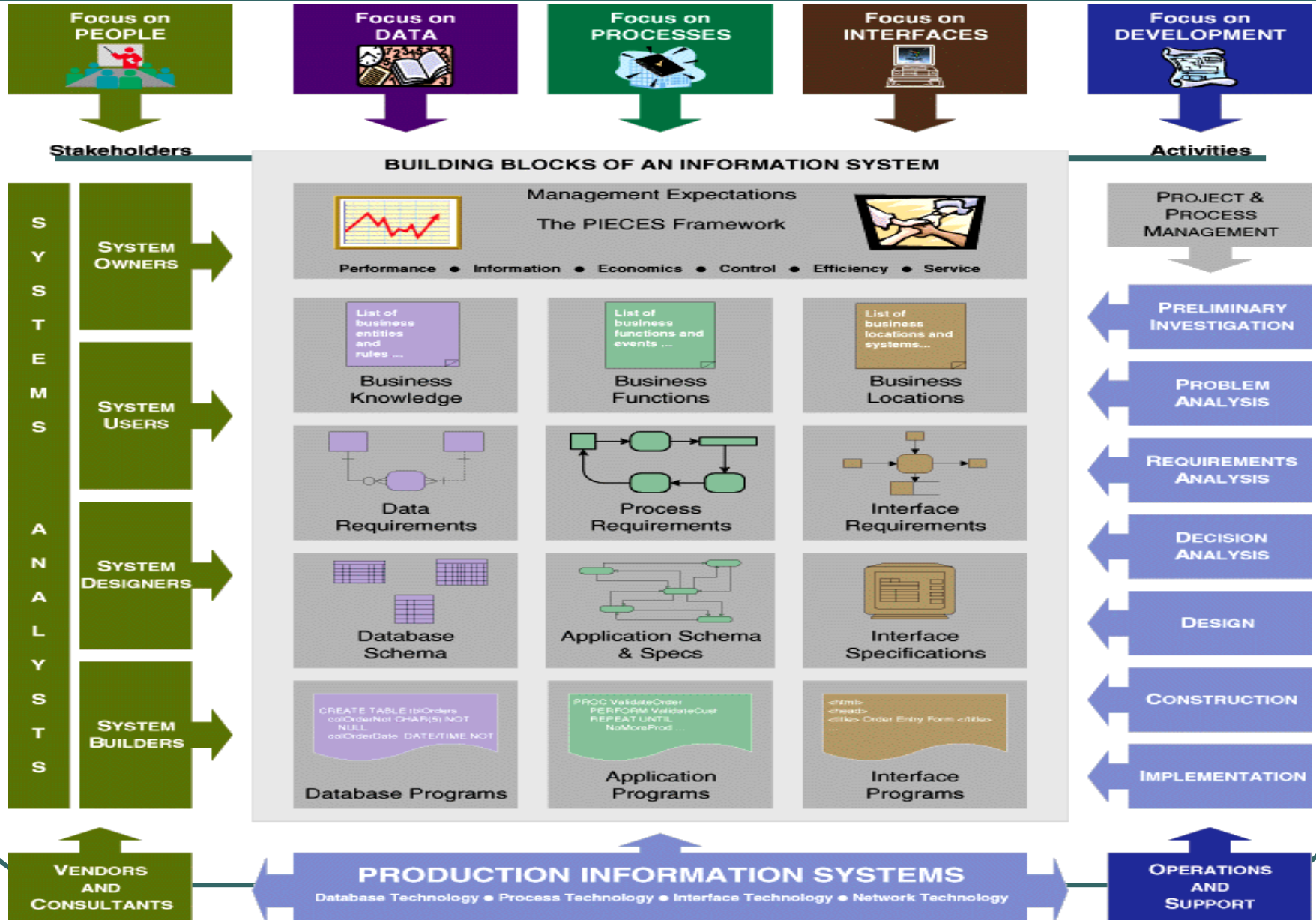


CHAPTER

17

**SYSTEMS
OPERATION
AND SUPPORT**

Chapter Map



Support versus Operation

An **operational system** is frequently called a **production system**.

Systems support is the **on-going technical support** for users, as well as the **maintenance** required to **fix any errors, omissions, or new requirements** that may arise.

Systems operation is the **day-to-day, week-to-week, month-to-month, and year-to-year execution** of an **information system's** business processes and application programs.

Systems Operation and Support

TECHNICAL SUPPORT COMMUNITY

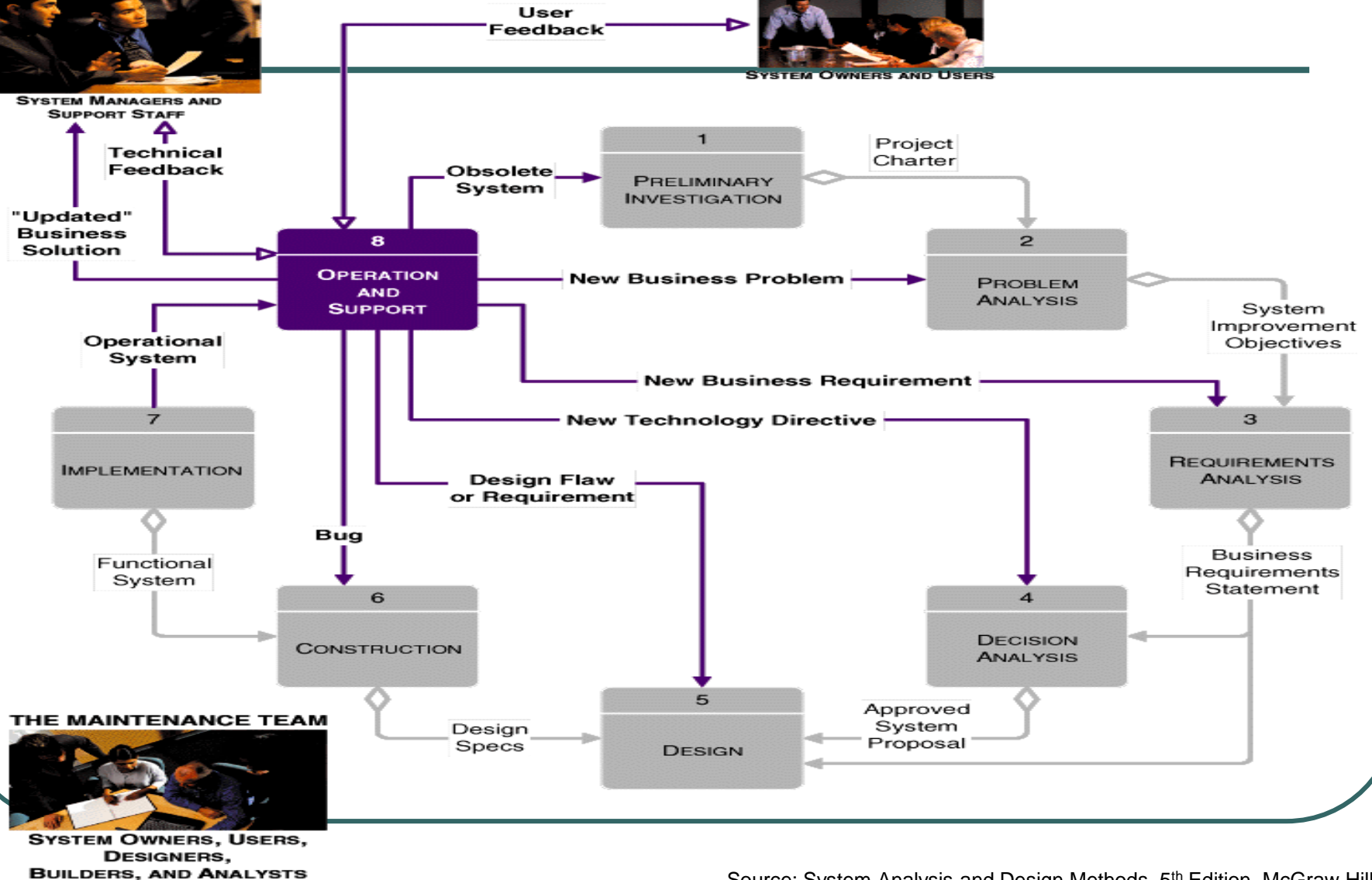


SYSTEM MANAGERS AND SUPPORT STAFF

THE USER COMMUNITY



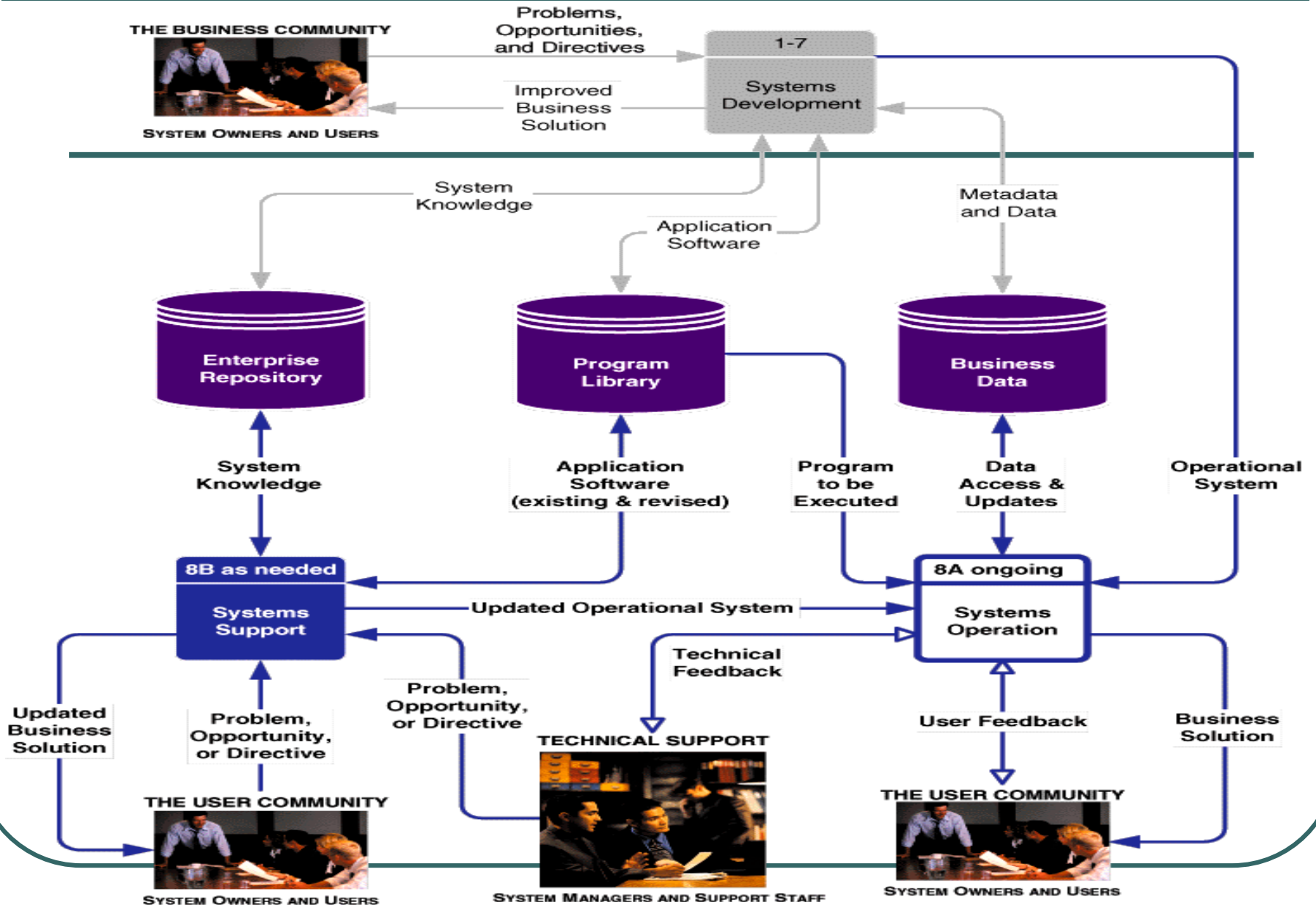
SYSTEM OWNERS AND USERS



Three Important Data Stores

- 1 The **repository** is a data store(s) of accumulated **system knowledge**—system models, detailed specifications, and any other documentation accumulated during systems development.
- 2 The **program library** is a data store(s) of all application programs.
- 3 The **business data** is all those data stores of the actual business data created and maintained by the production application programs.

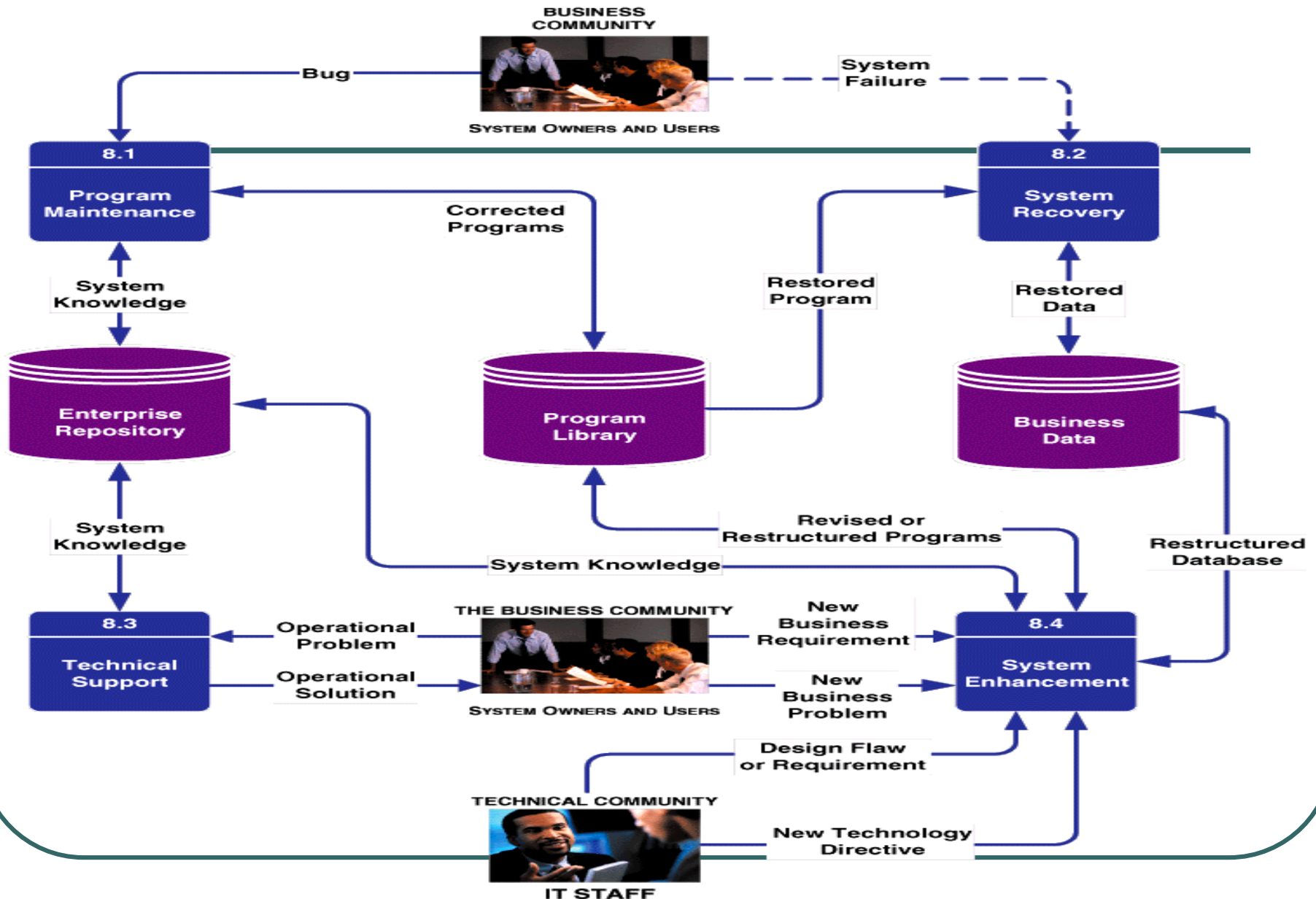
Systems Development, Operation, and Support



System Support Activities

- 1 Program maintenance** corrects “bugs” or errors that slipped through the system development process.
- 2 System recovery** is the restoration of the system and data after a system failure.
- 3 Technical support** is any assistance provided to users in response to inexperience or unanticipated situations.
- 4 System enhancement** is the improvement of the system to handle new business problems, new technical problems, or new technology requirements.

Systems Support Activities



Causes of “Bugs”

- 1 Poorly validated requirements.
- 2 Poorly communicated requirements.
- 3 Misinterpreted requirements.
- 4 Incorrectly implemented requirements or designs.
- 5 Simple misuse of the programs.

System Maintenance Objectives

- 1 To make predictable changes to existing programs to **correct errors**.
- 2 To preserve those aspects of the programs that were correct, and to **avoid “ripple effects”** of changes that may adversely affect the correctly functioning aspects.
- 3 To avoid, as much as possible, the **degradation of system performance**.
- 4 To **complete the task as quickly** as possible without sacrificing quality and reliability of the system.

System Maintenance Tasks

1 Validate the problem.

2 Benchmark the program.

- A **test script** is a repository of test cases to be executed against all program revisions.

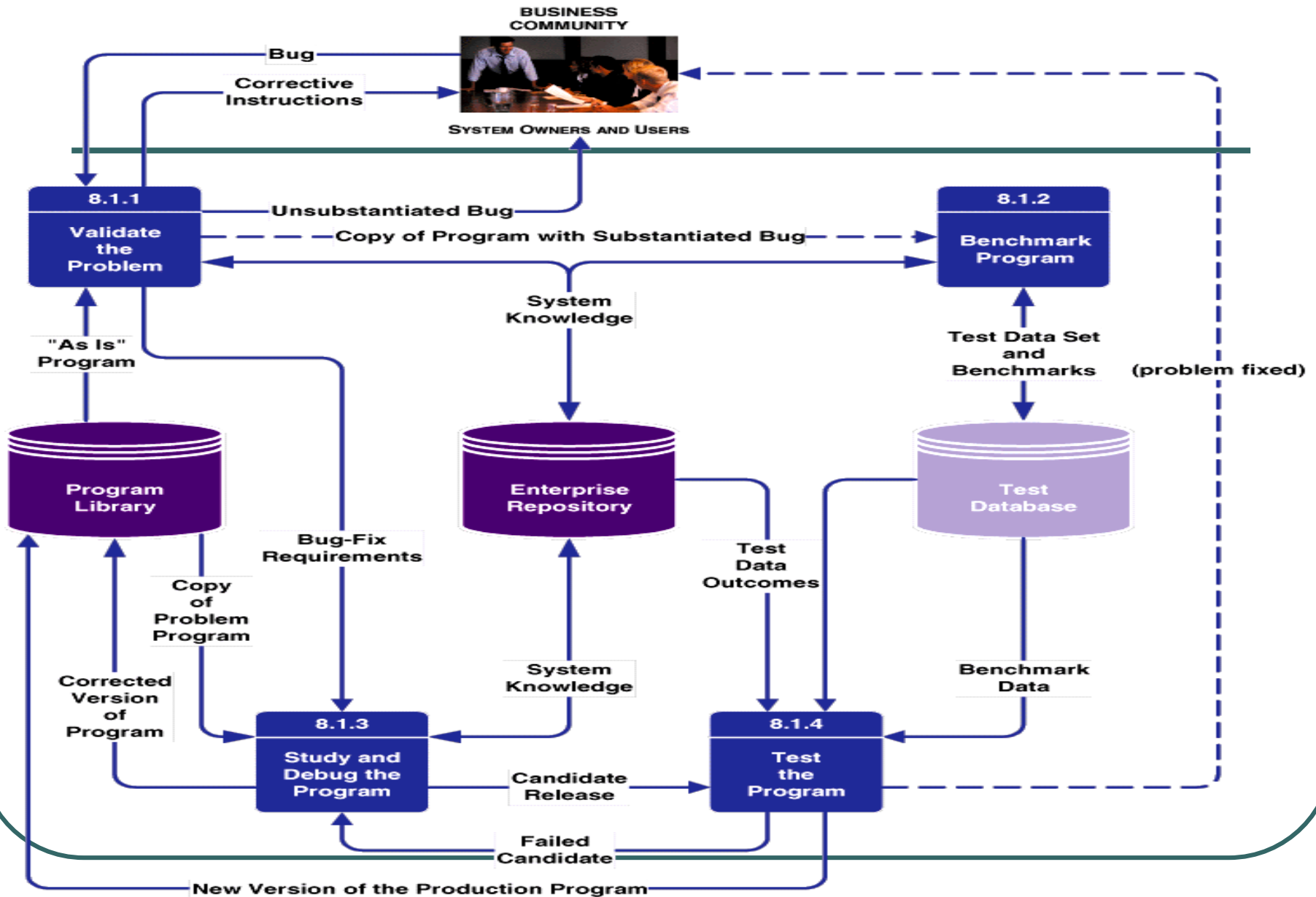
3 Study and debug the program to fix:

- Poor program structure.
- Unstructured (or poorly structured) logic.
- Prior maintenance (so-called “ripple” effects.)
- Dead code.
- Poor or inadequate documentation.

4 Test the program.

- **Version control** is a process whereby a librarian program keeps track of changes made to programs to facilitate backtracking. :
[Configuration management](#)

System Maintenance Tasks



Types of Testing

- 1 Unit testing** (essential) ensures that the stand-alone program fixes the bug without undesirable side effects to the program.
- 2 System testing** (essential) ensures that the entire application, of which the modified and unit tested program was a part, still works as a complete system.
- 3 Regression testing** (recommended) extrapolates the impact of the changes on system performance (throughput and response time) by analyzing before-and-after performance against the test script.

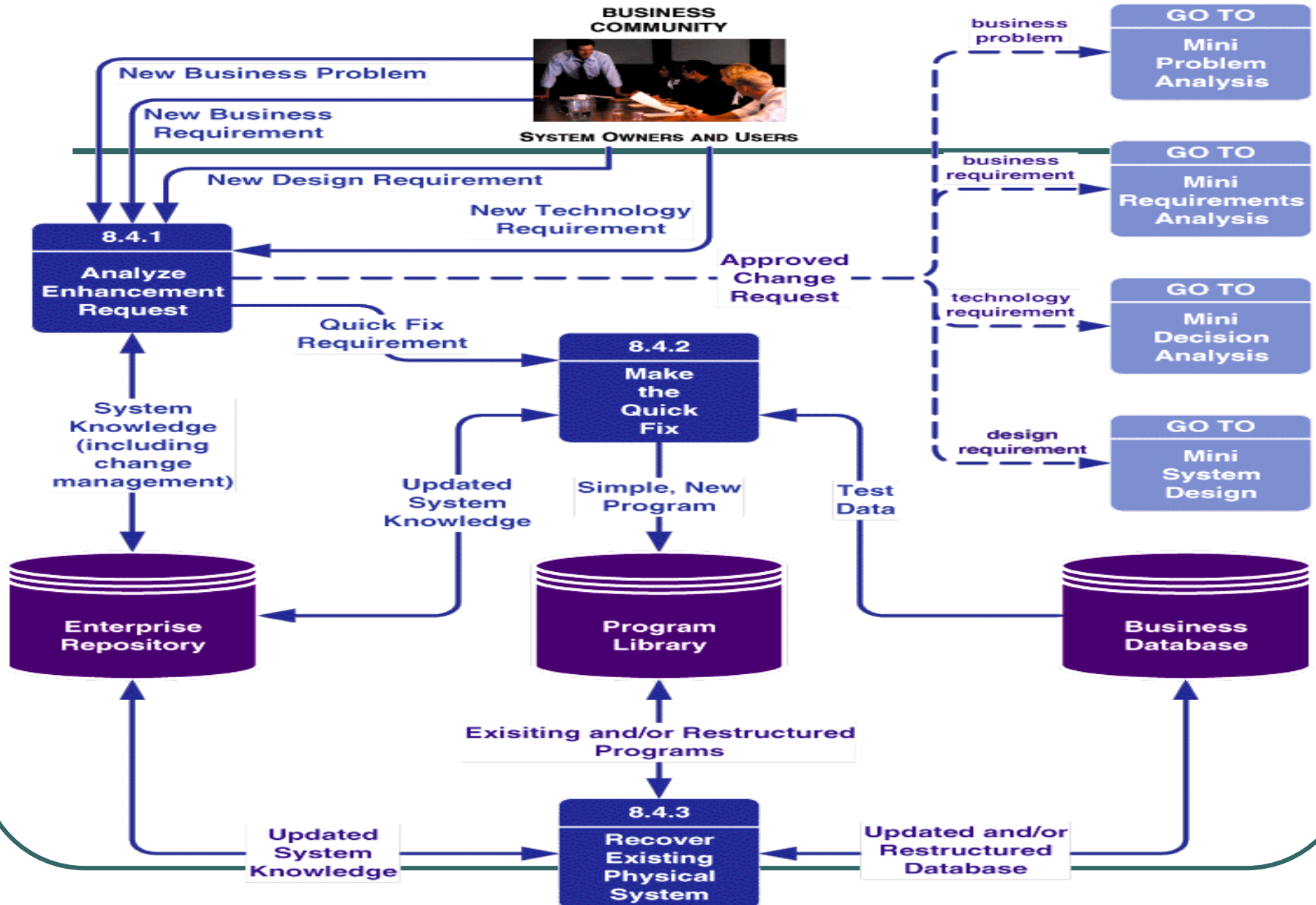
System Enhancement Triggers

- 1 New business **problems**
- 2 New business **requirements**
- 3 New **technology** requirements (inclusive of hardware and software upgrades)
- 4 New **design requirements**

System Enhancement Tasks

- Analyze enhancement **request**.
- If appropriate, make the **quick fix**.
 - e.g., report writing
- Recover the existing physical system:
 - Database recovery and restructuring
 - Program analysis, recovery, and restructuring
 - **Software metrics** are mathematically proven measurements of software quality and productivity.
 - Measurement of **control flow knots** (complexity of logic)
 - Measurement of **cycle complexity**
 - **Code reorganization** of modularity and/or logic
 - **Code conversion** from one language to another
 - **Code slicing** to create reusable software components or objects
- (Repeat appropriate phases and tasks of the original development methodology)

System Enhancement Activities



System Obsolescence



Re-built

Summary

- Systems operations and support.
- Roles of a repository, program library, and database in systems operations and support.
- Maintenance, recovery, technical support, and enhancement as system support activities.
- Tasks required to maintain programs in response to bugs.
- Role of benchmarking in system maintenance.
- Systems analyst's role in system recovery.
- Forms of technical support
- Tasks for system enhancement
- Role of reengineering in systems enhancement.
- Types of reengineering.