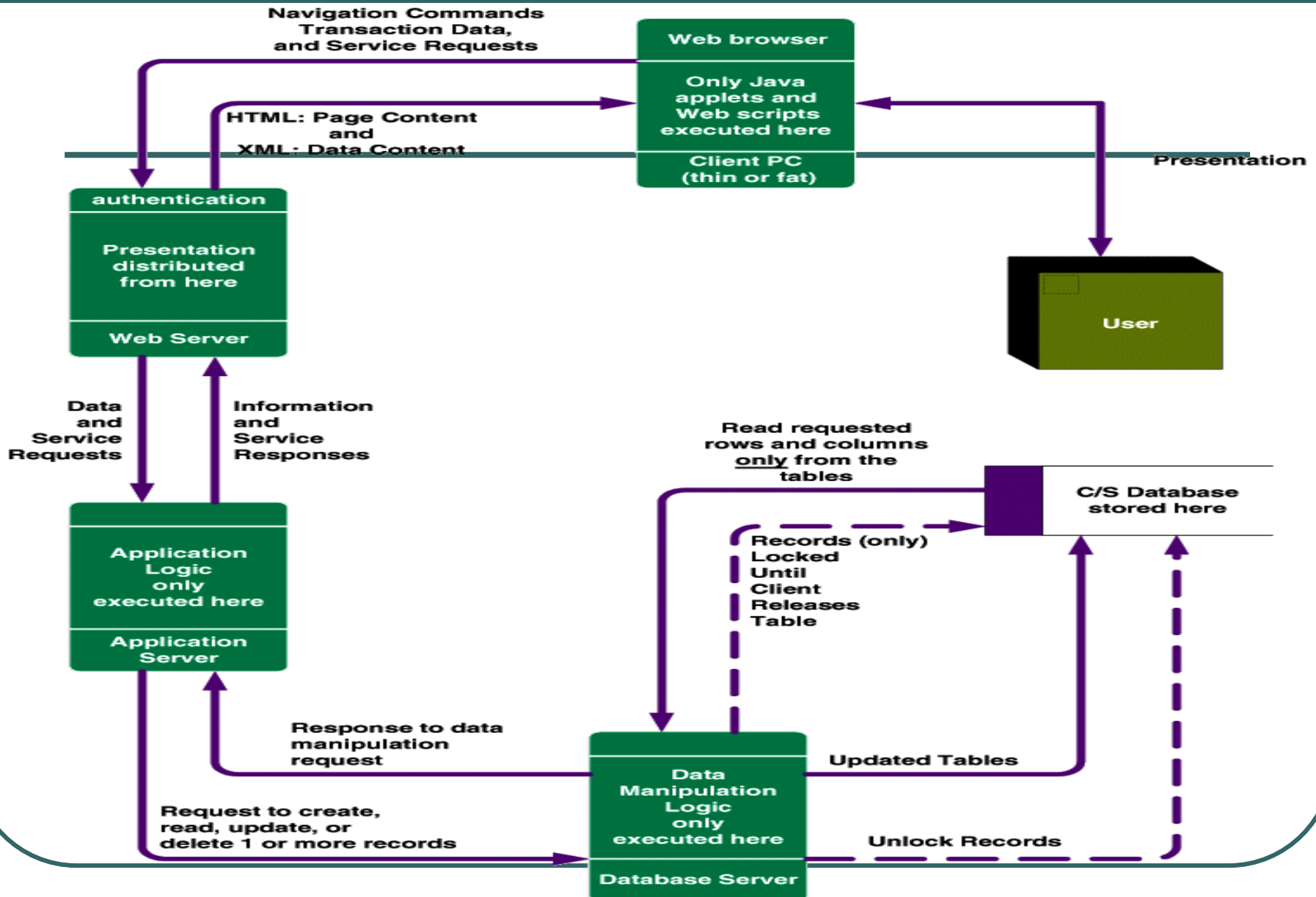
**ID  
(opt)**

**Data Store Name  
(Implementation Method)**

# Physical Data Store Implementations

Logical Data Store	Implementation	Physical Data Store
 <b>Human Resources</b>	A database (multiple tables)	 <b>Oracle : Human Resources DB</b>
 <b>Marketing</b>	A database view (subset of a database)	 <b>SQL Server: Northeast Marketing DB</b>
 <b>Purchase Orders</b>	A table in a database	 <b>MS Access: Purchase Orders</b>
 <b>Accounts Receivable</b>	A legacy file	 <b>VSAM File: Accounts Receivable</b>
 <b>Tax Rates</b>	Static data	 <b>ARRAY: Tax Table</b>
 <b>Orders</b>	An off-line archive	 <b>TAPE Backup: Closed Orders</b>
 <b>Employees</b>	A file of paper records	 <b>File Cabinet: Personnel Records</b>
 <b>Faculty/Staff Contact Data</b>	A directory	 <b>Handbook: Faculty/Staff Directory</b>
 <b>Course Enrollments By Date</b>	Archived reports (for reuse and recall)	 <b>REPORT MGR: Course Enrollment Reports</b>

# Internet- and Intranet-based Architectures



# Data Partitioning versus Data Replication

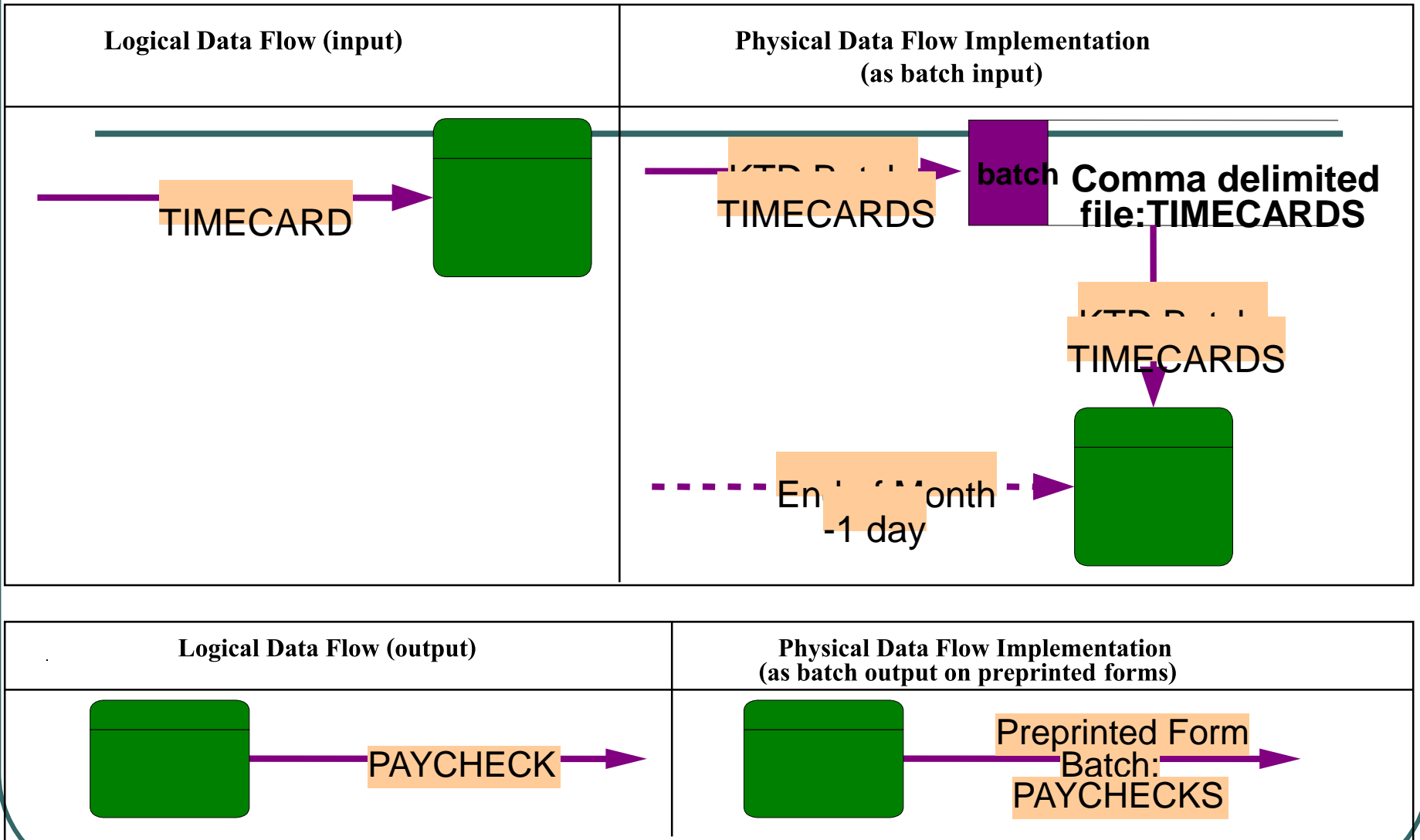
Logical Data Store	Physical Data Stores using Partitioning	Physical Data Stores using Replication
<p><b>1</b> CUSTOMERS</p>	<p><b>1P.#</b> Oracle 7: REGION 1 CUSTOMERS</p> <hr/> <p><b>1P.#</b> Oracle 7: REGION 2 CUSTOMERS</p>	<p>Not applicable. Branch offices do not need access to data about customers outside of their own sales region.</p>
<p><b>2</b> PRODUCTS</p>	<p>Not applicable. All branch offices need access to data for all products, regardless of sales region.</p>	<p><b>2M</b> Oracle 8i: PRODUCTS (Master)</p> <hr/> <p><b>2R</b> Oracle 8i: PRODUCTS (Replicated Copy)</p>

# Interface Architectures

---

- Batch inputs and outputs
- On-line inputs and outputs
- Remote batch
- Keyless data entry (and automatic identification)
- Pen input
- Electronic Data Interchange (EDI)
- Middleware

# Batch Inputs and Outputs

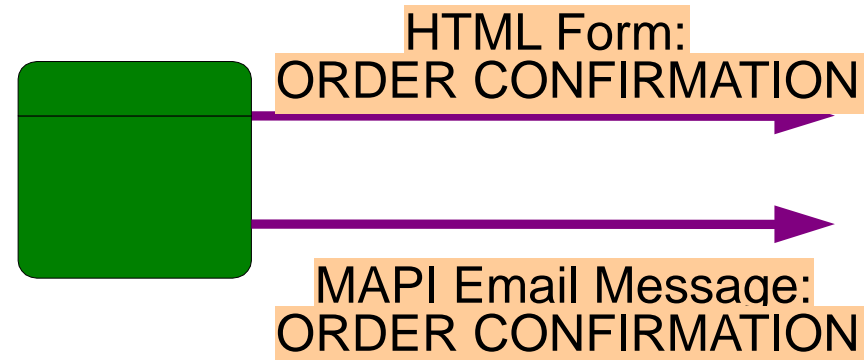
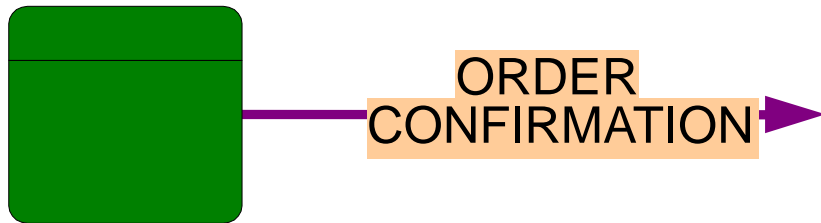
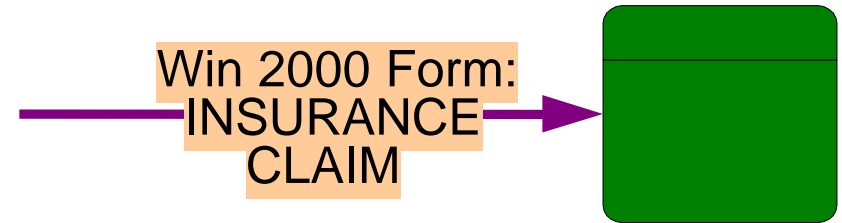
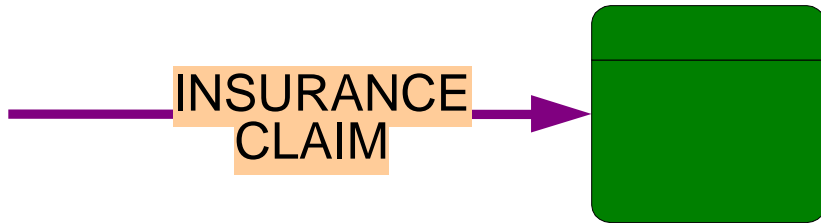


# On-Line Inputs and Outputs

**Logical Data Flow (input and output)**

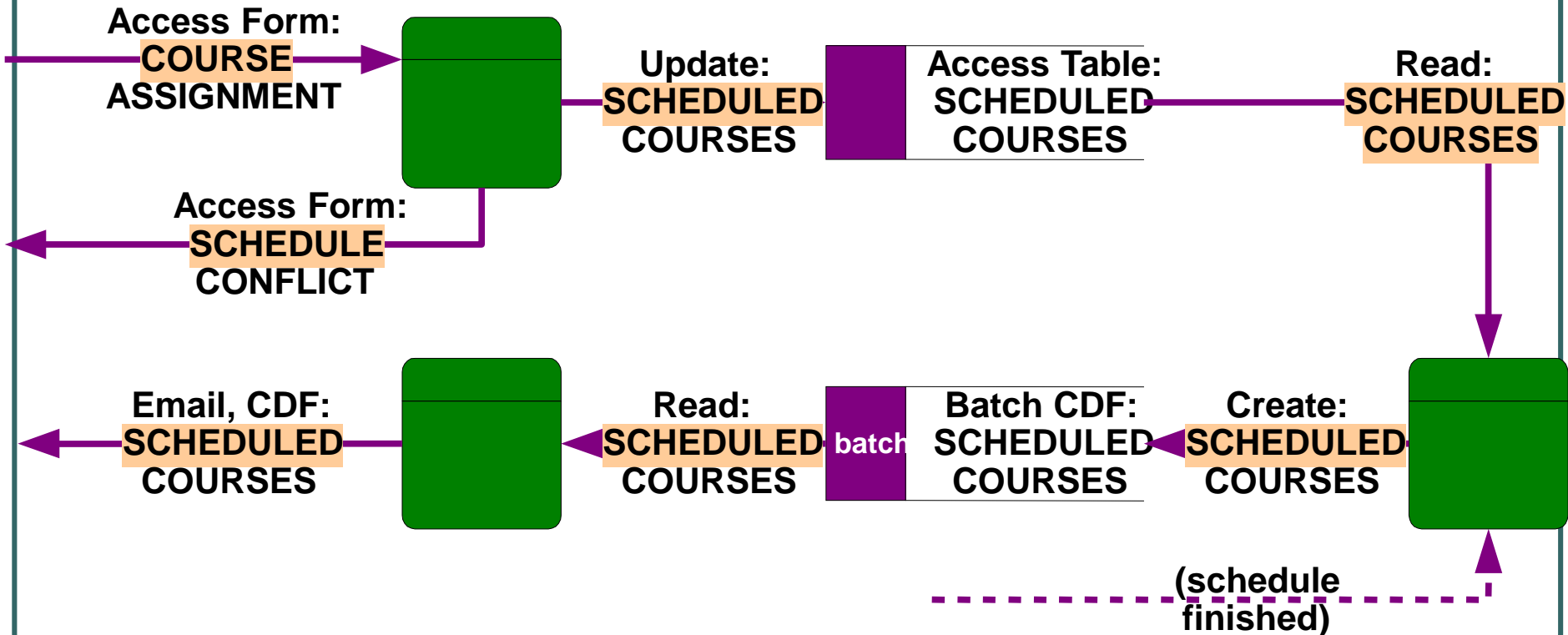
**Physical Data Flow Implementation**

(as on line input and output;  
2 alternatives shown)

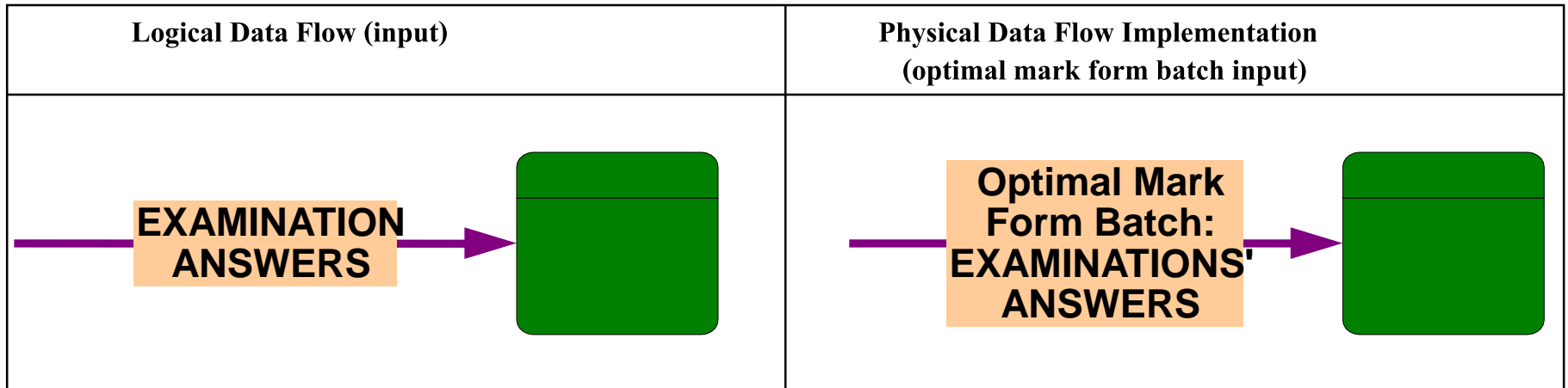




# Remote Batch



# Keyless Data Entry (and Automatic Identification)



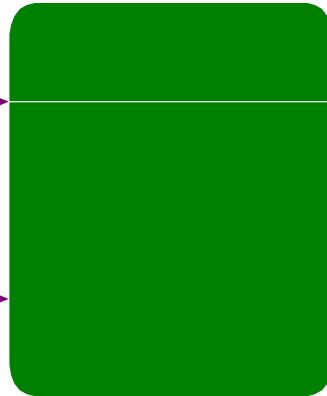
# Pen Input

---

**Pen:  
Customer  
Signature**



**Pen:  
Package  
Delivery**



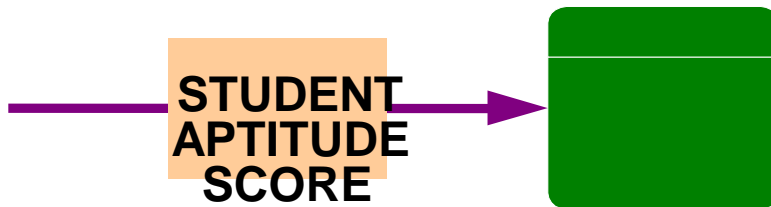
**Cellular:  
Package Delivery**



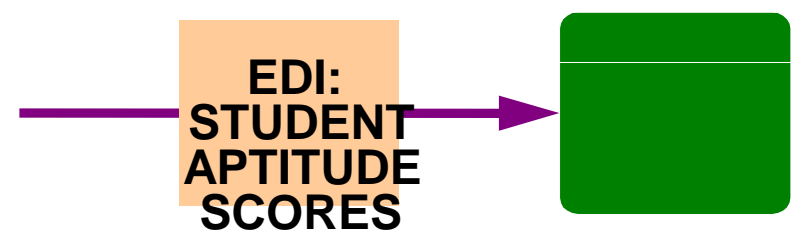
# Electronic Data Interchange (EDI)

Electronic Data Interchange (EDI) is the standardized electronic flow of business transactions or data between businesses. Typically, many businesses must agree to a common data format to make EDI feasible.

Logical Data Flow (input)



Physical Data Flow Implementation  
(automatic ID input)



# Middleware

---

**Middleware** is utility software that enables communication between different processors in a system. It may be built into the respective operating systems or added through purchased middleware products.

- Presentation middleware
- Application middleware
- Database middleware

# Summary

- 
- Information system's architecture
  - Logical and physical data flow diagrams
  - Centralized and distributed computing, including various client/server and Internet-based computing options.
  - User and system interface
  - Software development environments
  - Strategies for developing or determining the IS architecture
  - Draw physical data flow diagrams