Systems Analysis and Design

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System Design

Chapter 7

Key Definitions

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

Transition from Requirement to Design

- Influences on the Acquisition Strategy
- Selecting a Design Strategy
- Selecting a System Acquisition Strategy
- Developing an Alternative Matrix

Classical Design Mistakes

- Reducing design time
- Feature creep
- Silver bullet syndrome
- Switching tools in mid-project

Design Strategies

- Custom development (build from scratch) in-house
- Purchase software package (and customize it)
- Outsource development to third party

Custom Development

PROS	CONS
Allows flexibility and creativity	Requires significant time and effort
Consistent with existing technology and standards	May exacerbate existing backlogs
Builds technical skills and functional knowledge in-house	May require missing skills
	Often costs more
	Often takes more calendar time
	Risk of project failure

Packaged Software

- Available for many common business needs
- Tested, proven; cost and time savings
- Rarely a perfect fit with business needs
- May allow for customization
  - Manipulation of system parameters
  - Changing way features work
  - Synchronizing with other application interfaces
- May require workarounds

Systems Integration

- Building systems by combining packages, legacy systems, and custom pieces
- Integrating data is the key

Outsourcing

- Hiring an external vendor, developer, or service provider
- May reduce costs or add value
- Risks include possibly
  - Losing confidential information
  - Losing control over future development
  - Losing learning opportunities

Outsourcing Contracts

- Time and arrangements
- Fixed-price
- Value-added

Outsourcing Guidelines

- Keep the lines of communication open between you and your outsourcer.
- Define and stabilize requirements before signing a contract.
- View the outsourcing relationship as a partnership.
- Select the vendor, developer, or service provider carefully.
- Assign a person to manage the relationship.
- Don't outsource what you don't understand.
- Emphasize flexible requirements, long-term relationships, and short-term contracts.

INFLUENCES ON THE ACQUISTION STRATEGY

Selecting a Design Strategy

- Consider each of the following when deciding what strategy to use:
  - Business need
  - In-house experience
  - Project skills
  - Project management
  - Time frame

Selecting a System Acquisition Strategy

	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

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Time frame	The time frame is flexible.	The time frame is short.	The time frame is short or flexible.

In-House Experience

- If in-house experience exists for all the functional and technical needs of the system, it will be easier to build a custom application.
- A packaged system may be a better alternative for companies that do not have the technical skills to build the desired system.

Project Skills

- The skills that are applied during projects are either technical or functional.
- Different design alternatives are more viable, depending on how important the skills are to the company's strategy.

Project Management

- Custom applications require excellent project management and a proven methodology.
- There are so many things that can push a project off track, such as funding obstacles, staffing, and overly demanding business users.

Project Management - continued

- The project team should choose to develop a custom application only if it is certain that the underlying coordination and control mechanisms will be in place.
- Packaged and outsourcing alternatives also must be managed; however, they are more shielded from internal obstacles.

Time Frame

- When time is a factor, the project team should probably start looking for a system that is already built and tested.
- If a custom alternative is chosen, and the time frame is very short, consider using techniques like timeboxing to manage the problem.

Selecting an Acquisition Strategy

- Once a project team has a good understanding of how well each acquisition strategy fits with the project's needs, it must begin to understand exactly how to implement these strategies.
- One helpful tool is the *request for proposal (RFP),* a document that solicits a formal proposal from a potential vendor, developer, or service provider

Selecting an Acquisition Strategy - continued

- For smaller projects with smaller budgets, the *request for information (RFI)* may be sufficient, as it is shorter and less detailed.
- A *request for quote (RGQ)* may be used when a list of equipment is so complete that the vendor only need provide a price.

Developing an Alternative Matrix

- 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?

Developing an Alternative Matrix

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

Developing an 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

Summary Slide

- System Design Phase – transitioning from requirements to design
- Design all the elements of the system
- First Task – determine the system acquisition strategy
  - Custom development
  - Purchase software package
  - Outsource
- Use Alternatives Matrix to structure the system acquisition decision

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