

Application Development Methodology

ADM

*A framework for projects
utilizing Business Process Consulting
to Deliver Software Applications*

March, 2006

The information contained in this document is the property of First Consulting, Inc. and is intended for use by First Consulting, Inc. resources for the purposes of delivery of applications to our customers. All contents are proprietary and are to be handled in a confidential manner.

Table of Contents

Application Development Methodology	1
ADM	1
Table of Contents	2
Introduction.....	3
Phase 1 Initiation.....	5
Phase 2 Requirements.....	6
Phase 3 Design	8
Phase 4 Construction	10
Phase 5 Testing	12
Phase 6 Implementation.....	14
Phase 7 Post Implementation.....	15

Introduction

➤ THE NEED FOR A STANDARD

- 1.2 The Application Development Methodology (ADM) is designed to provide a structured framework for the development of systems projects.
- 1.3 The ADM at First Consulting, Inc. is a task focused, streamlined approach.
- 1.4 The ADM is designed to simplify and accelerate our development efforts and requires a manageable degree of project controls.
- 1.5 First Consulting, Inc.'s goal is to use the ADM to ensure the quality and timeliness of our systems projects.
- 1.6 These standards provide formal guidelines to a project team while leaving sufficient flexibility for customization and individual creativity.

➤ BENEFITS OF THE ADM

- 1.7 Management & Communication Framework
 - ◆ PERIODIC MANAGEMENT REVIEW AND APPROVAL COMMUNICATES PROGRESS AND HIGHLIGHTS ISSUES.
 - ◆ IDENTIFIES CLEAR INFORMATION CHANNELS AND THE KEY PLAYERS THROUGH THE PROJECT CYCLE.
- 1.8 Consistency of Approach
 - ◆ BASED ON AN ESTABLISHED METHODOLOGY OF PROJECT STANDARDS, TECHNIQUES AND CONTROLS.
- 1.9 Core Systems Tasks & Deliverables
 - ◆ MANY TASKS ARE CONSISTENT FROM ONE PROJECT TO ANOTHER.
 - ◆ REPEATABILITY EQUALS EFFICIENCIES IN PRODUCING DELIVERABLES.

➤ PROJECT MANAGEMENT

- 1.10 A Project Manager versed in the ADM is assigned to each project and by complying with the ADM standards is responsible for:
 - ◆ PROJECT INITIATION
 - ◆ PLANNING AND CONTROL
 - ◆ ASSIGNING APPROPRIATE RESOURCES
 - ◆ MANAGING DAY-TO-DAY ACTIVITIES
 - ◆ REPORTING PROGRESS AND ISSUES
 - ◆ FINAL DELIVERY
- 1.11 Project Planning
 - ◆ FORMALIZE THE PROJECT ACTIVITIES
 - ◆ IDENTIFY TASKS AND DEPENDABILITIES
 - ◆ IDENTIFY SKILL SETS REQUIRED
 - ◆ POSITION RESOURCES

1.12 Project Tools

- ◆ SPECIFIC APPLICATION DEVELOPMENT
- ◆ SPECIFIC OPERATING SYSTEM
- ◆ MS PROJECT
- ◆ MS EXCEL
- ◆ MS WORD
- ◆ INTERNET / EMAIL

➤ **STRUCTURED METHODOLOGY**

1.13 Relationship of Phases > Activities > Tasks > Deliverables

1.14 Generally the ADM consists of 7 Phases.

- ◆ PHASE 1 INITIATION
- ◆ PHASE 2 REQUIREMENTS
- ◆ PHASE 3 DESIGN
- ◆ PHASE 4 CONSTRUCTION
- ◆ PHASE 5 TESTING & CONVERSIONS
- ◆ PHASE 6 IMPLEMENTATION
- ◆ PHASE 7 POST IMPLEMENTATION

1.15 Activities within each phase are broken down into tasks, and the associated work effort result into Deliverables.

Phase 1 Initiation

ADM PHASE 1 INITIATION – PURPOSE

The purpose of Phase 1 Initiation is to assess the business purpose, size, and overall priority of a project by developing a *Project Assessment*.

The *Project Assessment*:

- ◆ DEFINES THE PROJECT.
- ◆ IS A DETAILED ANALYSIS PERFORMED TO ESTABLISH THE OBJECTIVES, SCOPE, DELIVERABLES AND RESOURCES OF THE PROJECT.
- ◆ IS A HIGH-LEVEL PROJECT PLAN THAT SHOWS MAJOR MILESTONES AND EXPECTED DURATIONS.
- ◆ INCLUDES PRELIMINARY COST ESTIMATES.

ADM PHASE 1 INITIATION – TASKS

1. Introductions to the organization, the business, key players
2. Initial Assessment / Needs Analysis
3. Technology Assessment
4. Resource Skills Assessment

ADM PHASE 1 INITIATION – DELIVERABLES

- ◆ **PROJECT ASSESSMENT** - IDENTIFIES THE PURPOSE, SCOPE, OBJECTIVES AND ARCHITECTURE OF THE PROJECT.
- ◆ **PROJECT PLAN** - IDENTIFIES THE MAJOR ACTIVITIES, MILESTONES, DEPENDENCIES, TASKS, RESPONSIBILITIES.
- ◆ **ISSUES LISTING** - LISTING USED TO TRACK SIGNIFICANT ISSUES THAT COULD IMPACT THE COMPLETION OF ONE OR MORE TASKS.
- ◆ **DETAILED PLAN** FOR PHASE 2 REQUIREMENTS

Phase 1 Initiation is complete when the **Project Assessment** is delivered to management. Based on management acceptance, Phase 2 Requirements begins

Phase 2 Requirements

ADM PHASE 2 REQUIREMENTS – PURPOSE

The purpose of Phase 2 Requirements is to define and document the business requirements that will be supported by the application and results in the **Functional Requirements Analysis**. The Functional Requirements Analysis is comprised of two sections: *business functional requirements* and *system functional requirements*.

Business Functional Requirements includes information in these areas:

- ◆ BUSINESS JUSTIFICATION
- ◆ DEVELOPMENT CONSIDERATIONS
- ◆ CRITICAL SUCCESS FACTORS
- ◆ ORGANIZATIONAL IMPACTS
- ◆ BUSINESS FUNCTIONS TO BE SUPPORTED BY THE SYSTEM
- ◆ DEFINITIONS OF FUNCTIONAL DELIVERABLES
- ◆ DATA REQUIREMENTS
- ◆ AS-IS PROCESS FLOW DIAGRAMS (DETAILING PROCESSES, JOB RESPONSIBILITIES, EXISTING SYSTEM INTERFACES, DATA CAPTURE)
- ◆ DATA CALCULATIONS

System Functional Requirements include information in these areas:

- ◆ SYSTEM OVERVIEW
- ◆ DATA FLOW DIAGRAMS
- ◆ PROCESSING FLOW DIAGRAMS
- ◆ DATABASE REQUIREMENTS
- ◆ HARDWARE AND SOFTWARE REQUIREMENTS
- ◆ SYSTEM INTERFACES

ADM PHASE 2 REQUIREMENTS – TASKS

1. Gather Data, Interview Users and Collect Requirements
2. Describe Current System or Manual Operation to be Replaced
3. Describe Proposed Functions (manual and automated)
4. Define Functional Data and Process Flows
5. Identify Impact on User Area Procedures
6. Define Legal/Regulatory Requirements
7. Define Accounting, Security Administration and Control Requirements
8. Define Backup/Contingency Requirements
9. Estimate Volumes and Define Performance Requirements
10. Identify Assumptions and Restrictions
11. Define Primary Input and Output Requirements
12. Identify Impacts on Business Areas and Facilities
13. Define Interfaces to Other Computer Systems
14. Produce the Functional Requirements Analysis document
15. Obtain Reviews and Approvals
16. Develop Plans for Phase 3 – Design

ADM PHASE 2 REQUIREMENTS – DELIVERABLES

- ◆ **FUNCTIONAL REQUIREMENTS ANALYSIS** – COMPOSED OF BUSINESS FUNCTIONAL REQUIREMENTS AND SYSTEM FUNCTIONAL REQUIREMENTS.
- ◆ **BACKUP/CONTINGENCY REQUIREMENTS** – IDENTIFIES THE POTENTIAL IMPACT OF SYSTEM UNAVAILABILITY OR LOSS. KEY FACTORS TO CONSIDER SHOULD BE IMPACTS TO BUSINESS. INFORMATION IS USEFUL IN DETERMINING THE TECHNOLOGY ARCHITECTURE REQUIREMENTS AND IDENTIFYING CONTINGENCY PLANS.
- ◆ **DETAILED PLAN** FOR PHASE 3 – DESIGN

Phase 3 Design

ADM PHASE 3 DESIGN - PURPOSE

The objective of the Phase 3 Design is to engineer a system design based upon the *Functional Requirements Analysis*. The purpose of the resulting *Design Specification* is to present detailed specifications to support business requirements including:

- ◆ SYSTEM DESIGN
- ◆ SYSTEM FUNCTIONS
- ◆ SYSTEM PROCESSES
- ◆ DATA FLOWS
- ◆ INPUTS/ OUTPUTS
- ◆ CONTROLS NECESSARY
- ◆ TO DEFINE THE COMPONENTS OF THE SYSTEM, INCLUDING PROGRAM AND DATA SPECIFICATIONS.
- ◆ TO SPECIFY SYSTEM INTERFACES.
- ◆ TO DESCRIBE THE HARDWARE, COMMUNICATIONS AND SYSTEM SOFTWARE ENVIRONMENT.

The *Design Specification* document will include Use Cases for identifying the functional requirements of the users. Use Cases will be developed for, but are not limited to:

- ◆ ADMINISTRATION
- ◆ NAVIGATION
- ◆ ADD/DELETE/MODIFY
- ◆ PRINTING/REPORTS
- ◆ Display/Searching

Systems and user documentation is also designed, all in sufficient detail to allow the necessary products to be developed during Phase 4 Construction.

ADM PHASE 3 DESIGN – TASKS

1. Develop Use Cases [a Recommended Solution & Approach
2. Complete Approval Process (if necessary)
3. Prepare Design & Data Specifications
4. Design Systems Architecture & Components
5. Develop Equipment, Operating Environment & Telecommunications Specifications
6. Prepare Program Specifications
7. Conduct Design Specification Walk-through
8. Prepare Prototypes as Practicable to Confirm Designs with Users
9. Develop Preliminary Plans for Systems Testing
10. User Testing
11. Preparation of User Procedures
12. User Guides & Data Center/Operators Guide
13. Training
14. Conversion & Implementation

15. Develop Security Administration Specifications (i.e. User Group profiles based on functional need, user population, etc.)
16. Develop Backup/Contingency Specifications (i.e. procedures, hardware, telecommunication requirements for contingency, frequency of data/system backup, etc.)
17. Develop external performance indicators
18. Develop internal performance indicators
19. Obtain Reviews and Approvals
20. Develop Plans for the Phase 4 - Construction

ADM PHASE 3 DESIGN – DELIVERABLES

- ◆ **DESIGN SPECIFICATION** - PROVIDES A SYSTEMS OVERVIEW, DETAILED SYSTEMS SPECIFICATIONS, DATA SPECIFICATIONS, PROGRAM SPECIFICATIONS, DATA FLOWCHARTS, REPORT LAYOUTS, ETC.
- ◆ **DATA SECURITY SPECIFICATION** - DEFINE SYSTEM ACCESS REQUIREMENTS ANTICIPATED FOR THE SYSTEM. CONSIDERATION SHOULD BE GIVEN TO THE FUNCTIONAL BUSINESS NEEDS OF THE USER POPULATION.
- ◆ **BACKUP / CONTINGENCY SPECIFICATIONS** - DEFINE THE DETAILED SPECIFICATIONS FOR SYSTEM BACKUP AND RECOVERY DURING A SHORT-TERM OUTAGE. ADDITIONALLY, SPECIFICATIONS SHOULD BE PROVIDED FOR LONG-TERM SYSTEM OUTAGE THAT WOULD REQUIRE THE USE OF AN ALTERNATE PROCESSING SITE AND TELECOMMUNICATIONS ACCESS. THE DEVELOPMENT OF THESE SPECIFICATIONS SHOULD BE DONE IN CONJUNCTION WITH THE USER BUSINESS RECOVERY PLAN AND THE DEPARTMENT'S CONTINGENCY PROCEDURES.
- ◆ **DETAILED PLAN FOR PHASE 4 CONSTRUCTION** - THIS WILL IDENTIFY MAJOR ACTIVITIES, MILESTONES, DEPENDENCIES, TASKS, SCHEDULES, RESPONSIBILITIES AND RESOURCE ESTIMATES (IST, USER AND VENDOR) FOR EACH TASK.
- ◆ **PRELIMINARY PLANS & CONSIDERATIONS** - DOCUMENT IN THE AREAS OF SYSTEMS TESTING, USER ACCEPTANCE TESTING, DEVELOP OPERATORS & USER GUIDES, TRAINING, CONVERSION & IMPLEMENTATION

Phase 4 Construction

ADM PHASE 4 – CONSTRUCTION

The purpose of Phase 4 Construction is to build the system and supporting documents to meet the project's objectives.

The technical *Design Specification* from Phase 3.0 Design is converted into working program code and all other products of the development process are created:

- ◆ BUILD THE APPLICATION
- ◆ PLANS FOR TESTING, TRAINING, CONVERSION.
- ◆ USER AND TECHNICAL DOCUMENTATION
- ◆ PLANS FOR IMPLEMENTATION.

ADM PHASE 4 CONSTRUCTION - TASKS

1. Design & Document Program Logic
2. Prepare Program Level Documentation
3. Design & Document Program to Program Logic
4. Build File & Record Structures
5. Define Backup & Contingency Strategies
6. Construct System Configuration (Hardware, Network)
7. Set up Appropriate Levels of Security
8. Establish Test Libraries & Files
9. Code, Compile & Check Program Modules
10. Prepare Unit Test Plans & Test Cases
11. Conduct Unit Testing & Document Results
12. Link Program Modules into a System
13. Update Design Specification as necessary
14. Develop System Test Strategy, Plan & Test Cases
15. Develop User Acceptance Test Plan
16. Prepare Data Center/Operators Guide
17. Prepare User Guide
18. Prepare Updates to User Area Procedures
19. Prepare Training Plan
20. Prepare Conversion & Implementation Plans

ADM PHASE 4 CONSTRUCTION – DELIVERABLES

- ◆ THE OUTPUT OF THIS PHASE WILL BE AN APPLICATION AND ANCILLARY DELIVERABLES READY FOR TESTING.
- ◆ **SYSTEMS DOCUMENTATION** - INCLUDING PROGRAM DESCRIPTIONS, PROGRAM MODULE LISTINGS AND ANY OTHER SUPPORTING TECHNICAL SPECIFICATIONS.
- ◆ **USER GUIDE**
- ◆ **UPDATES TO USER AREA PROCEDURES**
- ◆ **Data Center/Operators Guide**
- ◆ **Systems Test Plan**
- ◆ **User Acceptance Test Plan**
- ◆ **Training Plan**
- ◆ **Conversion & Implementation Plans**

- ◆ **Backup/Contingency Strategy** -The procedure used to backup & restore files/libraries should be developed & tested. In addition, contingency strategy should be defined and tested in the Testing Phase
- ◆ **System Configuration** - The hardware and telecommunication configuration should be documented. With the adoption of decentralized or distributed processing, many systems are becoming increasingly complex. This document is essential toward understanding and supporting complex systems.

Phase 5 Testing

ADM PHASE 5 - TESTING

The purpose of Phase 5 Testing is to:

- ◆ UNCOVER PROBLEMS BEFORE THE SYSTEM MOVES INTO PRODUCTION
- ◆ VALIDATE USER PROCEDURES
- ◆ VALIDATE TECHNICAL OPERATIONAL PROCEDURES
- ◆ VALIDATE TRAINING MATERIALS

The Testing phase incorporates both **System Testing** and **User Acceptance Testing**.

Also in this phase, **operational and technical documentation** should be made available in final form, and final revisions to the data conversion and implementation plans are made.

TESTING STRATEGIES

Testing strategies should always attempt to verify that all functions in the system are working according to specifications and should include:

- ⇒ ONE OR MORE REGULAR PROCESSING DAYS
- ⇒ A PERIOD ENDING (I.E. MONTH-END, QUARTER-END, YEAR-END)

TO ENSURE THAT ANY PROGRAM CHANGE CORRECTIONS DO not adversely affect processing, the concept of **regression testing** should be applied. Test cases are rerun to detect any remaining or new errors.

Careful attention to the preparation of **test data** will make for comprehensive and successful testing.

System testing should also include a **stress test**, where unusually high volumes of data are entered in order to assess the new system's ability to handle peak workloads.

USER ACCEPTANCE TEST

User Acceptance Test planning and execution should be conducted through the joint efforts of the technical staff and the user area.

Users are responsible for performing sufficient tests to assure themselves that the requirements have been met.

When applicable, **parallel processing** is required in order to compare results from the new system against the current system.

User testing should be conducted in as close to a **simulated live production environment** as possible with conscientious tracking of test cases, documentation of problems and follow-through to resolution.

The **Problem Tracking Methodology** developed during *1.0 INITIATION* should be used to log problems encountered during testing.

CHANGE CONTROL PROCESS

Existing **change control procedures** should be followed during **5.0 TESTING** to ensure the integrity of the system being tested.

All User Acceptance Testing should be performed from a secured library and all subsequent changes should be documented, approved and performed using the change control process.

ADM PHASE 5 TESTING – TASKS

1. Finalize System Test Plans & Test Cases
2. Supply, Install & Commission Hardware as required
3. Provide a Secure Test Environment
4. Conduct System Testing
5. Review Results, Identify & Correct Errors
6. Revise User & Operators Guide
7. Revise User Area Procedures
8. Revise Systems Documentation
9. Finalize User Acceptance Test Plans & Test Cases
10. Obtain the Correct Level of User Participation
11. Conduct User Acceptance Testing & Final Training
12. Perform Backup & Recovery Testing & where possible perform Contingency Testing
13. Review Results, Identify & Correct Errors
14. Determine Criticality of Outstanding Problems & Identify Interim Solutions if necessary
15. Make Final User & System Documentation Changes
16. Prepare Final Conversion & Implementation Plans
17. Obtain Reviews & Approvals (as defined in the Responsibility Matrix)

ADM PHASE 5 TESTING - DELIVERABLES

- ◆ DOCUMENTED TEST STRATEGIES & PLANS
- ◆ SYSTEMS TEST RESULTS
- ◆ USER ACCEPTANCE TEST RESULTS
- ◆ OPERATORS GUIDE
- ◆ USER GUIDE
- ◆ UPDATED SYSTEMS DOCUMENTATION
- ◆ REVISED USER AREA PROCEDURES
- ◆ CONVERSION & IMPLEMENTATION PLANS

Phase 6 Implementation

ADM PHASE 6 – IMPLEMENTATION

The purpose of 6.0 Implementation is to complete the traditional system development life cycle.

The new or amended system passes from an evolving state to being operational. Responsibility for the system passes from the project team to the business/user area. Processing schedules are established and verified, and operations staff is prepared to work with the new application.

The *User Acceptance Memorandum* indicates that the results of the 5.0 TESTING have been reviewed and that the reviewers have approved proceeding to the next step - live operation.

Any outstanding issues or exceptions are documented and are to be addressed in the production environment after implementation.

ADM PHASE 6 IMPLEMENTATION - TASKS

1. Verify user preparedness
2. Verify technical support preparedness
3. Implement appropriate security & processing controls for the production environment
4. Develop fallback plan if problems occur during implementation
5. Execute the Conversion and Implementation Plans
6. Complete User Acceptance Memorandum
7. Develop or update Business Recovery Plans
8. Obtain reviews & approvals (as defined in the Responsibility Matrix)
9. Start live operation

ADM PHASE 6 IMPLEMENTATION - DELIVERABLES

- ◆ OPERATIONAL SYSTEM
- ◆ USER ACCEPTANCE MEMORANDUM

Phase 7 Post Implementation

ADM PHASE 7 – POST IMPLEMENTATION

The purpose of 7.0 Post Implementation is to evaluate, prioritize and resolve faults and deficiencies remaining after implementation of the system.

The work effort is based on the exceptions resulting from Phase 5 - Testing - and any items held over from the user acceptance test and sign-off.

Determining the causes and correcting them as quickly as possible is the next step.

Conduct a project evaluation and benefits review, designed to improve the quality of future projects by applying lessons learned and new ideas developed during the life of the project, as well as assessing that the planed benefits have been realized.

Move the system into maintenance mode by following established problem reporting and change control procedures and perform contingency testing.

ADM PHASE 7 POST IMPLEMENTATION - TASKS

1. Prioritize known defaults / deficiencies & identify solutions
2. Code / test / document / implement changes
3. Analyze lessons learned from the entire process
4. Document anticipated vs. actual benefits
5. Prepare Project Evaluation Report.
6. The system should be processed to ensure that all files needed for contingency recovery are backed-up and available off-site.
7. Prepare for contingency testing & updating Contingency plans
8. Enforce the Change Control process.

ADM PHASE 7 POST IMPLEMENTATION - DELIVERABLES

- ◆ USER ACCEPTANCE EXCEPTIONS DOCUMENT
- ◆ PLAN TO RESOLVE EXCEPTIONS
- ◆ Project Evaluation report
- ◆ Contingency Test Plan
- ◆ Maintenance log
- ◆ Documentation Updates