System Analysis and Design

Eighth Edition

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Chapter 6

Moving into Design

Objectives

- Explain the initial transition from analysis to design.
- Create a system specification.
- Describe three ways to acquire a system: custom, packaged, and outsourced alternatives.
- Create an alternative matrix.

Transition from Requirements to Design

- In ***systems analysis*** we figure out…
  - What the business needs
- In ***system design*** we figure out…
  - How to build the system that fulfills those needs
- All the “logical” work from systems analysis is converted to the “physical”

- Design phase
  - Decide *how* to build the system
  - Create ***system requirements*** that describe all technical details for building the system
- System specification
  - Final deliverable from design phase
  - Conveys exactly what system the development team will implement during the implementation phase

Activities of the Design Phase

Activities in the Design Phase	Deliverables	Chapter
✓ Determine preferred system acquisition strategy (make, buy, or outsource).	– Alternative matrix	6
✓ Design the architecture for the system.	– Architecture design	7
✓ Make hardware and software selections.	– Hardware and software specification	
✓ Design system navigation, inputs, and outputs.	– Interface design	8
✓ Convert logical process model to physical process model.	– Physical process model	9
✓ Update CASE repository with additional system details.	– Updated CASE repository	
✓ Design the programs that will perform the system processes.	– Program design specifications	
✓ Convert logical data model to physical data model.	– Physical data model	10
✓ Update CASE repository with additional system details.	– Updated CASE repository	
✓ Revise CRUD matrix.	– CRUD matrix	
✓ Design the way in which data will be stored.	– Data storage design	
✓ Compile final system specification.	– System specification: all of the above deliverables combined and presented to approval committee	6

Elements of System Specification

- Recommended System Acquisition Strategy
- System Acquisition Weighted Alternative Matrix
- Architecture Design
- Hardware and Software Specification
- Interface Design
- Physical Process Model
- Program Design Specifications
- Physical Data Model
- Data Storage Design
- Updated CRUD Matrix
- Updated CASE Repository Entries

Ways to Acquire a New System

- Custom development (build from scratch) in-house
- Purchase software package (and possibly customize it)
  - Install on our own computers, or
  - Obtain access from a software provider (host)
- Outsource development to third party, who might
  - Build system from scratch for us, or
  - Purchase software for us, customize and install it

Custom Development

Pros

- Get **exactly** what we want
- New system built consistently with existing technology
- and standards
- Build and retain technical skills and functional
- knowledge in-house
- Allows team flexibility and creativity
- Unique solutions created for strategic advantage

Cons

- Requires significant time and effort
- May add to existing backlogs
- May require skills we do not have
- Often costs more
- Often takes more calendar time
- Risk of project failure

Purchased Software

- Application service providers (ASP) supply access to software on a pay-as-you-go basis
- Many applications today are “in the cloud”…
  - ASP – provider hosts someone else’s software
  - SaaS – software vendor hosts its own software
  - Considerable savings – no hosting infrastructure needed; host provides everything
- Risks include
  - Fear of losing confidential information
  - Performance

Purchased Software Continued

- Analyze the vendor as well as the software functionality
- Verify vendor claims with others
- Look carefully at vendor support
- Assess long-term viability of vendor as an on-going business
  - A new software company may have a great idea, but can they survive as a business over the long haul?
  - If the vendor is an acquisition target, what will happen to the product?

Packages (Purchased or Obtained from ASP or SaaS)

Pros

- No need to “reinvent the wheel” for common business needs
- Tested, proven product
- Cost savings
- Time savings
- Utilize vendors’ expertise
- Some customization may be possible

Cons

- Rarely a perfect fit
- Organizational processes must adapt to software
- Reliance on vendor for maintenance and future
- enhancements
- Will not develop in-house
- functional and
- technical skills
- Unique needs may go unmet
- May require system integration

Systems Integration

- Building systems by combining packages, existing (legacy) systems, and custom software written for integration
- Integrating data between various parts of the system is the key challenge
- Many consultants specialize in systems integration

Outsourced Development

Pros

- Hire expertise we do not have
- May save time and money
- Lower risk

Cons

- No opportunity to build in-house
- expertise
- Reliance on vendor
- Future options limited
- Security—potential
- loss of confidential info
- Performance based on contract terms

Outsourcing

- Hiring an external vendor, developer, or service provider to supply the system
- Can also obtain custom system created by outsourcer
- Can reduce costs and/or add value (resources, experience)
- Risks include
  - Losing confidential information
  - Losing control over future development
  - Losing learning opportunities

Outsourcing Contracts

- Time and arrangements
  - You agree to pay for whatever time and expenses are needed to get the job done
- Fixed-price
  - You will pay exactly what is agreed to
- Value-added
  - The outsourcer reaps some percentage of the completed system's benefits

Outsourcing Guidelines

- Keep lines of communication open
- Define and stabilize requirements before signing the contract
- View the relationship as a partnership
- Select vendor, developer, or provider carefully
- Assign someone to manage the relationship
- Do not outsource what you do not understand
- Emphasize flexible requirements, long-term relationships, and short-term contracts

Influences on the Acquisition Strategy

- Business need
- In-house experience
- Project skills
- Project management
- Time frame

Acquisition Strategy Selection Factors

	When to Use Custom Development	When to Use a Packaged System	When to Use Outsourcing
Business need	The business need is unique.	The business need is common.	The business need is not core to the business.
In-house experience	In-house functional and technical experience exists.	In-house functional experience exists.	In-house functional or technical experience does not exist.
Project skills	There is a desire to build in-house skills.	The skills are not strategic.	The decision to outsource is a strategic decision.
Project management	The project has a highly skilled project manager and a proven methodology.	The project has a project manager who can coordinate vendor's efforts.	The project has a highly skilled project manager at the level of the organization that matches the scope of the outsourcing deal.
Time frame	The time frame is flexible.	The time frame is short.	The time frame is short or flexible.

Selecting an Acquisition Strategy

- Start by collecting information
- What tools and technologies are needed for a custom development project?
- What vendors make products that address the project needs?
- What service providers would be able to build this application if outsourced?

Request for Proposals (RFP)

- Solicits proposals from vendor, developer, or service provider
- Explains the system to be built and criteria for selecting among applicants
- Request for Information (RFI) -- a shorter and less detailed version
- Request for Quote (RFQ) – use when you just need a price

Typical RFP Contents

- Description of desired system
- Special technical needs or circumstances
- Evaluation criteria
- Instructions on how to respond
- Desired schedule
- Other information that will help the submitter to make a more complete or accurate proposal

Alternative Matrix

- Combine several feasibility analyses into one matrix
- Include technical, economic, and organizational feasibilities
- Assign weights to indicate the relative importance of the criteria
- Assign scores to indicate how well the alternative meets the criteria

Sample Alternative Matrix

Evaluation Criteria	Relative Importance (Weight)	Alternative 1: Custom Application Using VB.NET	Score (1–5)*	Weighted Score	Alternative 2: Custom Application Using Java	Score (1–5)*	Weighted Score	Alternative 3: Packaged Software Product ABC	Score (1–5)*	Weighted Score
Technical Issues:										
Criterion 1	20		5	100		3	60		3	60
Criterion 2	10		3	30		3	30		5	50
Criterion 3	10		2	20		1	10		3	30
Economic Issues:										
Criterion 4	25	Supporting	3	75	Supporting	3	75	Supporting	5	125
Criterion 5	10	Information	3	30	Information	1	10	Information	5	50
Organizational Issues										
Criterion 6	10		5	50		5	50		3	30
Criterion 7	10		3	30		3	30		1	10
Criterion 8	5		3	15		1	5		1	5
TOTAL	100			350			270			360

Chapter Review

- Identify and describe the steps associated with the design phase of the project.
- Explain the meaning and purpose of the components of the system specification.
- Explain the pros and cons of obtaining the new system through a custom development project.
- Explain the pros and cons of obtaining the new system through a purchasing a software package.

Chapter Review Continued

- Explain the pros and cons of obtaining the new system through an outsourcing firm.
- Explain how the characteristics of the project influence the selection of the acquisition strategy.
- Explain the use of RFPs, RFIs, and RFQs as ways of gathering information from vendors.
- Discuss the use of an alternatives matrix to systematically evaluate and compare alternatives.

Key Terms

- Alternative matrix
- Application service provider (ASP)
- Custom development
- Design phase
- Enterprise resource planning (ERP)
- Fixed-price contract
- Outsourcing
- Packaged software
- Request for information
- (RFI)
- Request for proposal
- (RFP)
- Request for quote
- (RFQ)
- Software as a Service
- (SaaS)
- System requirement
- Systems integration
- System specification
- Time and arrangements deal
- Value-added contract
- Weighted alternative matrix
- Workaround