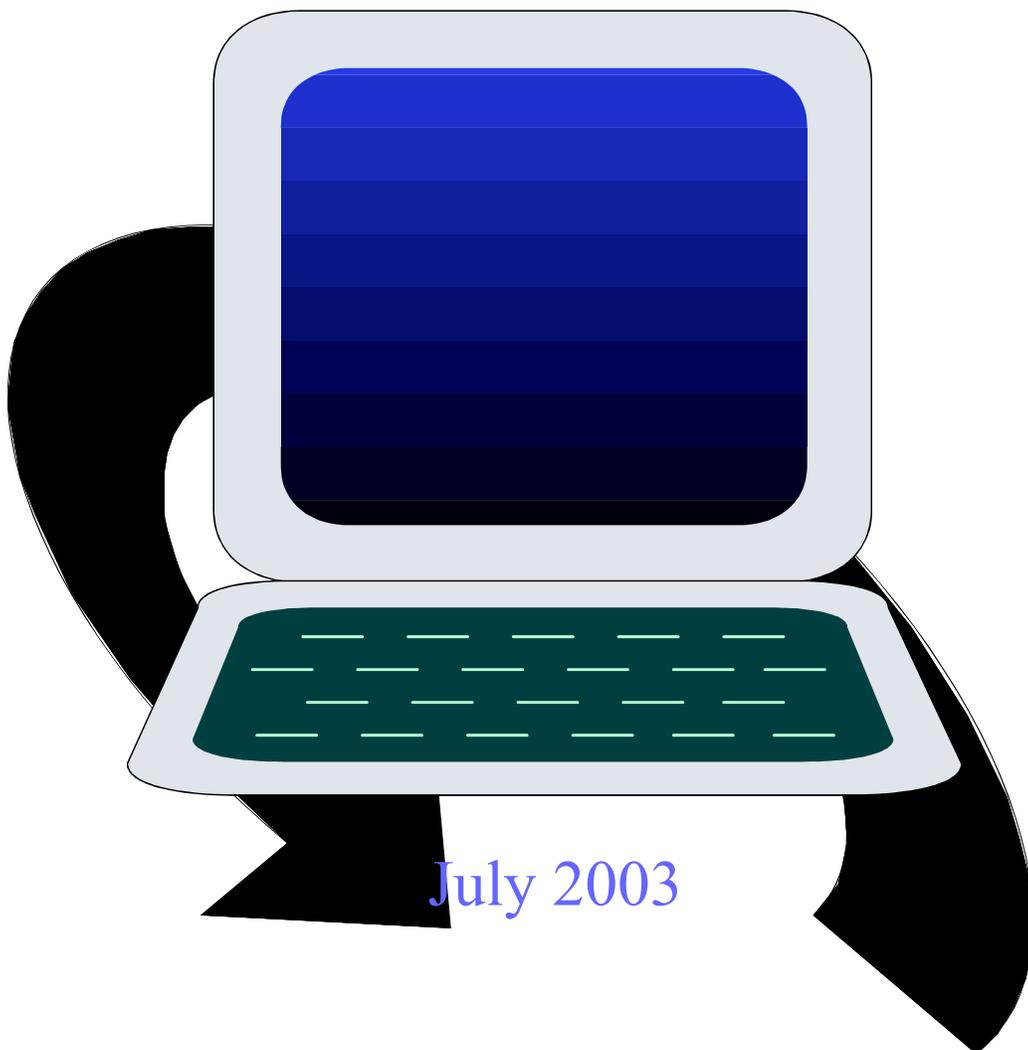


Fairfax County Department of Information Technology

System Development
Life Cycle Standards
Version 1.2



July 2003

INTRODUCTION

Introduction to System Development Life Cycle Standards

The System Development Life Cycle Standards (SDLCS) provide a guide to documentation for the entire system life cycle for those who are developing or enhancing applications for Fairfax County government. They should be used for all IT development and enhancement projects that are anticipated to consume significant resources. These projects may be funded through Information Technology Fund 104, the user agency's budget, or may be enhancements responding to change requests.

About These Standards

The Standards consist of development phases, steps and outputs. There are eight phases, each one with multiple steps, which in turn may have one, or several, outputs. While these are presented in a certain order, outputs are not necessarily completed in this sequence.

Once projects are approved, Project Managers select the appropriate documentation for each project, using the Checklist for System Development Life Cycle Standards, reproduced at the end of the Introduction. The Checklist enumerates all development phases, steps and outputs. Project Managers select, record and obtain management approval for which documents they anticipate using, and the brief rationale for not selecting others.

Each output description contains the purpose of the output, its recommended content, and the recommended techniques and tools. Many of the outputs have samples that show how they have been applied. Other documentation is acceptable as long as it provides the essential elements contained in the output and its name and number are referenced.

The Standards are most useful when employed as an organizing device for outputs that may include records, agreements, discussions, minutes of meetings, use of samples, etc.

Any information in funding applications or from other sources could be used in the SDLCS Outputs as long as the information provides the essential elements contained in the output and the output's name and number are referenced.

The listing on the InfoWeb has a retrieval capability so that the user can click on the title of each output to retrieve the text.

Some outputs contain references to more detailed documents. The majority will be accessible through the Infoweb as referenced in each Standard.

Recommended Uses:

Development of a new application.

Preparation for implementation of COTS (Commercial Off The Shelf) Software

Implementation of a new technology.

Enhancement: Upgrade to an existing application.

Interfaces between applications.

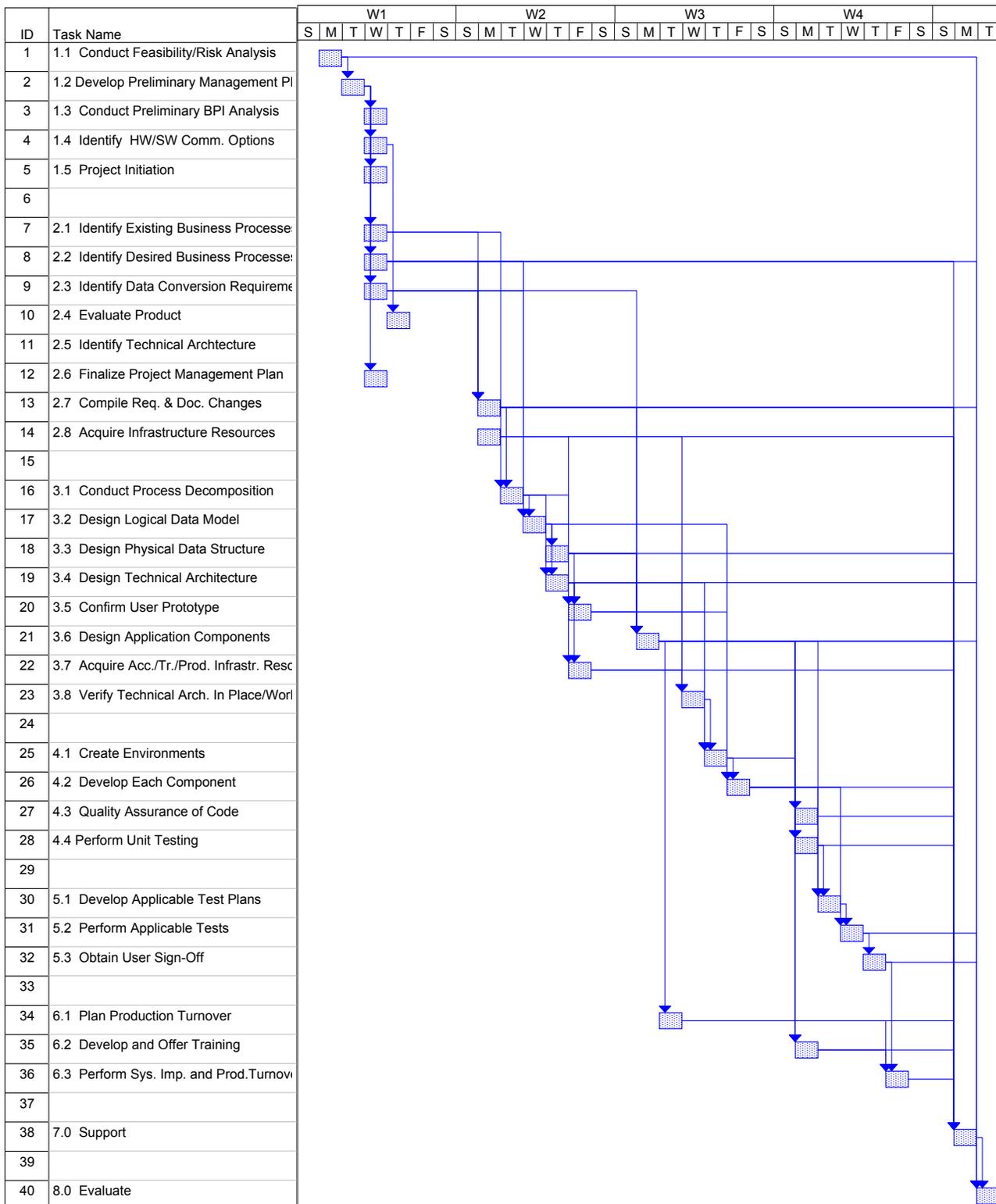
References in RFPs/RFIs, contracts and contract monitoring.

On-going maintenance of projects developed using the SDLCS

How to Use These Standards

- The Project Management Team (DIT and/or User PMs, including consultants, if applicable) will identify which steps and outputs are appropriate for each project, using the Checklist for System Development Life Cycle Standards. The selection will be made according to their professional judgement, and with the written concurrence of the Division Directors.
- When selecting the outputs and content, consideration should be given to the type of project, staff and consultant resources, time availability, application complexity, budget issues and maintenance.
- Project Managers are urged to accumulate project documentation as the project develops. Meeting minutes or notes from discussions may be important in demonstrating that communications or other discussions took place as proposed by a certain output. It is recommended that the documents be stored in the order of the outputs, with the relevant number of the output cited on the document.
- At the end of a project, the Division Directors will assess the suitability of the selected outputs they approved with the Project Managers, as a training exercise for all.
- A post-implementation review will be conducted 3-6 months after project completion.
- The next two graphics show two possible sequences in which the steps might be performed. The first is the Waterfall Sequence for the Completion of Steps and the second, Incremental Development Approaches. Following these is chart showing the Recommended Input Documents shows the potential input documents for each step.

WATERFALL SEQUENCE FOR COMPLETION OF STEPS

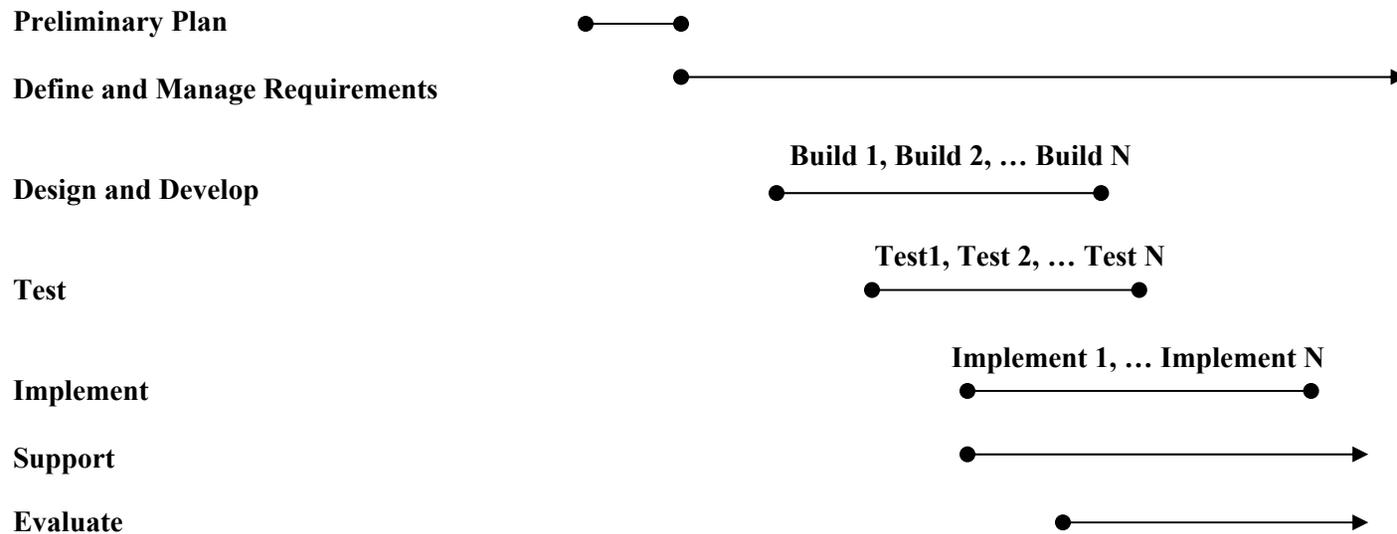


INCREMENTAL DEVELOPMENT APPROACHES

Although the previous diagram shows a fixed set of tasks with well recognized project phases following the ‘waterfall’ methodology, software projects using incremental development process are becoming more common. With the first approach, it is easier to define the initial project schedule, however, many projects, either to reduce complexity in dealing with large projects, or because of contractual obligations, are delivered in increments. The incremental approach can significantly improve the value of the delivered system to the user. Some of the advantages of developing software in increments are:

- 1) Problems are detected earlier and not until they are too complex and costly to fix
- 2) A useful part of the system can be delivered early to the user
- 3) Feedback from the users can be incorporated into successive increments
- 4) No delivery of a ‘monster application’ at one time
- 5) Better architecture as the end result

The diagram below shows this approach. Defining project schedules for the incremental process is more difficult and defining the objectives and time frames for each increment can be very challenging. These projects should be implemented by adding testable system functionality in increments.



RECOMMENDED INPUT DOCUMENTS

Below is a listing of application development steps, recommended inputs and resulting outputs. The listed Input Documents are outputs from previous steps. Other documents generated from the budget process or other sources should also be used as appropriate. Project Management Team members are encouraged to use this list in selecting which steps they need to undertake on any given project and which inputs should assist in accomplishing these steps. The availability of resources, the time constraints and the complexity of the project must all be taken into consideration when selecting outputs.

1. PRELIMINARY PLAN

	Step	Input Documents	Outputs
1.1	Conduct feasibility/ risk analysis studies		1.1.1 Feasibility and Risk Analysis
1.2	Develop preliminary project management plan	<i>1.1.1 Conduct feasibility/ risk analysis studies</i>	1.2.1 Preliminary Project Management Plan 1.2.2 Statement of Scope 1.2.3 Expenditure Plan 1.2.4 Staffing Plan
1.3	Conduct preliminary business process improvement analysis	<i>1.2.1 Preliminary Project Management Plan; 1.2.2 Statement of Scope; 1.2.3 Expenditure Plan; 1.2.4 Staffing Plan</i>	1.3.1 Preliminary Business Process Improvement Document
1.4	Identify hardware/ software/ communications options	<i>1.2.1 Preliminary Project Management Plan; 1.2.2 Statement of Scope</i>	1.4.1 Viable Hardware/ Software/ Communications Options
1.5	Project Initiation	<i>1.2 Preliminary Project Management Plan</i>	1.5.1 Communication with Sponsoring Agency and Information Technology Senior Staff 1.5.2 Initial Project Briefing for Participants 1.5.3 Initial Project Meeting for Project Team Participants

2. DEFINE REQUIREMENTS

	Step	Input Documents	Outputs
2.1	Identify EXISTING business functions and included processes	<i>1.2.1 Preliminary Project Management Plan; 1.2.2 Statement of Scope; 1.2.3 Expenditure Plan; 1.2.4 Staffing Plan</i>	2.1.1 Existing Business Process and/or Workflow Model
2.2	Identify DESIRED business functions including processes	<i>1.2.1 Preliminary Project Management Plan; 1.2.2 Statement of Scope; 1.2.3 Expenditure Plan; 1.2.4 Staffing Plan</i>	2.2.1 Business Process Redesign (BPR) Document
2.3	Identify data and conversion requirements (inputs)	<i>1.2.1 Preliminary Project Management Plan; 1.2.2 Statement of Scope</i>	2.3.1 Conceptual Data Model
2.4	Evaluate product	<i>1.4.1 Viable Hardware/ Software/ Communications Options</i>	2.4.1 Product Evaluation
2.5	Identify technical architecture	<i>1.2.1 Preliminary Project Management Plan; 1.2.2 Statement of Scope; 1.2.3 Expenditure Plan; 1.2.4 Staffing Plan; 2.2.1 Business Process Redesign (BPR) Document 2.4.1 Product Evaluation</i>	2.5.1 Proposed Technical Architecture 2.5.2 Preliminary Systems Management Plan 2.5.3 Preliminary Network Infrastructure Plan
2.6	Finalize project management plan	<i>1.2.1 Preliminary Project Management Plan; 1.2.2 Statement of Scope; 1.2.3 Expenditure Plan; 1.2.4 Staffing Plan</i>	2.6.1 Final and Approved Project Management Plan
2.7	Compile requirements and document changes with user approval	<i>2.1.1 Existing Business Process and/or Workflow; 2.2.1 BPR Document; 2.3.1 Conceptual Data Model; 2.5 Identify technical architecture</i>	2.7.1 Signed Requirements Document 2.7.2 Document Requirement Changes with User Approval
2.8	Acquire infrastructure resources needed for design and development	<i>2.5.1 Proposed Technical Architecture 2.5.2 Preliminary Systems Management Plan 2.5.3 Preliminary Network Infrastructure Plan 2.5.1 Proposed Technical Architecture</i>	2.8.1 Design and Development Agreements/Notifications/Purchase Requisitions

3. DESIGN

	Step	Input Documents	Outputs
3.1	Conduct process decomposition	<i>2.2.1 Business Process Redesign (BPR) Document; 2.7.1 Signed Requirements Doc;</i>	3.1.1 Detailed Process Decomposition Document
3.2	Design logical data model	<i>2.2.1 Business Process Redesign (BPR) Document; 2.3.1 Conceptual Data Model; 2.7.1 Signed Requirements Document; 3.1.1 Detailed Process Decomposition Document</i>	3.2.1 Logical Data Model and Data Definitions Document
3.3	Design physical data structure	<i>2.5.1 Proposed Technical Architecture 3.2.1 Logical Data Model & Data Defs Doc</i>	3.3.1 Physical Data Design Document
3.4	Design technical architecture	<i>2.5.1 Proposed Technical Architecture; 3.1.1 Detailed Process Decomposition Document; 3.2.1 Logical Data Model and Data Definitions Document</i>	3.4.1 Technical Architecture Design Doc; 3.4.2 Checklist for Technical Architecture Installation; 3.4.3 Approved Sys Mgt Plan 3.4.4 Network Infrastr. Plan; 3.4.5 Business Continuity Plan
3.5	Confirm with user via system mock-up /prototype application	<i>3.1.1 Detailed Process Decomposition Doc; 3.2.1 Logical Data Model and Data Defs Doc; 3.3.1 Physical Data Design Doc; 3.4.1 Technical Architecture Design Doc</i>	3.5.1 Confirmed Mock-Up/Prototype
3.6	Design application components	<i>2.3.1 Conceptual Data Model; 2.7.1 Signed Requirements Doc; 3.3.1 Physical Data Design Doc; 3.4.1 Technical Arch Design Doc.; 3.5.1 Confirmed Mock-Up/ Prototype</i>	3.6.1 Design Specifications
3.7	Acquire acceptance, training and production infrastructure resources	<i>2.5 Identify technical architecture; 2.8.1 Design and Development Agreement/Notification/Purchase Requisitions; 3.4.1 Technical Architecture Design Document. 3.4.3 Approved System Management Plan; 3.4.4 Network Infr Plan</i>	3.7.1 Acceptance and Training Agreements/Notifications/Purchase Requisitions
3.8	Verify technical architecture is in place and functioning	<i>2.8.1 Design and Development Agreement /Notification/Purchase Requs; 3.4.2 Checklist for Technical Arch Verif; 3.7.1 Acceptance & Training Agreements/ Notifications /Purchase Requisitions; See 5.1.1 Test Plan</i>	3.8.1 Completed Technical Architecture Checklist

4. DEVELOP

	Step	Input Documents	Outputs
4.1	Create environments--Networking, files, libraries, etc.	<i>3.4.2 Checklist for Technical Architecture Verification 3.5.1 Confirmed Mock-Up/ Prototype; 3.6.1 Design Specifications; 3.8.1 Completed Checklist</i>	4.1.1 Operations Development Environment Checklist
4.2	Develop each component	<i>3.2.1 Logical Data Model and Data Definitions Document; 3.5.1 Confirmed Mock-Up/ Prototype 3.6.1 Design Specifications; 4.1.1 Operations Development Environment Checklist</i>	4.2.1 Completed (Coded) Module/Program, Linked Modules and Objects
4.3	Perform quality assurance of code	<i>3.6.1 Design Specifications; 4.2.1 Completed (coded) Module/Program, Linked Modules & Objects</i>	4.3.1 Reviewed Code with Improvements or Efficiencies Identified
4.4	Perform unit testing	<i>3.6.1 Design Specifications; 4.1.1 Operations Development Environment Checklist; 4.2.1 Completed (coded) Module/Program, Linked Modules & Object; See also 5.1.1 Test Plan</i>	4.4.1 Tested Program/Module/Business Object and Operational Network Components 4.4.2 Possible Ideas for Improvement to System

5. TEST

	Step	Input Documents	Outputs
5.1	Develop applicable test plans	<i>3.6.1 Design Specifications; 4.2.1 Completed ("coded") Module/Program, Linked Modules And Objects; 4.4.1 Tested Program/ Module/ Business Object and Operational Network Components</i>	5.1.1 Test Plan
5.2	Perform applicable tests	<i>4.2.1 Completed (coded) Module/Program, Linked Modules and Objects; 5.1.1 Test Plan</i>	5.2.1 Test Results Documentation
5.3	Obtain user sign-off	<i>5.2.1 Test Results Documentation</i>	5.3.1 Memorandum of Acceptance; Signed Change Request; Signed Migration Form

6. IMPLEMENT

	Step	Input Documents	Outputs
6.1	Plan production turnover	<i>3.6.1 Design Specifications</i>	6.1.1 Production System Implementation Plan 6.1.2 Operations' Documentation 6.1.3 User's Manual 6.1.4 Systems Abstracts
6.2	Develop training plan and materials, provide training	<i>3.6.1 Design Specifications; 4.2.1 Completed (coded) Module/Program, Linked Modules And Objects</i>	6.2.1 Training Plan 6.2.2 Training Materials
6.3	Perform system implementation and production turnover	<i>5.3.1 Memorandum of Acceptance; Signed Change Request; Signed Migration Form; 6.1.3 User's Manual; 6.1.4 Systems Abstracts; 6.2.1 Training Plan; 6.2.2 Training Materials</i>	6.3.1 Production Turnover Sign-Off Document 6.3.2 Signed Service Level Agreement/Vendor Maintenance Agreement

7. SUPPORT

	Step	Documents	Outputs
7.1	Develop necessary documentation for application support	2.7.1 <i>Signed Requirements Document</i> ; 2.7.2; <i>Compilation of Requirement Changes Approved by User</i> ; 2.8.1; <i>Design and Development Agreements/ Notifications/ Purchase Requisitions</i> ; 3.6.1 <i>Design Specifications</i> ; 3.7.1 <i>Acceptance and Training Agreements/ Notifications/Purchase Requisitions</i> 6.1.4 <i>Systems Abstracts</i> ; 6.3.1 <i>Production Turnover Sign-Off Document</i> ; 6.3.2 <i>Signed Service Level Agreement/Vendor Maintenance Agreement</i>	7.1.1 Documentation of Responsibilities, Procedures and Assignments for Application
7.2	Provide technical/ functional/ helpdesk/ training assistance	6.2.2 <i>Training Material</i>	7.2.1 Service provided 7.2.2 Documentation of Service
7.3	On-going maintenance support	2.2 <i>Identify desired business functions including processes</i> ; 2.7 <i>Compile requirements and document changes with user approval</i> ; 3.3 <i>Design physical data structure</i> ; 3.6 <i>Design application components</i> ; 4.2 <i>Develop each component</i> ; 4.3 <i>Perform quality assurance of code</i> ; 4.4 <i>Perform unit testing</i> ; 6.1 <i>Plan production turnover</i> ; 6.2 <i>Develop training plan & materials and provide training</i> ; 6.3 <i>Perform system implementation and production turnover</i>	7.3.1 On-Going Maintenance Support

8. EVALUATE

	Step	Input Documents	Outputs
8.1	Accumulate and check documentation is in order	<i>All relevant outputs and other relevant documentation</i>	8.1.1 Documentation Arranged According to SDLCS Checklist
8.2	Ascertain whether project met objectives and requirements	2.7.1; 2.7.2	8.2.1 Comparison of Project Scope and Requirements with Outcome and Customer Satisfaction
8.3	Compare actual to plan (time and budget)	<i>2.6.1 Final and approved Project Management Plan; 7.2.1 Service Provided</i>	8.3.1 Planned vs. Actual Comparison Document
8.4	Compare expected system performance with actual	<i>3.6.1 Design Specifications , 5.2.1 Test Results Documentation; 5.3.1 Memorandum of Acceptance</i>	8.4.1 Expected and Actual Performance Comparison Document
8.5	Evaluate system impact on business processes and (customer) service delivery	<i>2.2.1, Business Process Redesign (BPR) Document 3.6.1 Specifications 5.2.1 Test Results Documentation; 5.3.1 Memorandum of Acceptance</i>	8.5.1 Resources Comparison Document 8.5.2 Infrastructure Resources Comparison Document 8.5.3 Process Measures Comparison Document
8.6	Evaluate adequacy of business continuity plans/ procedures	<i>3.4.5 Business Continuity Plan;</i>	8.6. 1 Analysis Document Of Adequacy of Business Continuity Plans/Procedures.
8.7	Post-implementation review: Critique how methodology worked for this project	<i>2.7.1 Signed Requirements Document, 3.4.1 Technical Architecture Design Document.; 7.1 Develop necessary documentation for application support; 8.1.1 Planned vs. Actual Comparison Document. 8.3.1 Resources Comparison Document.</i>	8.7.1 Post Implementation Review Document

B. Possible Commercial Products For Recommended Techniques And Tools

Tool	Commercial Products
Asset Management	Microsoft Systems Management Server (SMS)
CASE Tools (Business Process Modeling and Data Modeling Software)	ERWin, Oracle Designer 2000
Change Management	Quintus Help Q
Change Request	Quintus, Microsoft Word
Charts	Microsoft Word, Microsoft Excel
Diagrams/Diagramming	ERWin; VISIO
Facilitated Sessions	Group Decision Support Center
Flowcharting Tools	ERWin; VISIO
Gantt Chart	Microsoft Project
Graphical Presentation Tools	Microsoft PowerPoint; VISIO
Inventory Control	Microsoft Systems Management Server (SMS)
Pert Chart	Microsoft Project
Problem Management	Quintus Help Q
Process Modeling Tools	BPWin, VISIO
Project Management	Microsoft Project
Requirements Tracking	Quintus Change Management
Screen Prototyping Tools	Web-based applications: Homesite, Notepad, HotMetal and ASP Powerbuilder. CICS, or CICS/DB2--CICS screen generator.
Spreadsheets	Microsoft Excel
Word Processing	Microsoft Word

C. Maintaining These Standards

Regular Maintenance

Recommendations for changes in these Standards should be made as they arise, at the end of post-implementation reviews when the conclusions may impact the Standards, or to comply with new or modified DIT policies. Please contact Joi Kudirka with these suggested changes, either at (703) 324-5467 or joi.kudirka@fairfaxcounty.gov

Biannual Review

These standards should be reviewed every other year to ensure they are current. A team from all the major disciplines within DIT, representing every Division, will join together to undertake this review.

CHECKLIST FOR SYSTEM DEVELOPMENT LIFE CYCLE STANDARDS

Name of Project:

Date:

Name of Sponsor and Agency:

Name of Responsible DIT Division Director or Branch Chief:

Names and Agencies of Project Managers:

Brief Description of Project:

Who Is Responsible for Completing the Checklist?

*The Project Management Team (DIT and User Project Managers, including consultants, if applicable) will identify which steps and outputs are appropriate for each project, writing a **brief** explanation as to why an output was **not** selected. The selection will be made according to their professional judgment and with the written concurrence of the appropriate Division Directors.*

The Checklist can be modified as the project progresses. Modifications should be dated and signed by the same individuals as signed the original Checklist.

Phases 1-6 should be completed by the Project Management Team and signed off by the responsible DIT Branch Chief or Division Director and the user Project Manager. Phase 8 should have the dates identified at the end of 6.1.1 Production System Implementation Plan.

Factors to Consider in Selecting Outputs

Consideration should be given to complexity of the application or enhancement, staff and consultant resources, budget issues, maintenance, and post implementation review needs when selecting which outputs are needed for a project.

The additional blank lines allowed for each Phase are for any additional outputs that are not listed here, but are required for the project

Checklist as A Guide to Documentation

The completed Checklist is a guide to the documentation Project Managers have selected for the project. Those who have used the SDLCS in the past recommend maintaining a project notebook to hold all documentation pertaining to the System Development Life Cycle Standards, starting with the Checklist.

I. TO BE COMPLETED BEFORE DEVELOPMENT

1. PRELIMINARY PLAN

	Step	Outputs	Use? (Y/N/NA)
1.1	Conduct feasibility/ risk analysis studies	1.1.1 Feasibility and Risk Analysis	_____
1.2	Develop preliminary project management plan	1.2.1 Preliminary Project Management Plan 1.2.2 Statement Of Scope* 1.2.3 Expenditure Plan 1.2.4 Staffing Plan*	_____ _____ _____ _____
1.3	Conduct preliminary business process improvement analysis	1.3.1 Preliminary Business Process Improvement Document	_____
1.4	Identify hardware/ software/ communications options	1.4.1 Viable Hardware/ Software/ Communications Options	_____
1.5	Project initiation	1.5.1 Communication with Sponsoring Agency and Information Technology Senior Staff* 1.5.2 Initial Project Briefings for Participants* 1.5.3 Initial Project Meeting for Project Team Participants*	_____ _____ _____

Reasons for the Preliminary Plan Outputs Not Selected:

2. DEFINE REQUIREMENTS

	Step	Outputs	Use? (Y/N/NA)
2.1	Identify existing business functions and included processes	2.1.1 Existing Business Process and/or Workflow Model*	_____
2.2	Identify desired business functions including processes	2.2.1 Business Process Redesign (BPR) Document*	_____
2.3	Identify data and conversion requirements (inputs)	2.3.1 Conceptual Data Model	_____
2.4	Evaluate product	2.4.1 Product Evaluation*	_____
2.5	Identify technical architecture	2.5.1 Proposed Technical Architecture 2.5.2 Preliminary Systems Management Plan 2.5.3 Preliminary Network Infrastructure Plan	_____ _____ _____
2.6	Finalize project management plan	2.6.1 Final and Approved Project Management Plan*	_____
2.7	Compile requirements and document changes, with user approval	2.7.1 Signed Requirements Document* 2.7.2. Compilation of Requirement Changes Approved by User*	_____ _____
2.8	Acquire infrastructure resources needed for design and development	2.8.1 Design and Development Agreements/Notifications/Purchase Requisitions	_____

Reasons for the Outputs Not Selected:

3. DESIGN

	Step	Outputs	Use? (Y/N/NA)
3.1	Conduct process decomposition	3.1.1 Detailed Process Decomposition Document*	_____
3.2	Design logical data model	3.2.1 Logical Data Model and Data Definitions Document*	_____
3.3	Design physical data structure	3.3.1 Physical Data Design Document	_____
3.4	Design technical architecture	3.4.1 Technical Architecture Design Document. 3.4.2 Checklist for Technical Architecture Installation 3.4.3 Approved System Management Plan 3.4.4 Network Infrastructure Plan 3.4.5 Business Continuity Plan	_____ _____ _____ _____ _____
3.5	Confirm with user via system mock-up /prototype application	3.5.1 Confirmed Mock-Up/ Prototype*	_____
3.6	Design application components	3.6.1 Design Specifications	_____
3.7	Acquire acceptance, training and production infrastructure resources	3.7.1 Acceptance and Training Agreements/ Notifications/Purchase Requisitions*	_____
3.8	Verify technical architecture is in place and functioning	3.8.1 Completed Technical Architecture Checklist	_____

Reasons for the Outputs Not Selected:

4. DEVELOP

	Step	Outputs	Use? (Y/N/NA)
4.1	Create environments--networking, files, libraries, etc.	4.1.1 Operations Development Environment Checklist	_____
4.2	Develop each component	4.2.1 Completed (Coded) Module/Program, Linked Modules and Objects	_____
4.3	Perform quality assurance of code	4.3.1 Reviewed Code With Improvements or Efficiencies Identified	_____
4.4	Perform unit testing	4.4.1 Tested Program/Module/Business Object and Operational Network Components 4.4.2 Possible Ideas for Improvement to System	_____ _____

Reasons for the Outputs Not Selected:

5. TEST

To be used for all projects

	Step	Outputs	Use? (Y/N/NA)
5.1	Develop applicable test plans	5.1.1 Test Plan*	Yes
5.2	Perform applicable tests	5.2.1 Test Results Documentation*	Yes
5.3	Obtain user sign-off	5.3.1 Memorandum of Acceptance; Signed Change Request; Signed Migration Form*	Yes

6. IMPLEMENT

	Step	Outputs	Use? (Y/N/NA)
6.1	Plan production turnover	6.1.1 Production System Implementation Plan* 6.1.2 Operations' Documentation 6.1.3 User's Manual* 6.1.4 Systems Abstracts	_____ _____ _____
6.2	Develop training plan and materials, provide training	6.2.1 Training Plan* 6.2.2 Training Materials	_____
6.3	Perform system implementation and production turnover	6.3.1 Production Turnover Sign-Off Document* 6.3.2 Signed Service Level Agreement/Vendor Maintenance Agreement*	_____ _____

Reasons for the Outputs Not Selected:

II. TO BE USED AS NEEDED

Section 7 should all be used as necessary during the Support phase

7. SUPPORT

	Step	Outputs
7.1	Develop necessary documentation for application support	7.1.1 Documentation of Responsibilities, Procedures and Assignments for Application*
7.2	Provide technical/ functional/ helpdesk/ training assistance	7.2.1 Service Provided 7.2.2 Documentation Of Service
7.3	On-going maintenance support	7.3.1 On-Going Maintenance Support

III. DATES SHOULD BE SPECIFIED

Specify the dates you expect to complete the project (complete Output 6.3 Perform System Implementation And Production Turnover). Also, specify when you expect to begin the evaluation, two to three months after the completion of the project.

8. EVALUATE

	Step	Outputs	Planned Date
8.1	Accumulate documentation and put in order	8.1.1 Documentation Arranged According to SDLCS Checklist	_____
8.2	Ascertain whether project met objectives and requirements	8.2.1 Comparison of Project Scope and Requirements With Outcome and Customer Satisfaction*	_____
8.3	Compare actual to plan (time and budget)	8.3.1 Planned vs. Actual Comparison Document*	_____
8.4	Compare expected system performance with actual	8.4.1 Expected and Actual Performance Comparison Document*	_____
8.5	Evaluate system impact on business	8.5.1 Resources Comparison Document*	_____

	Step	Outputs	Planned Date
	processes and (customer) service delivery	8.5.2 Infrastructure Resources Comparison Document 8.5.3 Process Measures Comparison Document*	_____ _____
8.6	Evaluate adequacy of business continuity plans/ procedures	8.6. 1 Analysis Document of Adequacy of Business Continuity Plans/Procedures.	_____
8.7	Post –Implementation Review	8.7.1 Post Implementation Review Document*	_____

Section 8 Evaluation has been completed. We concur with the selection of outputs:

_____ **DATE** _____
 Branch Chief

_____ **DATE** _____
 DIT Division Director

_____ **DATE** _____
 User Agency Senior Staff Member

NOTES:

- PHASE:** 1. Preliminary Plan
- STEP:** 1.1 Conduct feasibility / risk analysis studies
- OUTPUT:** 1.1.1 Feasibility and Risk Analysis

PURPOSE

To evaluate the relative need, potential risks, and cost benefit of a proposed automated system, or a major upgrade of an existing system prior to any commitment of County resources. Infrastructure requirements need to be identified at the beginning of a project, especially for multi-tier and web-based solutions that may require substantial changes or additions. This analysis will include recommendations as to how the project can best be accomplished, whether using County staff for development or additional staff resources and whether a COTS solution should be considered. This document presents the recommended approach and evaluates and provides alternatives for potential operational risks to insure that the specific business objectives are met.

CONTENT

- **SUMMARY**—underlying operational problem, recommended solution, cost of implementing the solution, the major benefits expected, and the anticipated impact on existing resources.
- **PURPOSE**—brief description of the objectives of the study and of the activities undertaken.
- **BACKGROUND**—goals and objectives of the automation effort, anticipated major work activities, existing systems and present methods, and interrelationships with other agencies.
- **OPERATIONAL DEFICIENCIES AND LIMITATIONS**—description and analysis of problems which prevent efficient or effective accomplishment of agency goals/objectives.
- **RISKS**—assessment of risk, the consequences of which can have significant impact on planned schedules, functions, costs, quality, staff and continued business operations.
- **PRELIMINARY OPERATIONAL REQUIREMENTS SUMMARY**—of operational problem areas and requirements, present and anticipated future requirements and objectives, functions to be performed, performance attributes, hardware requirements, and special software requirements, IT staff and end-user training requirements, information security requirements, and high-level business continuity objectives. Make a determination as to whether the project can be accomplished with in-house resources or if an RFP or other contract mechanism needs to be used to acquire COTS or additional resources.
- **EVALUATION OF ALTERNATIVES**— description of information flow; cost to develop and operate; expected benefits; organizational and operational impacts, interfaces with other systems, resources, summary of cost and benefits for each alternative; and a review of similar projects to determine the feasibility of different options (i.e., small systems may not require the same level of planning effort).
- **RECOMMENDATION AND IMPLEMENTATION PLAN**— recommended alternative reasoning, suggested steps for implementation including consideration and cost of running parallel systems; coordination of resources and organizations, approval of recommendations by higher levels, dates and timeframes for various phases, necessary management actions to be taken to improve existing operations, accomplishment of actions which will result in improved operations.

RECOMMENDED TECHNIQUES AND TOOLS

- Form a matrix management/oversight team of appropriate representatives from DIT departments to ensure potential risks and costs are identified if multi-tier and web-based solutions are a possibility
- Reference the current Fairfax County Information Technology Plan <http://www.fairfaxcounty.gov/gov/dit/itplan.htm> and Computer System Abstracts documents for information on other systems
- Review and apply lessons learned from appropriate prior projects, from post implementation reviews or from interviews and visits to other jurisdictions with relevant experience

1.1.1 Feasibility and Risk Analysis, continued

- Release Requests For Information (RFIs) to ascertain the state-of-the-art solutions in the area of interest
- Review relevant RFPs (current and historical)
- Vendor demonstrations
- Visits to comparable jurisdictions with possible solutions
- Discussions with subject matter experts (SMEs) including consultants such as the Gartner Group, internet research
- Work flow analysis of business process

- PHASE:** 1. Preliminary Plan
- STEP:** 1.2 Develop preliminary project management plan
- OUTPUT:** 1.2.1 Preliminary Project Management Plan

PURPOSE

To provide a detailed guideline to be used for the development of all Information Technology applications and enhancements in which DIT is involved that will consume significant project resources. A smaller project will not require the same level of detail as a large, complex project; however, it is necessary that each project manager maintain some basic information.

CONTENT

- Executive Summary
- Introduction
 - Service Needs to be Addressed
 - Project Mission, Objectives and Quantifiable and Intangible Benefits
 - Identification of Customers and Stakeholders
 - Assumptions
 - Statement of Scope (*Reference Output 1.2.2 Statement of Scope and Objectives*)
- Project Organization and Responsibilities
- Work Breakdown Structure and Deliverables
- Milestones and Schedule
- Responsibility Assignment Matrix and Staffing Plan (*Also reference Output 1.2.4 Staffing Plan*)
- Cost Estimates and Project Budget/Expenditure Plan
- Risk Management
- Critical Success Factors
- Service Level Agreements (*Reference Phase 6, Samples 6.3.2a Service Level Agreement and b Vendor Maintenance Agreement*)
- Appendices
 - Expenditure Plan (*Also reference Output 1.2.3 Expenditure Plan*)
 - Project Charter
 - Communication Plan and Progress Reporting (Performance)
 - Change Control Procedures
 - Test Plan
 - Return on Investment
 - Lessons Learned

RECOMMENDED TECHNIQUES AND TOOLS

- Establish a Steering committee to review proposed technical and functional changes. See DIT Memo Number 16, Responsibilities and Functions of a Steering Committee
- Establish a Project Team to complete the various phases of the project, See 1.5.3 Initial Project Meeting for Project Team Participants
- Work Breakdown Structure and Deliverables
- Responsibility Assignment Matrix and Staffing Plan
- GANTT/PERT charts showing project critical paths

SAMPLE

- 1.2.1a. WBS Template, Work Breakdown Structure
- 1.2.1b. RAM, Responsibility Assignment Matrix and Staffing Plan
- 1.2.1c. GANTT Chart, GANTT/PERT charts showing project critical paths

Sample 1.2.1a.

Work Breakdown Structure (WBS) Template

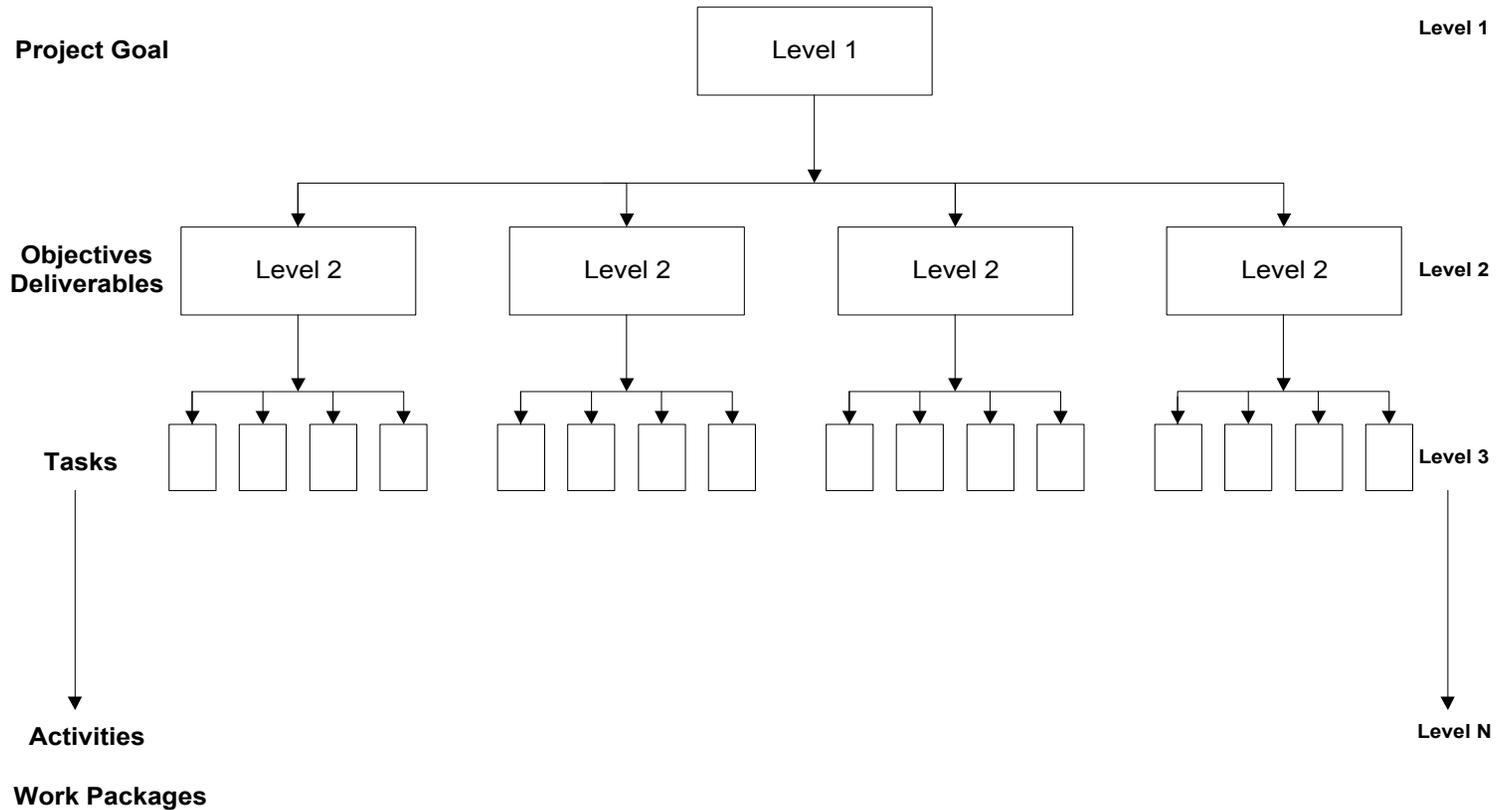
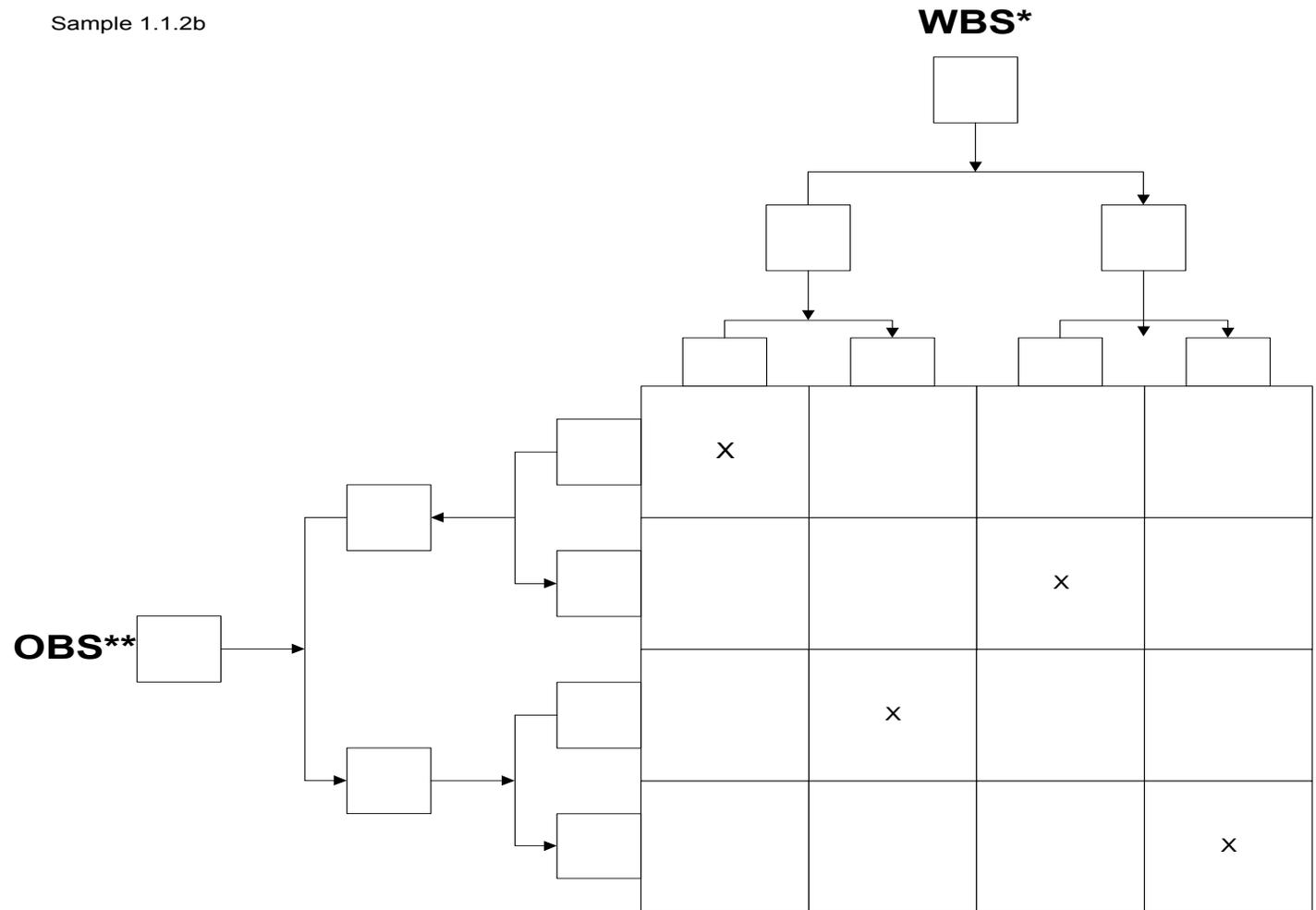


Chart Developed by: Tomorrow's Enterprise's
Managing a Successful Project Course

Responsibility Assignment Matrix (RAM)

Sample 1.1.2b



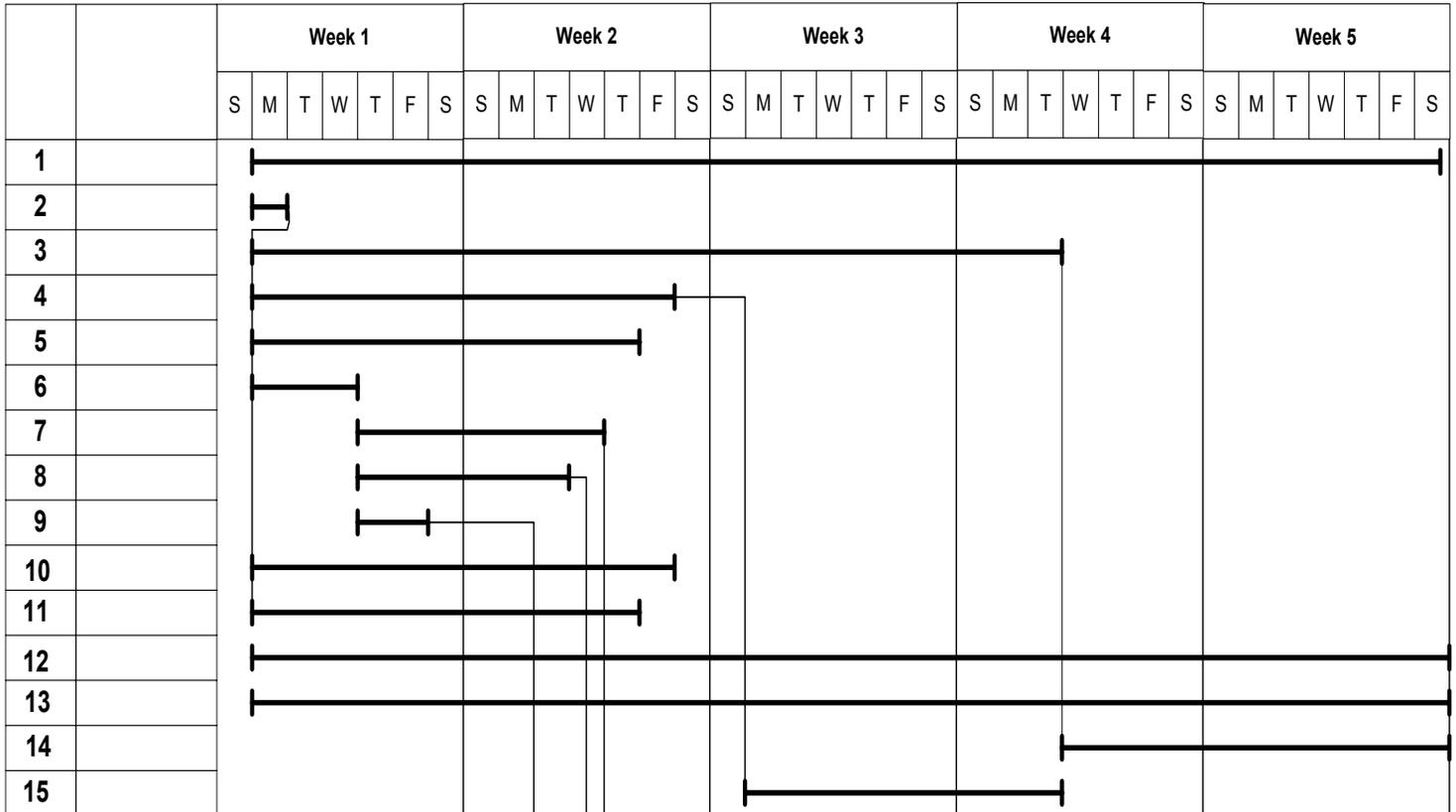
* Work Breakdown Structure

** Organizational Breakdown Structure

Chart Developed by: Tomorrow's Enterprise's
 Managing a Successful Project Course

Sample 1.2.1c

Gantt Chart



Tomorrow's Enterprise

Managing a Successful
 Project

- PHASE:** 1. Preliminary Plan
- STEP:** 1.2 Develop preliminary project management plan
- OUTPUT:** 1.2.2 Statement of Scope and Objectives

PURPOSE

To define the purpose and boundaries of the project and to delineate the tasks to be accomplished.

CONTENT

- Objectives of Project: A brief statement of what the project is to achieve and how the impact of the project will be measured.
- Scope: The mutually agreed upon boundaries (technical and functional) within which these objectives are to be met.
 - Considerations:
 - A COTS implementation potentially implies a change in County policies or procedures to incorporate best industry practices in the users' business. The results of a gap analysis comparing current business processes to those of the package can be used to identify which business processes will have to be revised, should the COTS solution be implemented.
 - Business user's expectations of a COTS solution must be defined as to whether the business will change to meet the data collection and procedural requirements of the COTS, or whether a custom-developed system needs to be pursued.
 - If the project is deemed to be either multi-tiered or web-based, the scope should include technical considerations for implementing these more complex architectures. Required interfaces to the new system, whether existing or planned, should also be included within the project scope.
- Agreement from the major stakeholders (including end-users and contractors) as to what will be accomplished by the project—all groups are dependent on complete and accurate product specifications and must approve the document to ensure it meets their needs.
- Steering committee approval of objectives and scope, if applicable.

RECOMMENDED TECHNIQUES AND TOOLS

Establish a Steering Committee to review proposed technical and functional changes. See DIT Memo No. 16, Responsibilities and Functions of an IT Project's Policy/Steering Committee.

- Sign-off from all customers and stakeholders to agree to statement of scope

- PHASE:** 1. Preliminary Plan
- STEP:** 1.2 Develop preliminary project management plan
- OUTPUT:** 1.2.3 Expenditure Plan

PURPOSE

To identify project expenditure plan, specify planned expenditures, and measure actual vs. budgeted for the fiscal year as project proceeds.

CONTENT

- Sum of the projected expenditures for equipment, training, software, hardware, licensing and maintenance agreements upgrades, and consulting.

RECOMMENDED TECHNIQUES AND TOOLS

- Spreadsheets
- Cost Estimation packages
- Annual DIT Project and Expenditure Plan Memorandum
- DIT Memorandum No. 10, Fund 104 Project Technical and Fiscal Management Tracking

SAMPLE

- Reference: Annual DIT Project and Expenditure Plan Memorandum

- PHASE:** 1. Preliminary Plan
- STEP:** 1.2 Develop preliminary project management plan
- OUTPUT:** 1.2.4 Staffing Plan

PURPOSE

To identify necessary staffing resources to complete the project, to allocate resources to tasks, and to identify potential short falls and additional staffing requirements.

CONTENT

- Account for the following items to plan properly for staffing resources:
 - Staffing ramp-up and staffing roll-off.
 - Up-front investment to ensure completed project requirements.
 - Potential impact of multi-tiered and web-based solutions on staffing requirements.
 - Development of prototyping.
 - Training in order to achieve full productivity, to include potential impact of multi-tiered and web-based solutions on training.
 - Identify and match skills to assigned tasks (DIT, agency, contractor).
 - Supporting project processes, including documentation and implementing performance measures.
 - Vacations and holidays.
 - Interference from activities outside new project.
 - Project staff performing multiple activities in parallel with more than one supervisor.
 - Should staff be assigned to the project full time, identifying who will undertake some of their regular duties for the duration of the project.
- Identify County staffing requirements (Staff Year Equivalent) Costs.
- Contractor staffing requirements and costs.

RECOMMENDED TECHNIQUES AND TOOLS

First build a schedule-constrained plan, then transition to a resource-constrained plan:

- Identify activities, their owners, and their dependencies.
- Add a rough cut at what the duration for each activity might be.
- Debug plan, making sure that all activities are properly linked with one another.
- Carefully factor in the impact of staffing on each activity.
- Make sure that the duration of each of the activities is achievable based on the skills of the available staff.
- Plan and build in contingency buffers across all activities of a project.

- PHASE:** 1. Preliminary Plan
- STEP:** 1.3 Conduct preliminary business process improvement analysis
- OUTPUT:** 1.3.1 Preliminary Business Process Improvement Document

PURPOSE

A high-level analysis (a more detailed analysis is conducted in Output 2.2.1 Business Process Redesign (BPR) Document) to analyze the potential for business process efficiency improvements prior to automating current processes. The goal of this analysis is to improve system performance and customer service by reducing or eliminating redundant tasks, improving workflow processes, and streamlining the new system processes. An added benefit to conducting this high-level analysis in the preliminary planning phase is the opportunity to communicate these findings to potential vendors who would respond to a Request for Proposal, if submitted.

CONTENT

- Preliminary vendor research (Internet, IT Consultants, Technical periodicals).
- Preliminary vendor demos and/or site visits to learn about new industry trends, etc. (Verify with Purchasing that no violations will be incurred in conducting these site visits and demos.)
- A high-level workflow analysis of the current business processes to identify process bottlenecks, gaps, work-arounds and potential simple solutions.
- A high-level “**current-view**” analysis of the **existing** processes (including function/process decomposition and/or process mapping) to identify all critical processes and illuminate areas of redundancy.
- A high-level “**to-be view**” analysis of the **desired** processes, identifying areas where functions could be combined or otherwise made more efficient.
- A high-level data analysis to map functions to data and identify types, sources, and ownership of data.
- Identify the potential impact of laws and regulations on existing and desired business processes.
- In the case of a Commercial-Off-the-Shelf (COTS) implementation, a thorough business process improvement (BPI) analysis is likely to be completed after a particular package is selected, so that the package’s “best industry practices” may be incorporated.

RECOMMENDED TECHNIQUES AND TOOLS

- Workflow Analysis Tools (CASE Tools)
- Business Process Improvement analysis tools (CASE Tools)
- Joint Requirements Definition Meetings to Identify System Requirements
- Data Analysis tools (CASE Tools)
- Object-Oriented Analysis Tools

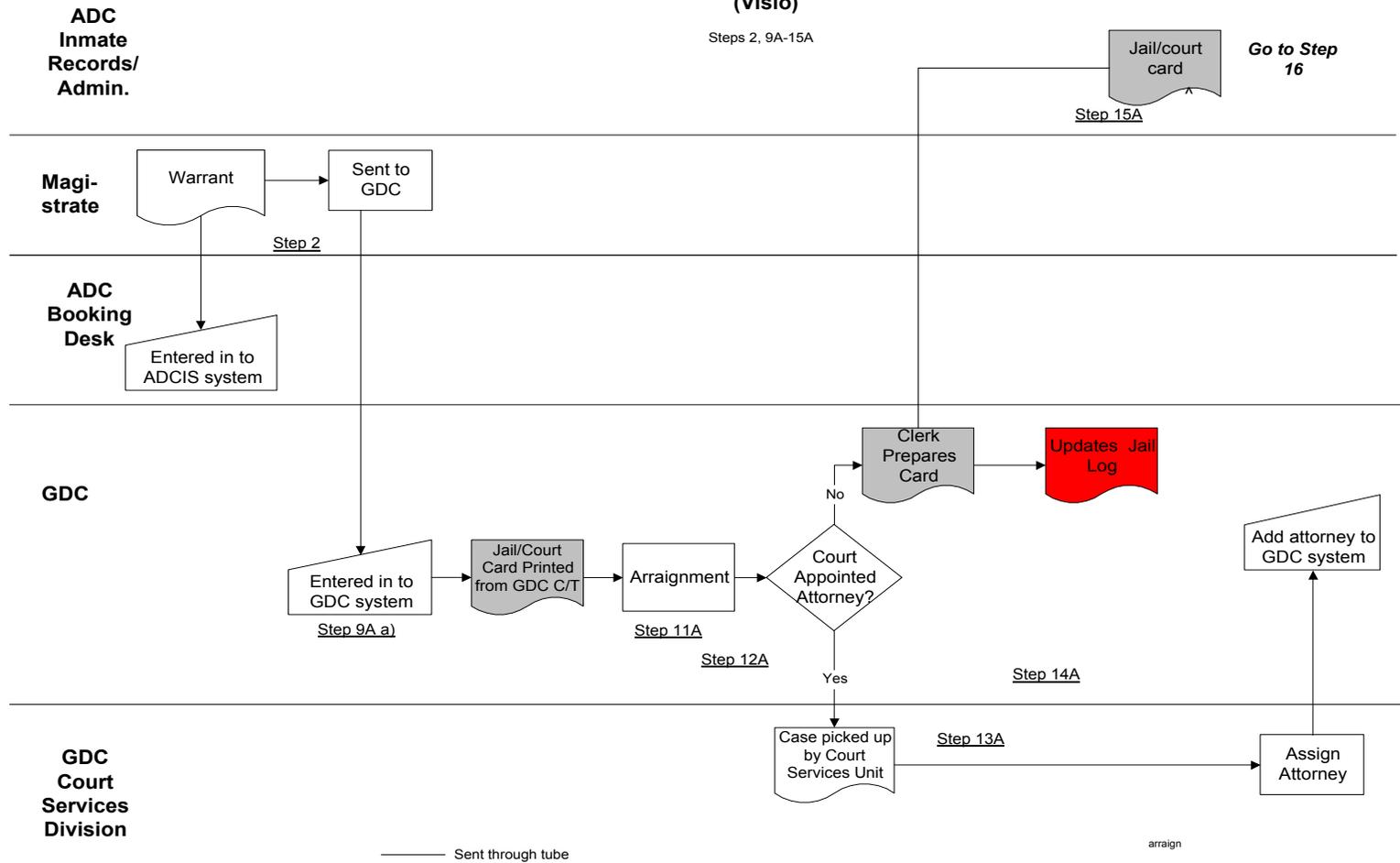
SAMPLE

- 1.3.1a. Jail/Court Card—Arrestment, As Is: High-Level Workflow Process Model
- 1.3.1b. Proposed Integrated Tax Administration System, High-Level Business Process Model
- 1.3.1c. ‘To Be’ Integrated System Data, High-Level Business Data Model
- 1.3.1d. System Requirements Spreadsheet, System Requirements Spreadsheet

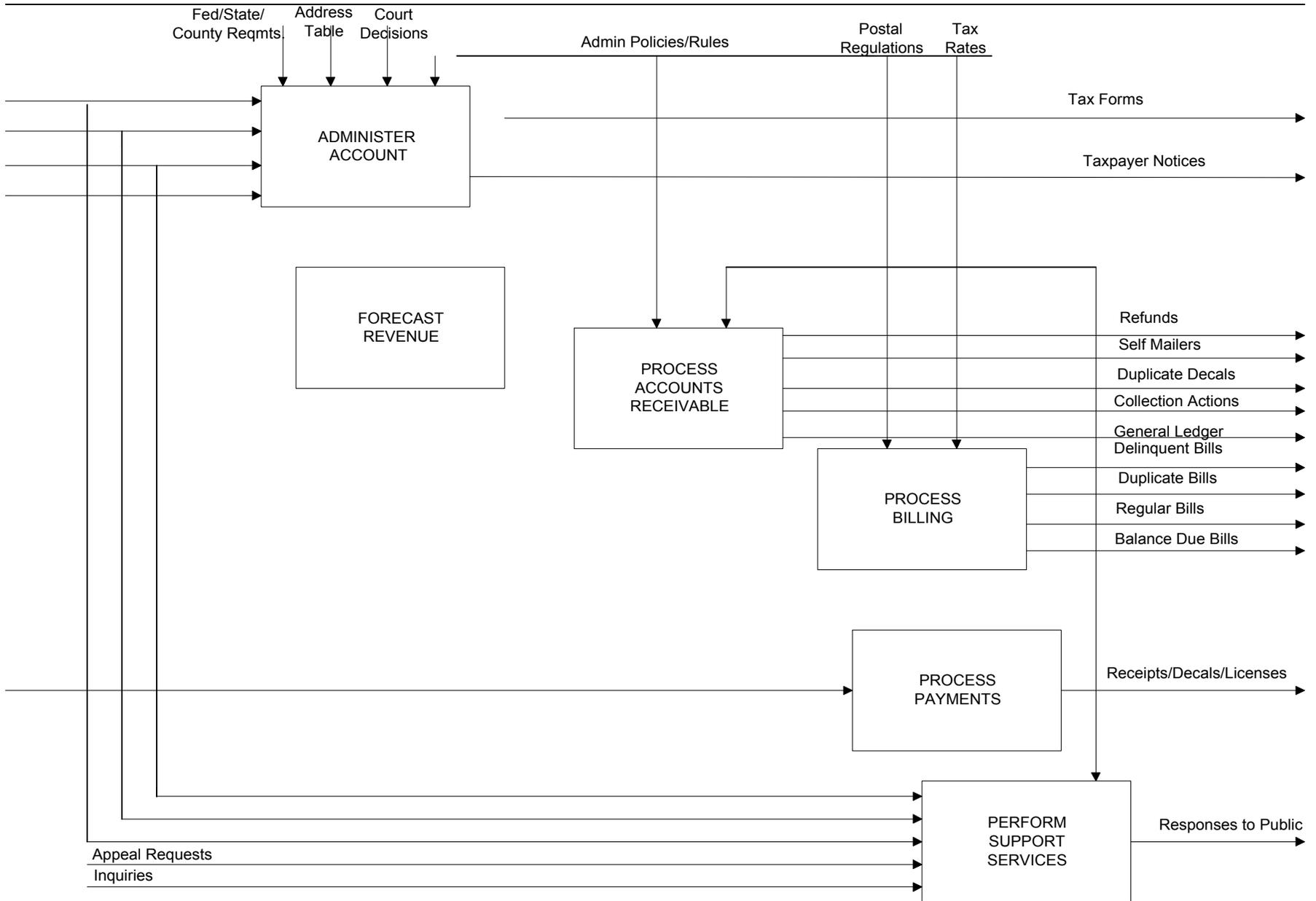
Sample 1.3.1a

As Is: Jail/Court Card--Arraignment (Visio)

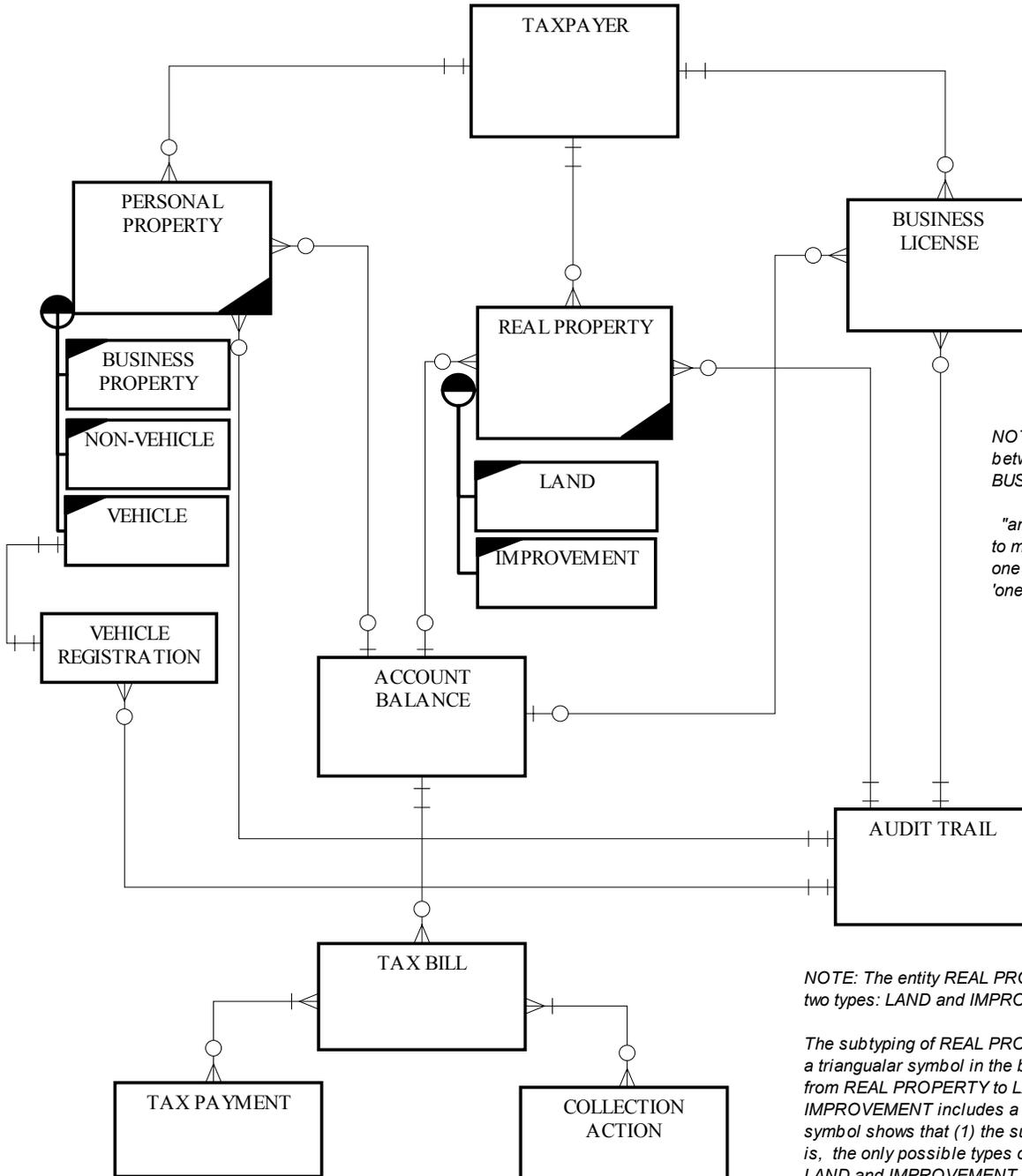
Steps 2, 9A-15A



· Sample 1.3.1b High-Level Business Process Model; Tax System



**1.3.1c High-level Business Data Model
"To-be Integrated Tax System"**



NOTE: The relationship line drawn between entities TAXPAYOR and BUSINESS LICENSE is read as:

"any one TAXPAYOR holds 'zero to many' BUSINESS LICENSEs; any one BUSINESS LICENSE is held by 'one and only one' TAXPAYOR".

NOTE: The entity REAL PROPERTY is subset into two types: LAND and IMPROVEMENT.

The subtyping of REAL PROPERTY is illustrated by a triangular symbol in the bottom corner. The line from REAL PROPERTY to LAND and IMPROVEMENT includes a half-filled circle: this symbol shows that (1) the subtype is 'covering' -- that is, the only possible types of REAL PROPERTY are LAND and IMPROVEMENT and (2) the subtype is non-partitioned -- that is, an instance of REAL PROPERTY can be either LAND or IMPROVEMENT or both.

Sample 1.3.1d System Requirements Spreadsheet

REAL ESTATE ADMINISTRATION		Offeror:			RFP#:
SPECIFICATIONS		REQ/ OPT	AVAIL Y/N	MO/ D/ HRS	TOOLS PARTIAL OR EXCEED COMMENTS
1	Account Maintenance				
2	Add, change, update parcel information online	R			
3	Edit map reference numbers on parcels.	R			
4	Maintain property legal description.	R			
5	Store edited code values/ text descriptions.	R			
6	Subdivision codes with text descriptions.	R			
7	Land use codes with text descriptions.	R			
8	Zoning codes with text descriptions.	R			
9	Neighborhood codes.	R			
10	School district codes and names.	R			
11	Appraisal unit groupings.	R			
12	Appraisal element groupings.	R			
13	Other geographic identifiers.	O			
14	Tenant names for non-owner occupied.	R			
15	Storage of Floor Area Ratio (FLAR).	R			
16	Storage of LEA (leasable area).	R			
17	Access data by index information.	R			
18	Search by common taxpayer identifier.	O			
19	Search by taxpayer name.	R			
20	Search by taxpayer street address.	O			
21	Search by property location (situs).	R			
22	Provide ‘walk down street’ capability.	R			
23	Search by account number.	O			

- PHASE:** 1. Preliminary Plan
- STEP:** 1.4 Identify hardware / software / communications options
- OUTPUT:** 1.4.1 Viable Hardware / Software / Communications Options

PURPOSE

Conduct preliminary review of options to identify potential hardware, software and communications protocols and products for consideration as part of the technical architecture. Review must include consideration of which solutions (including Commercial Off-the-Shelf [COTS], multi-tiered and web-based alternatives), may be viable options for meeting projected business and technical requirements as well as compliance with County IT Standards. Identify products for further consideration and a more detailed evaluation in Requirements Phase, Step 2.4 Evaluate Product.

CONTENT

- Introduction: Summary of business requirements, preliminary technical architecture and technical specifications for preliminary platform.
- Evaluation (grading) criteria
- Description of each product under consideration, its major components and functionality.
- Preliminary evaluation of product's ability to meet business requirements.
- Preliminary evaluation of product's impact on existing business processes.
- Preliminary evaluation of product's ability to meet technical requirements and comply with current County standards, and its impact on County network resources.
- Summary of results, products not selected, and recommendations for further evaluation.

RECOMMENDED TECHNIQUES AND TOOLS

- Site visits and preliminary/high-level vendor demonstrations are recommended to ensure state-of-the-art knowledge **prior to developing requirements**. Check with Department of Purchasing and Supply Management to ensure these demonstrations or their timing, do not violate regulations.
- Review of literature from vendor and non-vendor sources (trade publications, Gartner Group) to identify business and market trends and potential solutions
- Consultation with County IT staff.
- Consultation with other jurisdictions or organizations using the product
- Benchmark tests
- Request for Information (RFI)

- PHASE:** 1. Preliminary Plan
- STEP:** 1.5 Project initiation
- OUTPUT:** 1.5.1 Communication with Sponsoring Agency and Information Technology Senior Staff

PURPOSE

To ensure senior management of the user agencies, DIT, and other relevant players (if appropriate) are familiar with the project. Steering Committee members should also be briefed on the preliminary project plan, scope of the project, and any major issues regarding the project.

CONTENT

Brief all relevant players:

- DIT management
- User management
- County Management, if applicable
- Contractor Management, if applicable
- Other interested parties, if applicable e.g. interested and involved citizens' groups, Boards, Authorities and Commissions

Identify each phase of the preliminary project plan, including scope, time frames, and, if known, resource constraints, limitations and risks. The presentation will include the range of state of the art potential IT solutions and what the options are, and cover the constraints of the sponsoring agencies.

RECOMMENDED TECHNIQUES AND TOOLS

- Graphical Presentation Tools

- PHASE:** 1. Preliminary Plan
- STEP:** 1.5 Project initiation
- OUTPUT:** 1.5.2 Initial Project Briefings for Participants

PURPOSE

To ensure all staff participants, including the Project Team are familiar with the project and the preliminary project plan.

CONTENT

Brief all relevant players

- All DIT staff who will be working on any aspect of the project, including members of the Technology Infrastructure Division, the Information Security Office, the Business Systems Division and/or the Enterprise Systems Division.
- Contractor staff (if applicable)
- Business staff including business team members and those who will be asked to participate in the requirements and design phases.
- Other staff critical to the success of the project
- Topics to be covered may include
 - Project overview: objectives and scope
 - Project plan: major tasks and schedule

RECOMMENDED TECHNIQUES AND TOOLS

- Presentation packages for large audiences

- PHASE:** 1. Preliminary Plan
- STEP:** 1.5 Project initiation
- OUTPUT:** 1.5.3 Initial Project Meeting for Project Team Participants

PURPOSE

To reach agreement on the roles, communication, and issue resolution strategy for the Project Team.

CONTENT

Project team roles are identified and agreed-upon. Participants to agree upon how project information will be communicated and by whom. If there is any confusion or disagreement as to what the project constitutes, these issues must be resolved before continuing with the project. It is critical that the scope of the project is clearly identified, agreed-upon, and communicated to project team members

- Topics to be covered may include
 - Participant roles and responsibilities
 - Communication strategy
 - Issue resolution strategy

RECOMMENDED TECHNIQUES

- Team building and issue identification and resolution techniques such as brainstorming, the Group Decision Support Center

- PHASE:** 2. Define Requirements
- STEP:** 2.1 Identify existing business functions and included processes
- OUTPUT:** 2.1.1 Existing Business Process and/or Workflow Model

PURPOSE

Using as a foundation the results from the high-level analysis conducted in Step 1.3 Conduct Preliminary Business Process Improvement Analysis, document current manual and automated business functions and processes to serve as a basis/reference for subsequent tasks. End-users, management, and technical staff should participate in process identification. This process also serves as a foundation for writing system requirements as many current processes will need to be performed in the new system. However, how these processes are performed may well change over the life of the project.

CONTENT

Some of the following should be selected:

- List/description/graphical depiction of current manual and automated business processes, as identified by current and/or potential end-users.
- Functional Decomposition Model.
- Current workflow process diagram showing process relationships.
- Constraints and opportunities.
- Existing business outputs including:
 - Forms, reports, screens
 - List, description, and sample of each existing business output
 - List of performance measures, on-line response time, batch throughput, and volumes.
- Interface Document including sources and targets, conversion criteria, frequency, data subsets including performance measurements.

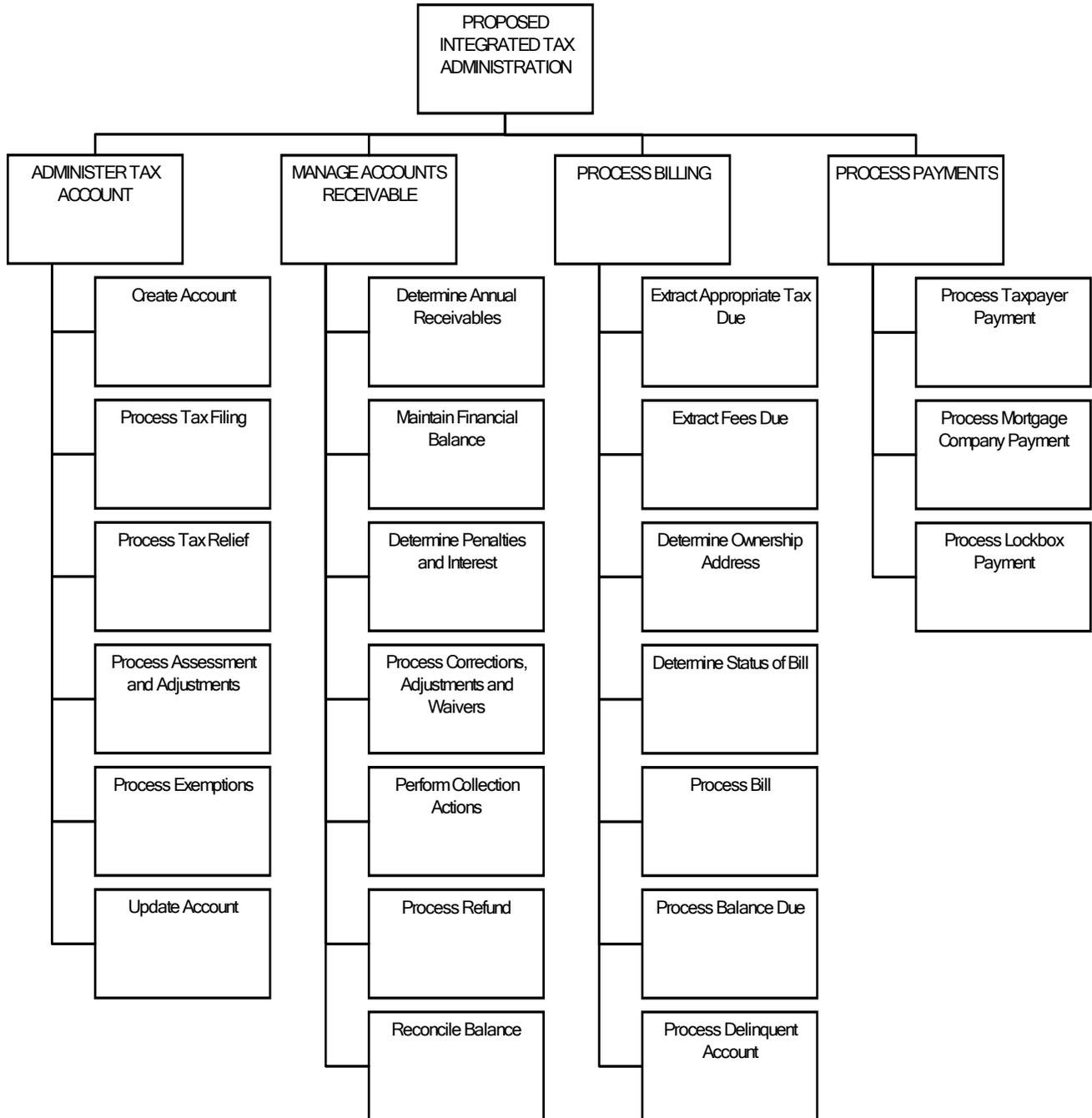
RECOMMENDED TECHNIQUES AND TOOLS

- Flowcharting tools
- Process modeling tools
- Facilitated sessions
- Spreadsheets
- Graphical presentation tools
- Screen prototyping tools
- Charts

SAMPLE

- 2.1.1a. Functional Decomposition Model, Process Model

**2.1.1a Sample:
 Functional Decomposition
 (tool used: CoolBiz 5.0)**



- PHASE:** 2. Define Requirements
- STEP:** 2.2 Identify desired business functions including processes.
- OUTPUT:** 2.2.1 Business Process Redesign (BPR) Document

PURPOSE

- Document desired manual and automated business functions and processes as a roadmap for system implementation and improving manual processes. These will be identified by customers and stakeholders, including end users, management, technical and training staff.
- Identify and document factors that impact and determine the approach of remaining project phases (including constraints and opportunities that need to be considered in various phases of the life cycle), with appropriate evaluation and recommendations.
- Ensure legal and mandated constraints are included if necessary.
- Identify interfaces to other systems and functional areas as well as changes to business policies and procedures so the scope of project is clear.

CONTENT

Involving customers and stakeholders, management, technical and training staff, identify:

- ‘To-Be’ Workflow Process Diagram showing process relationships
- ‘To-Be’ Functional Decomposition (breakdown), including system and other performance measures
- Model of new system
- List of typical users, (See 1.2.1, Preliminary Project Management Plan) and desired skills
- List of legally and other mandated constraints and opportunities
- Design issues at local and remote sites
- External and internal constraints (i.e., regulatory, information security and policy issues)
- System (or Functional) Requirements Spreadsheet
- Required business outputs to achieve objectives of system, including:
 - Forms, reports, screens
 - Medium preferred by end-users for reviewing output
 - List, description, and sample of each required business output
 - List of performance measures, on-line response time, batch throughput, and volumes
 - Preliminary estimate of retention (i.e., archival/purge processes including regulatory constraints, statute of limitations issues)
- Internal and External Interface Requirements including source, target, conversion criteria, frequency, data subsets, and system performance requirements
- List of assumptions and constraints, for example:
 - Management direction – COTS versus custom development, client/server versus mainframe platform versus internet application

RECOMMENDED TECHNIQUES AND TOOLS

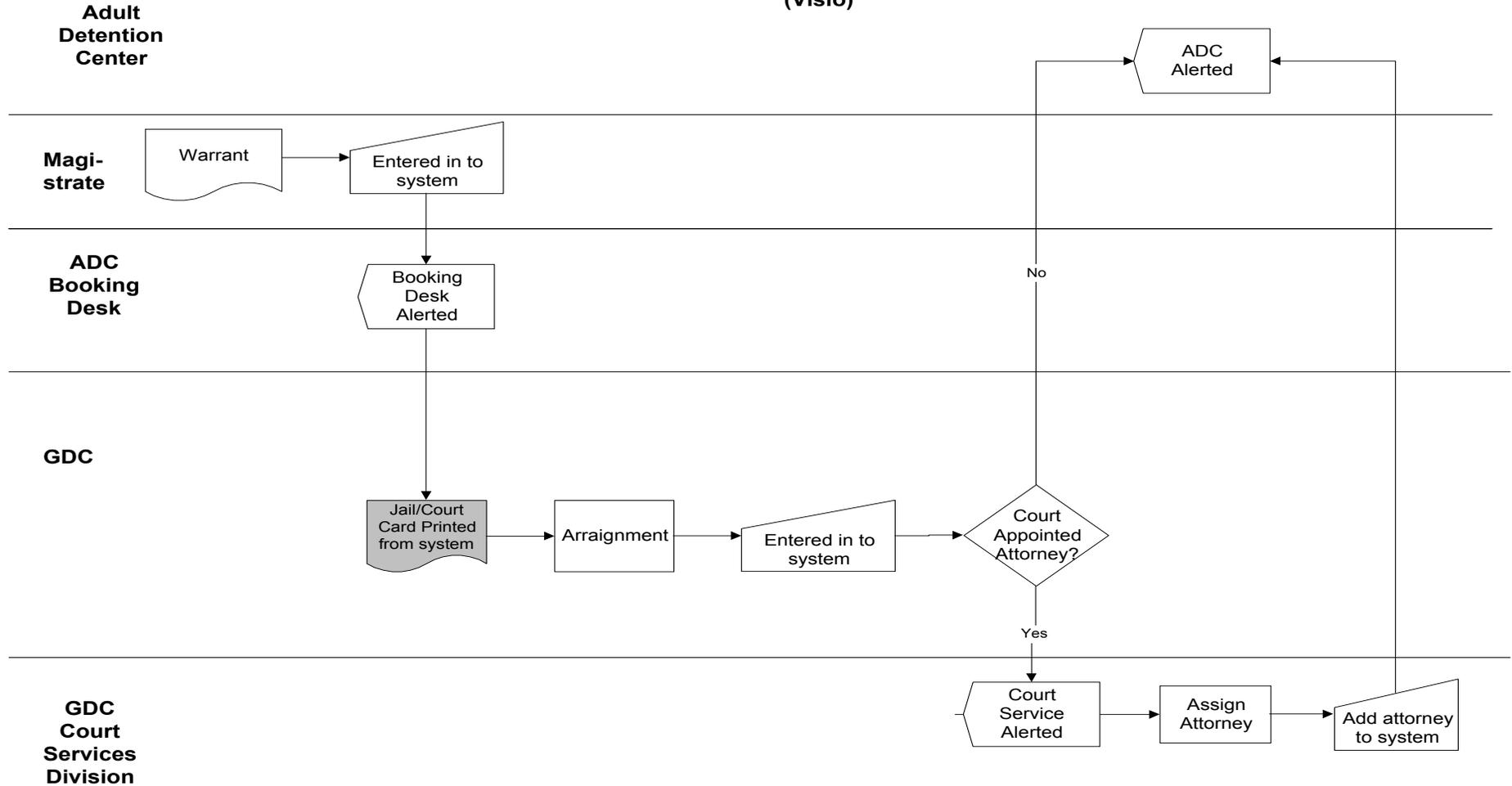
- Flowcharting tools
- Process modeling tools
- Facilitated sessions
- Spreadsheet and charting packages
- Screen prototyping tools
- Graphical presentation tools

SAMPLE

- 2.2.1a. Jail/Court Card—Arrestment, To Be: High-Level Workflow Process Model
- 2.2.1b. System Requirements Spreadsheet

Sample 2.2.1a

To Be:
Information Distribution--Arraignment
(Visio)



Sample 2.2.1b System Requirements Spreadsheet

REAL ESTATE ADMINISTRATION		Offeror:			RFP#:
		REQ/ OPT	AVAIL Y/N	MO/ D/ HRS	TOOLS PARTIAL OR EXCEED COMMENTS
SPECIFICATIONS					
1	Account Maintenance				
2	Add, change, update parcel information online	R			
3	Edit map reference numbers on parcels.	R			
4	Maintain property legal description.	R			
5	Store edited code values/ text descriptions.	R			
6	Subdivision codes with text descriptions.	R			
7	Land use codes with text descriptions.	R			
8	Zoning codes with text descriptions.	R			
9	Neighborhood codes.	R			
10	School district codes and names.	R			
11	Appraisal unit groupings.	R			
12	Appraisal element groupings.	R			
13	Other geographic identifiers.	O			
14	Tenant names for non-owner occupied.	R			
15	Storage of Floor Area Ratio (FLAR).	R			
16	Storage of LEA (leasable area).	R			
17	Access data by index information.	R			
18	Search by common taxpayer identifier.	O			
19	Search by taxpayer name.	R			
20	Search by taxpayer street address.	O			
21	Search by property location (situs).	R			
22	Provide 'walk down street' capability.	R			
23	Search by account number.	O			

- PHASE:** 2. Define Requirements
- STEP:** 2.3 Identify data and conversion requirements (inputs)
- OUTPUT:** 2.3.1 Conceptual Data Model

PURPOSE

Identify data required by the business of the user. Provide the basis for identifying detailed data requirements, interfaces, data conversion and information security requirements.

Commercial-Off-The-Shelf (COTS) packages include an established database [design]. However, unique data requirements should be identified for potential incorporation in to the COTS database. Depending on the complexity of these data requirements, a substantial modification of the COTS data model may be required and could impact the selection of a particular COTS solution.

CONTENT:

- Conceptual data model of proposed new system:
 - High-level entity relationship model.
 - Business area diagrams.
 - Identification of the relationship between core business entities and associated information.
 - Identification of data flow.
- List of current data sources and potential future sources of data.
- Sample data elements.

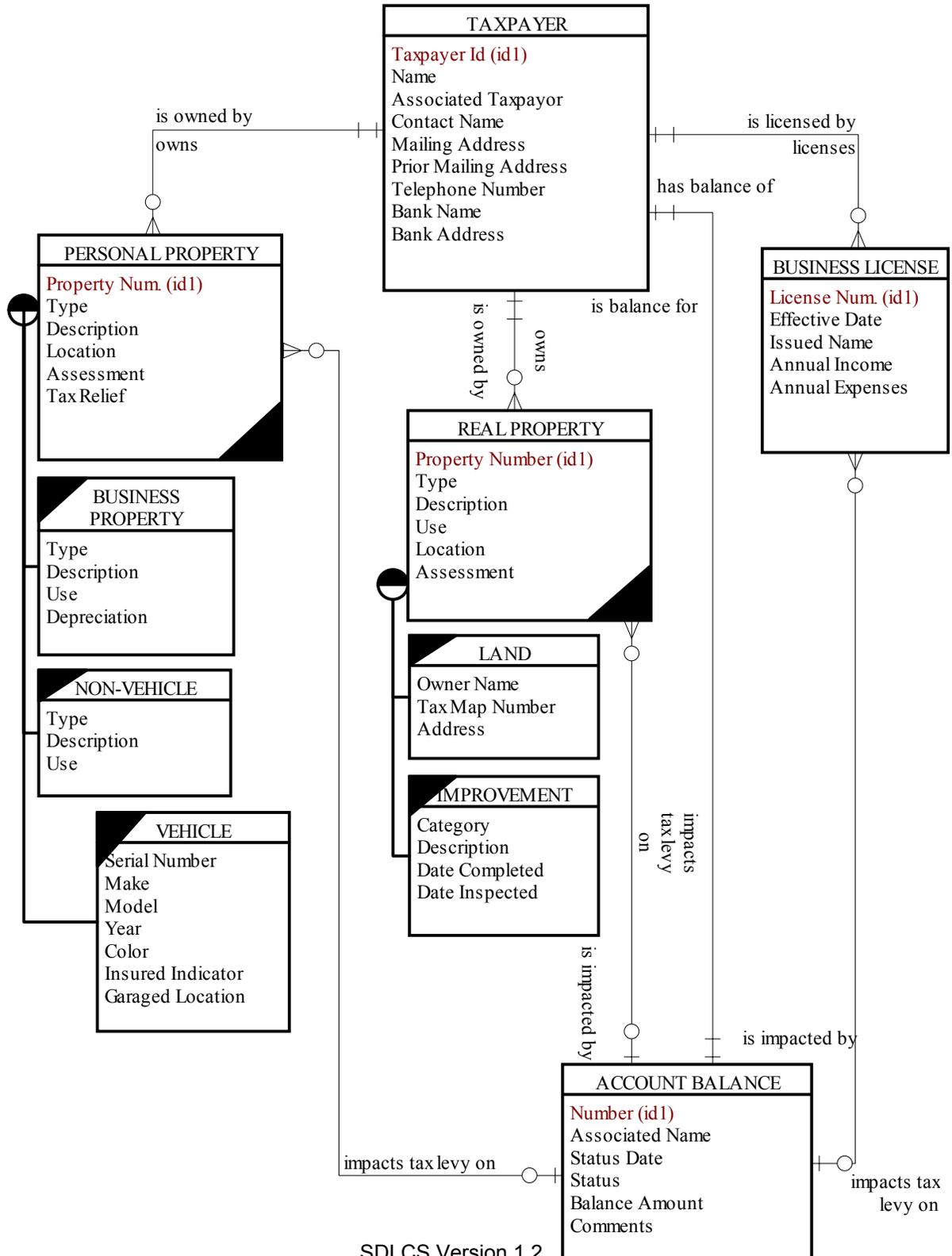
RECOMMENDED TECHNIQUES AND TOOLS:

- Graphical tools
- Spreadsheets
- Tables
- Word processing packages

SAMPLE:

- 2.3.1a Conceptual Data Model

2.3.1a Conceptual Data Model



PHASE: 2. Define Requirements

STEP: 2.4 Evaluate product

OUTPUT: 2.4.1 Product Evaluation

PURPOSE

Conduct a detailed evaluation of a hardware, software or communications product under consideration as a technical solution. Determine the extent to which the product meets functional requirements, technical requirements and applicable standards. Determine reasonableness and feasibility of its place in the overall solution. Finally, identify implementation issues and constraints, their impact on the project and an orderly transition from the current environment. The resulting evaluation should provide documentation for decision making.

Notes:

This step is a continuation, at a more detailed level, of the work completed in the Planning Phase (Step 1.4 - 'Identify Hardware, Software and Communications Options'), during which potential technical alternatives are first identified and reviewed. The step may be part of an RFI (Request For Information) to ascertain the state-of-the-art solutions in the area of interest, or RFP process.

CONTENT

Introduction: Summary of requirements and brief description of product

- Summary of business requirements and issues
- Summary of technical requirements, current environment and constraints
- Brief description of product being evaluated, its components and implementation requirements.

Approach to product evaluation

- Basis for criteria
- Description of methods used to evaluate product
- Scope and extent of evaluation.

Product evaluation criteria and results

- Fulfillment of business and functional needs
- Level of customization required to meet business needs
- Impact on existing business processes
- Applicability to technical environment, and adherence to standards, including technical architecture
- Impact on County network resources (i.e., speed, bandwidth, disk space, archival space)
- Satisfactory performance
- Ability and ease in implementing information security requirements
- Availability and track-record of product
- Track-record and references of vendor
- Availability of technical support for implementation and maintenance
- User training and support required and available for implementation and on-going production
- Implementation costs, including licensing and on-going maintenance costs.

Summary of results and final recommendation

- Summary of major findings
- Recommendation and rationale
- Implementation issues and required resources.

PHASE: 2. Define Requirements
STEP: 2.5 Identify technical architecture
OUTPUT: 2.5.1 Proposed Technical Architecture

PURPOSE

Provide information for planning the budget, procurement, installation of communications, hardware and software, training, and support associated with the proposed technical architecture. Ensure architecture is compatible with the County's technical architecture, including components (platform, hardware/software, communication) and associated performance measures.

CONTENT

- Possible constraints and issues, including human, financial, technology, time, and hardware/software compatibility.
- Proposed technical architecture platform (hardware, software, operating system, and network communications software).
- Internet/Intranet components.
- Interfaces with other systems.

RECOMMENDED TECHNIQUES AND TOOLS

- Diagrams
- Results from vendor demonstrations and benchmarking.
- Technical architecture information from Fairfax County IT Plan <http://www.fairfaxcounty.gov/gov/dit/itplan.htm>

PHASE: 2. Define Requirements
STEP: 2.5 Identify technical architecture
OUTPUT: 2 5.2 Preliminary Systems Management Plan

PURPOSE

To provide a mechanism for the review of the acquisition, development, implementation and subsequent support of the proposed architecture to ensure that it is in compliance with Fairfax County technical architecture. Those taking part in the review are the Chief Architect, Web Chief Architect, Enterprise Operations Center Manager, Information Technology Security Manager, and Technical Infrastructure Division. This plan is updated as necessary in Step 3.4, and not all elements are necessary for each project.

CONTENT

A sign-off document indicating approval by the Chief Architect, Information Technology Security Manager and Network Computing, Enterprise Operations Center Manager and Customer Services Division approval to continue with the project as proposed.

Preliminary estimates of the following:

Subject	Contents
Configuration Management	Reporting; Inventory; Software License Control; Modeling; Contingency
Performance Management	Capacity Considerations, Including Storage Requirements; Reporting; Service Level Monitoring; Configuration Considerations; Modeling
Information Security Management	Authentication; Access Control; Information Security Policy Implementation; Physical Access/Location Control
Asset Management	Inventory; Book Value, etc.; Book Life; Depreciation Periods/Date of Purchase; Location
Data Management	Backup/Restore; Archive; Purge, Contingency; Disaster Recovery; Data Maintenance (reorganization); Storage Requirements; Reporting
Change Management	Software Distribution (incl. Virus Control); Data Distribution; Business Impact Analysis; Capacity/Configuration Considerations; Version Control (incl. Roll Forward; Roll Backward; Coordination; Reporting).
Workload Management	Scheduling; Priority; Monitoring resources; Business Policy Implementation
Output Management	Report Distribution; Report Format and Media; Reprint Capability; Archival Capability
Problem Management	Help Desk; Change Management Tracking; Diagnosis/Resolution; Reporting/Logging System; Escalation Policies; Impact Analysis (Services); Reporting
Account Management	Reporting; Budget/Transfers
Support and Problem Resolution Management Responsibilities	Identifying potential support requirements and assignment of responsibilities for systems developed in-house as well as, for vendor supported products, the formation of a problem resolution management team

RECOMMENDED TECHNIQUES AND TOOLS

- Presentations
- Graphics packages
- Word processing packages
- Help desk software problem change management tools

- Asset/inventory management tools

PHASE: 2. Define Requirements
STEP: 2.5 Identify technical architecture
OUTPUT: 2.5.3 Preliminary Network Infrastructure Plan

PURPOSE:

To provide a preliminary plan to govern the design, selection, installation and support for the hardware and software components of the data communication architecture. This plan is updated as necessary in Step 3.4 Design Technical Architecture

CONTENT

The preliminary plan should be presented with both text description and graphics, and should include:

- Summary of proposed network architecture, including statement of adherence to County standards.
- Description of proposed network components: devices, media (fiber optics, copper, wireless, etc.).
- Identification of supported protocols (TCP/IP, IPX, and SNA).
- Identification of external entities and resources (organizations, servers, etc.).
- Proposed processes for management of network bandwidth.
- Proposed processes, guidelines and resource assignments for network disaster recovery including operations connection and emergency generator requirements.

RECOMMENDED TECHNIQUES AND TOOLS

- Estimated traffic volumes (existing vs. proposed).
- Estimated response-time criteria.
- Proposed protocol to be used.
- Estimated bandwidth requirements.
- Proposed user-interface.
- Proposed data-flow and transmission (LAN vs. WAN).
- Preliminary security requirements (internal vs. external).
- Preliminary determination if site is mission critical.
- Proposed device requirements: location, number, characteristics, etc.
- Proposed network considerations: location, structure, etc.
- Estimate of cabling needs.
- Proposed wire closet layout.
- Proposed applicable County standards.
- Proposed refinements.
- Preliminary vendor sign-off on plan.
- Plan emergency power backup (UPS and/or emergency generator).

- PHASE:** 2. Define Requirements
- STEP:** 2.6 Finalize project management plan
- OUTPUT:** 2.6.1 Final and Approved Project Management Plan

PURPOSE

To provide a finalized project plan and baseline for what will be done, by when, and with what resources (including schedule and budget) for ensuring the requirements are met for the development of all Information Technology Projects. A smaller project will not require the same level of detail as a large, complex project; however, it is necessary that each project manager maintain the project's basic information.

CONTENT

- **Executive Summary**
- **Introduction**
 - Service Need to be Addressed
 - Project Mission and Objectives and Quantifiable and Intangible Benefits
 - Customers and Stakeholders
 - Assumptions
 - Statement of Scope and Objectives (*Reference Output 1.2.2*)
- **Project Organization and Responsibilities**
- **Work Breakdown Structure and Deliverables**
- **Milestones and Schedule**
- **Responsibility Assignment Matrix and Staffing Plan** (*Also reference Output 2.6.1b*)
- **Cost Estimates and Project Budget**
- **Risk Management**
- **Critical Success Factors**
- **Service Level Agreements** (*Reference 6.3.2 Signed Service Level Agreement and Vendor Maintenance Agreement*)
- **Appendices**
 - Expenditure Plan (*Also reference Output 1.2.3*)
 - Project Charter
 - Training Plan
 - Communication Plan and Progress Reporting (Performance)
 - Change Control Procedures, (*including Requirements Change Control*)
 - Test Plan
 - Return on Investment
 - Lessons Learned

RECOMMENDED TECHNIQUES AND TOOLS

- Establish a Steering committee to review proposed technical and functional changes.
- Establish a Project Team to complete the various phases of the project.
- Work Breakdown Structure and Deliverables
- Responsibility Assignment Matrix and Staffing Plan
- GANTT/PERT charts showing project critical paths
- Training Plan

SAMPLE

- 2.6.1a. WBS Template, Work Breakdown Structure and Deliverables
- 2.6.1b. Responsibility Assignment Matrix, Staffing Plan 1.2.4
- 2.6.1c. GANTT Chart, GANTT/PERT charts showing project critical paths

2.6.1a Work Breakdown Structure (WBS) Template

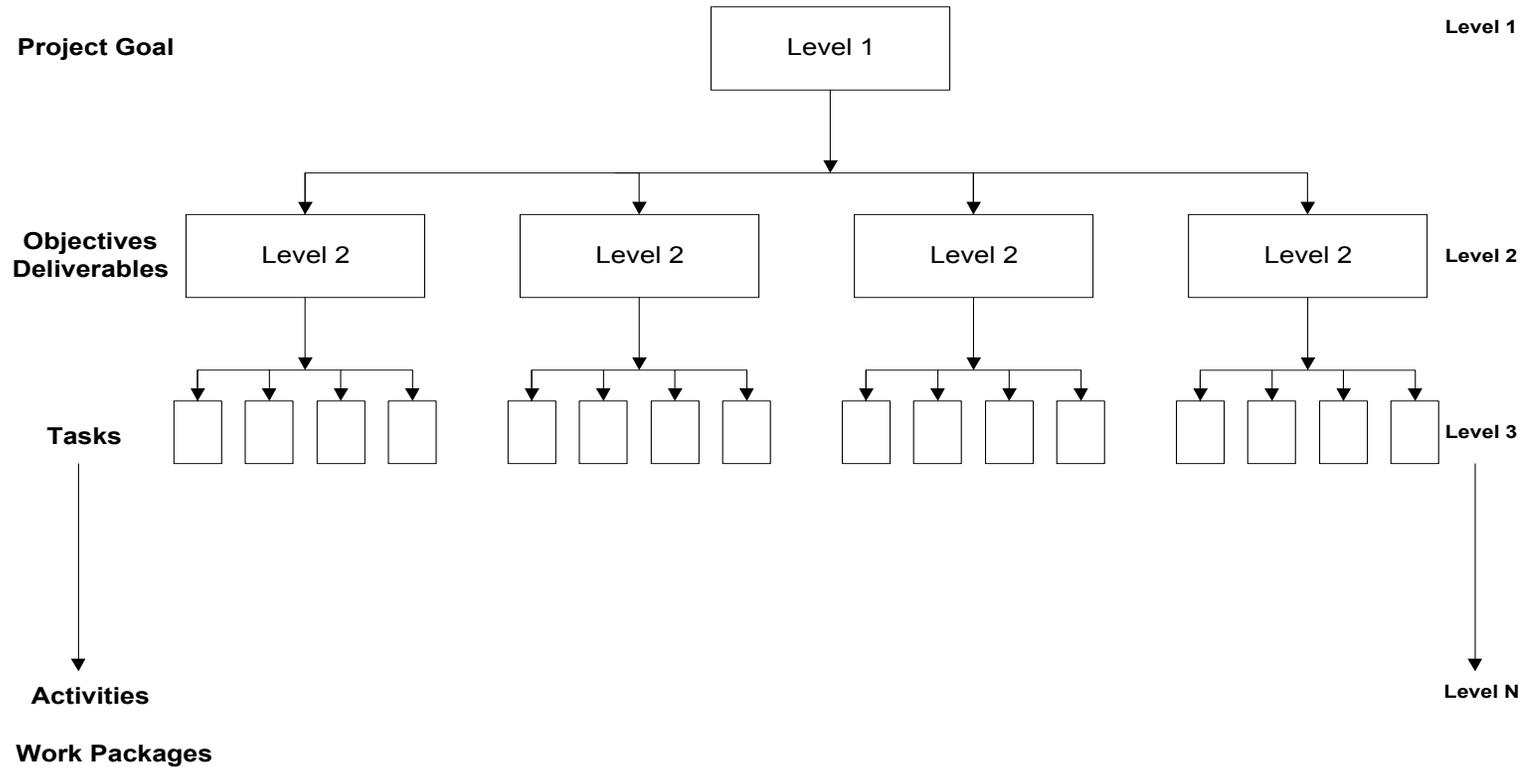


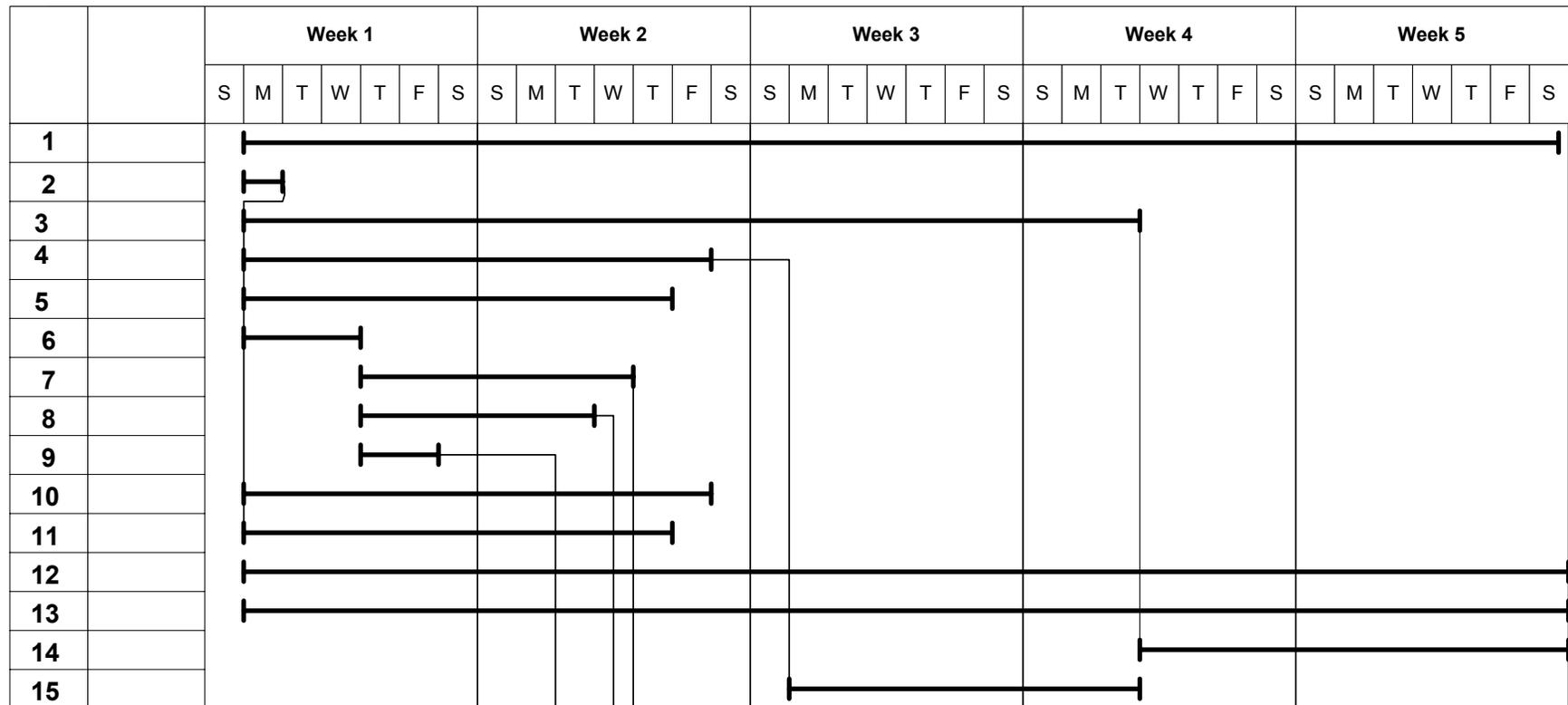
Chart Developed by: Tomorrow's Enterprise's Managing
a Successful Project Course

Sample 2.6.1b. Responsibility Assignment Matrix (RAM)

The Responsibility Assignment Matrix (RAM), shown on the next page, is a structure which relates the project organization structure (as shown in the Organizational Breakdown Structure, OBS) to the Work Breakdown Structure (WBS) to ensure that each element of the project's scope of work is assigned to an individual.

The OBS shows the organization and anticipated positions that will work on parts, or all of the projects. The Organizational Breakdown Structure should be arranged so as to relate work packages to organizational units.

2.6.1c Gantt Chart



- PHASE:** 2. Define Requirements
- STEP:** 2.7 Compile requirements and document changes with user approval
- OUTPUT:** 2.7.1 Signed Requirements Document

PURPOSE

To develop the requirements (document or contract) and ensure the appropriate stakeholders' concurrence and approval.

CONTENT

The requirements document contains requirements definition issues, assumptions, design requirements, technical architecture, interfaces, data requirements, information security requirements, process changes, training requirements, and business products (including hardware, software, communications, interfaces, and system performance). Appropriate users and stakeholders will sign the requirements document indicating their concurrence.

The measures of the current system, should be documented here to provide a basis for measuring the impact of the new system in 8.7 Post Implementation Review. If the processes are manual, current measures should also be taken.

RECOMMENDED TECHNIQUES AND TOOLS

- Word processing
- Impact of System--As-Is Measures

SAMPLE

2.7.1a Impact of System--As-Is Measures

Impact of System--As-Is Measures

<u>Requirement</u>	As Is	After Implementation
Time to respond to constituents' requests	Time to respond to request__	Time to respond to request__
Accuracy of information given to constituents	Survey to constituents showed _____ errors per response	Survey to constituents showed _____ errors per response
Ability to sort and analyze citizen inquiries	____ Yes/No	____ Yes/No
Number of hours per week per site spent by County staff in user support	__ hours	__ hours

PHASE: 2. Define Requirements

STEP: 2.7 Compile requirements and document changes with user approval

OUTPUT: 2.7.2 Compilation of Requirement Changes Approved by User

PURPOSE

To maintain the requirements, track changes and ensure the appropriate stakeholders' concurrence and approval.

CONTENT

Documented changes to requirements. Appropriate users and stakeholders will sign the revised and dated requirements document indicating their concurrence.

All changes to requirements after approval of the original requirements document, must be documented and tracked in the County's approved requirements tracking systems.

RECOMMENDED TECHNIQUES AND TOOLS

- Word processing
- Requirements Tracking
- DIT Memo No. 9, Change Management

- PHASE:** 2. Define Requirements
- STEP:** 2.8 Acquire infrastructure resources needed for design and development
- OUTPUT:** 2.8.1 Design and Development Agreements/Notifications/Purchase Requisitions

PURPOSE

To work with appropriate DIT Divisions and/or other County agencies to make the necessary project purchases for design and development. These may include: hardware/software, network connection requests, drive space (storage) requests, staffing (to include contracting), training, and data space and physical space in accordance with the guidelines and schedule developed for the project.

CONTENT

- Project Expenditure Plan.
- Documented notification and coordination with appropriate DIT Divisions.
- Preliminary DIT EOC Equipment Registration Form
<http://infoweb/dit/tid/eoc/forms/eocequipmentform.xls>
- Purchase requisition documents, if applicable.

RECOMMENDED TECHNIQUES AND TOOLS

- Coordination with DMB, DPSM, and DIT procurement staff using Service Level Agreements (See 6.3.2a Service Level Agreement, if necessary)
- RFP, IFB, vendor quotes
- Spreadsheets
- DIT Memorandum No. 2 (Procurement Procedures)

PHASE:	3. Design
STEP:	3.1 Conduct process decomposition
OUTPUT:	3.1.1 Detailed Process Decomposition Document

PURPOSE

The Detailed Process Decomposition Model presents all processes and component sub-processes that will be automated by the proposed application; the processes being included may be a sub-set of the overall business model. The Process/Data Interaction Model presents the relationships between the processes and data in terms of create/read/update/delete (CRUD) actions. These two models serve as an input to the detailed application design. The updated Process Definitions Document provides complete business definitions of all processes being included in the proposed system. It is a reference for designers in understanding the work associated with each process and in designing the proposed application functionality.

CONTENT

(a) Detailed Process Decomposition Model

- Identify the business area or sub-set being modeled.
- Identify the highest-level business function and place it at the top level of the decomposition hierarchy.
- Decompose this function into its component processes, sub-processes and elementary level processes.
- Identify all elementary processes being included in the proposed system design (i.e., those processes being automated).
- Define the logic for each discreet event.

(b) Process/Data Interaction Model

- Identify the processes included in the model.
- Identify the data included.
- Identify all create, read, update and delete (CRUD) actions of each process on the data.

(c) Process Definition Document

- Name each process using business terms.
- Define each process using business terms; process definitions should describe the work being accomplished by the process.

RECOMMENDED TECHNIQUES AND TOOLS

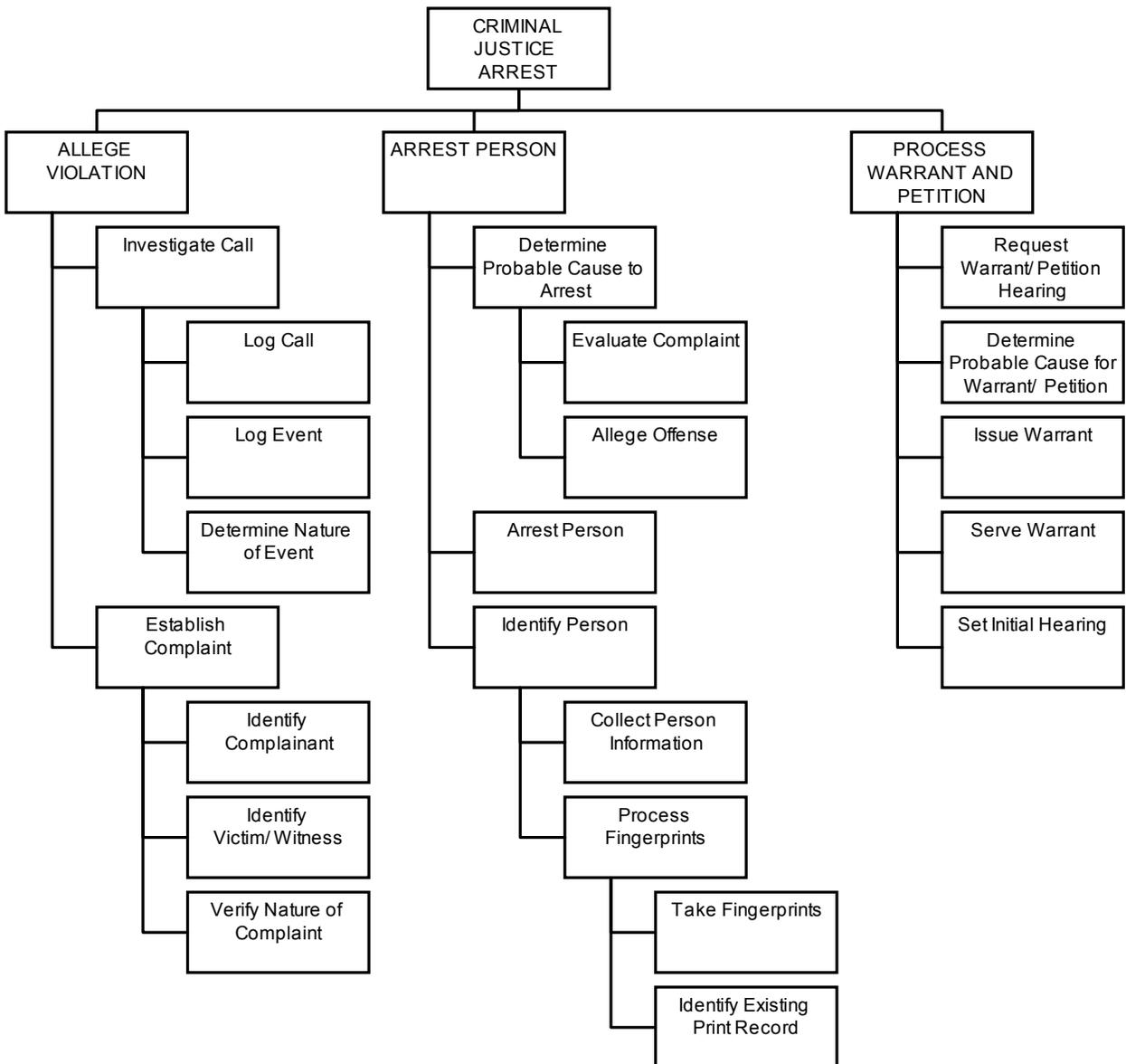
- Review applicable outputs from the Requirements Definition phase, including outputs: 2.1.1 Existing Business Process and/or Workflow Models, 2.2.1 Business Process Redesign (BPR) Document, and 2.3.1 Conceptual Data Model.
- Analyze processes to determine their impact on data (create/read/update/delete) by referencing current systems, proposed workflow, business improvement recommendations and related business documentation.
- Check for processes which have no associations to data (possibly not meaningful work) and for multiple processes doing the same work (possibly redundant).
- Check for data that have no associated process actions (possibly not useful).
- Use business modeling software (CASE tools).

SAMPLE

- 3.1.1a Detailed Process Decomposition Model
- 3.1.1b Process/Data Interaction Model
- 3.1.1c Process Definitions Document

3.1.1a SAMPLE DETAILED PROCESS
DECOMPOSITION MODEL

Criminal Justice Arrest Processing
September 1998



SAMPLE

3.1.1b SAMPLE PROCESS/DATA INTERACTION MODEL

	CALL	EVENT	COMPLAINT	PERSON	ROLE	CHARGE	ARREST
Log Call	create						
Log Event	read	create					
Determine Nature of Event		read	create				
Identify Complainant				create	create		
Identify Victim/Witness				create	create		
Verify Nature of Event		update					
Evaluate Complaint			update				
Allege Offense			read	read	read	create	
Arrest Person				read			create
Collect Person Information				update			
Take Fingerprints				update			
Identify Existing Arrest Record							read

SAMPLE

3.1.1c PROCESS DEFINITIONS DOCUMENT

Process: Make Complaint

Definition: A person's appearing before a magistrate and requesting that an arrest warrant be issued against a person regarding a specific incident.

This process is a sub-process of the function ALLEGE VIOLATION.

Comments: Complaint is defined as a formal written accusation made by any person, often a prosecutor, and filed in a court, alleging that a specified person has committed a specific offense.

Process: Set Bond

Definition: Determining the terms of a bond, including the bond amount for an alleged offender by examining certain facts about the alleged offense, including its nature and circumstances, the prior record if any of the offender, and his financial and social situation; the bond may be set by a judge or a magistrate.

This process is a sub-process of the function BOND ADMINISTRATION.

Comments: 5/2/96 The purpose of setting a bond is to ensure that the individual for whom the bond is set appears in court as required. A bond remains in effect until the matter involved is resolved.
7/2/96 There may be an appeal with the court of appeals; may not be able to set a date initially.

Bond is defined as the posting by a person accused of a crime, or his or her surety, of a written promise to pay a specified sum, secured or unsecured, ordered by a judicial officer, as a condition of bail to assure performance of terms contained in the recognizance.

Process: Review Bond Decision

Definition: Evaluating additional information regarding a bond that has been set for an offender; to alter the terms of the bond or to reaffirm the bond, as ordered by a judge.

This process is a sub-process of the function BOND ADMINISTRATION.

-
- PHASE:** 3. Design
- STEP:** 3.2 Design logical data model
- OUTPUT:** 3.2.1 Logical Data Model and Data Definitions Document

PURPOSE

The **Logical Data Model** presents the detailed data requirements for the proposed system or enhancements to an existing system. This model serves as the blueprint for physical database design.

The **Data Definitions Document** provides definitions of all data attributes comprising the Logical Data Model. It serves as the basis for the proposed system's Data Dictionary.

CONTENT

(a) Logical Data Model

- Identify the business area being modeled.
- Identify all data entities necessary to support the business area and proposed system functionality.
- Identify all relationships between entities and the corresponding constraints on cardinality (minimum/maximum number of possible occurrences of the relationship).
- Identify all business attributes for each entity.
- Identify attributes necessary for system administration and system processing.
- Identify attribute data types and cardinality.
- Identify proposed primary keys and other candidate keys (for possible use as indices).

(b) Data Definition Document

- Name each data entity and its attributes using clear business terms.
- Define each entity and attribute using business terms; definitions should clearly state the data each entity and attribute represents to the organization.
- Identify domains (value sets) and other constraints on the attributes.

RECOMMENDED TECHNIQUES AND TOOLS

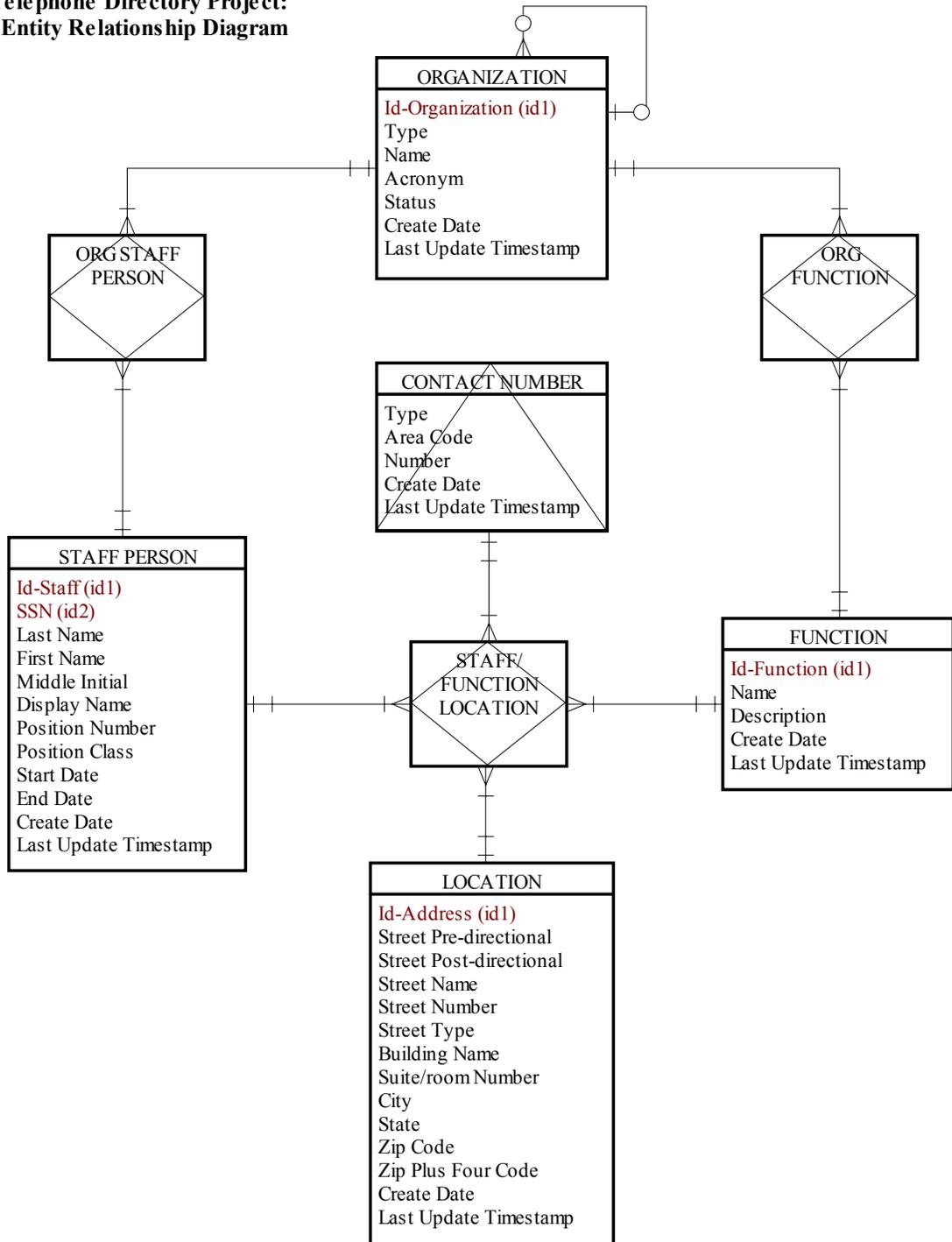
- Review applicable outputs from the Requirements Definition phase, including 2.3.1 Conceptual Data Model.
- Review detailed data contained in existing systems and their associated files, business forms and reports and related business information sources.
- Normalize data to third normal form (or higher): eliminate repeating groups of attributes, redundant attributes and attributes not dependent on the entity's primary key.
- The Logical Model should, at this point, be independent of a physical implementation.
- Entity and attribute names should be consistent and should adhere to applicable standards.
- Domains should be based on business standards where possible.
- Use business modeling software (CASE tools).

SAMPLE

- 3.2.1a Logical Data Model
- 3.2.1b Data Definitions Document

Sample 3.2.1a Logical Data Model

**Telephone Directory Project:
 Entity Relationship Diagram**



SAMPLE 3.2.1a Logical Data Model (continued)

Entity: ORGANIZATION			
	Attributes	Data Type	Primary Key Constraints
Id-Organization	CHAR (5)	min/max: 1-1	
Name	VARCHAR	min/max: 1-1	
Acronym	CHAR (8)	min/max: 0-1	
Code	NUM (4)	min/max: 0-1	
Type	CHAR (5)	min/max: 1-1	Domain: FXCNTY FXCITY FCCITY PRIVNP PRIVPR
Insert Date	DATE/TIME STAMP		

Sample 3.2.1b DATA DEFINITIONS DOCUMENT

Entity: FEE PAYER INVOICE

FEE PAYER INVOICE is an itemized list that specifies the service provided, date of service and associated costs, which may include an outstanding or delinquent balance.

Entity: FEE SCHEDULE

FEE SCHEDULE is a set of comparison criteria, categories and individual rates (in dollar amounts) for a specific service and used to determine client fees.

Entity: FUNDING CATEGORY

FUNDING CATEGORY is a source of money allocated for a specific service delivery purpose or for a client eligibility group.

Attribute: ADDRESS Unit Number

ADDRESS Unit Number is an apartment, condominium or suite number at a given address.

Attribute: ASSESSED FEE Amount

ASSESSED FEE Amount is the monetary charge (in dollars) assessed for a specific business arrangement and based on the appropriate fee schedule.

Attribute: ARRANGEMENT LIST Confidentiality Indicator

ARRANGEMENT LIST Confidentiality Indicator indicates whether or not information about a particular checklist or checklist item is confidential or can be released.

Attribute: ARRANGEMENT LIST Status Type

ARRANGEMENT LIST Status Type indicates the status of the checklist or checklist item.

-
- PHASE:** 3. Design
- STEP:** 3.3 Design physical data structure
- OUTPUT:** 3.3.1 Physical Data Design Document

PURPOSE

The Physical Data Structure Design Document serves as the blueprint for building the application's database, data files and other database objects. It contains complete, detailed specifications for the physical data structure. The document includes initial storage requirements and predicted data growth. It also includes definition and edit information for all columns/fields. The Physical Data Structure Design Document is a principal component of the final system documentation and is critical to the on-going support of the database.

CONTENT

(a) Physical Data Structure Specifications (include name, description and version, if applicable) of all components:

- Application and the physical implementation environment (database management system, file manager, etc.).
- Tables, records, files, views and columns/fields.
- Primary keys, unique keys and foreign keys.
- Indexes.
- Other database objects (such as triggers and procedures).
- Referential integrity constraints.
- Other constraints (such as nulls, default values).
- Special table parameters (such as cache, parallel).
- Special considerations (such as clusters, index-only tables).
- External data interfaces.

(b) Predicted Storage Requirements

- Storage estimates for each table, file and index for the first year of operation.
- Predicted growth (generally, 2-5 years).

(c) Data Dictionary

- Complete business or systems definition of all columns/fields.
- Data edits, domains and domain values.

RECOMMENDED TECHNIQUES AND TOOLS

- Review Logical Data Model and Data Definitions Document from the Design Phase (Task 3.2).
- Review all screen and report design to analyze system performance against the database or files.
- De-normalize tables/records as necessary for system performance.
- Apply applicable DBMS standards and tuning principles, as necessary.
- Use business modeling software (CASE tools).

SAMPLE

3.3.1a Physical Data Structure Documentation and Estimated Table Size

Sample 3.3.1a Physical Data Structure Documentation and Estimated Table Size

```

TABLE: ABA_TABLE01

  ABA_SEQ_NUM          DECIMAL(10,0)      NOT NULL
  ABA_RUY_CTG_TYP     CHAR(12)          NOT NULL WITH DEFAULT
  ABA_RLI_SHRT_NME    CHAR(10)          NOT NULL WITH DEFAULT
  ABA_ABY_CTG_TYP     CHAR(25)          NOT NULL WITH DEFAULT
  ABA_ATY_PRPS_CDE    CHAR(4)           NOT NULL WITH DEFAULT
  ABA_REQ_OPT_CDE     CHAR(3)           NOT NULL WITH DEFAULT
  ABA_MULTI_IND       CHAR(1)           NOT NULL WITH DEFAULT
  ABA_ABY_CTG2_TYP    CHAR(25)          NOT NULL WITH DEFAULT

  PRIMARY KEY
    (ABA_SEQ_NUM)

  UNIQUE INDEX ABA_SEQ_NUM ON ABA_TABLE01
    (ABA_SEQ_NUM      ASC )

  ESTIMATED NUMBER OF ROWS (FIRST YEAR IN PRODUCTION):  125,000

TABLE: ABA_TABLE02

  AR1_ATY_PRPS_CDE    CHAR(4)          NOT NULL
  AR1_SEQ_NUM         DECIMAL(10,0)     NOT NULL
  AR1_ALT_ID1         CHAR(40)          NOT NULL WITH DEFAULT
  AR1_ALT_ID2         CHAR(16)          NOT NULL WITH DEFAULT
  AR1_ARNG_EXP_DTE    TIMESTAMP         NOT NULL WITH DEFAULT
  AR1_CNCUR_GRP_NUMC  CHAR(9)           NOT NULL WITH DEFAULT
  AR1_DUP_IND         CHAR(1)           NOT NULL WITH DEFAULT
  AR1_CUR_LCS_TYP     CHAR(32)          NOT NULL WITH DEFAULT
  AR1_EST_DTE         TIMESTAMP         NOT NULL WITH DEFAULT
  AR1_SH_IND          CHAR(1)           NOT NULL WITH DEFAULT
  AR1_VALID_CDE       CHAR(4)           NOT NULL WITH DEFAULT
  AR1_PROC_LCS_TYP    CHAR(20)          NOT NULL WITH DEFAULT
  AR1_UOT_CTG_TYP     CHAR(10)          NOT NULL WITH DEFAULT
  AR1_PRIOR_ALT_ID    CHAR(25)          NOT NULL WITH DEFAULT
  AR1_PRTY_NUM        DECIMAL(4,1)      NOT NULL WITH DEFAULT
  AR1_PEER_RVW_IND    CHAR(1)           NOT NULL WITH DEFAULT
  AR1_AQL_APPL        CHAR(20)          NOT NULL WITH DEFAULT
  AR1_CUR_LCS_DTE     TIMESTAMP         NOT NULL WITH DEFAULT
  AR1_SUB_CNT         DECIMAL(3,1)      NOT NULL WITH DEFAULT

  PRIMARY KEY
    (AR1_ATY_PRPS_CDE, AR1_SEQ_NUM)

  UNIQUE INDEX AR1_ARNG_ID ON ABA_TABLE02
    (AR1_ATY_PRPS_CDE  ASC,
     AR1_SEQ_NUM       ASC)

ALTER TABLE ABA_TABLE02
  FOREIGN KEY ABAXXX01
    (AR1_UOT_CTG_TYP)
  REFERENCES ABA_TABLE03
  ON DELETE CASCADE;

  ESTIMATED NUMBER OF ROWS (FIRST YEAR IN PRODUCTION):  500,000

  ...
  
```

PHASE: 3. Design
STEP: 3.4 Design technical architecture
OUTPUT: 3.4.1 Technical Architecture Design Document

PURPOSE

To finalize the architecture being used to support the business solution. To provide both overview and detailed information concerning how and what is needed to tie the pieces of the system together through hardware, software, network and procedures.

CONTENT

- Introduction/overview of the project that the architecture will be supporting
- System description including terms, diagrams of system hardware and software components
- Data Model/Data base description and reference to location for further information or provide information in an appendix. Include any information particular to this database such as the DBMS name and version, locking rules, commit points and data integrity (3.2.1)
- Full description of the communications between the platforms or components
- Specifications on the servers, mainframe, client PCs, and any additional hardware required such as external tape drives
- Description of the development tools used to build and maintain the automated system
- System scalability such as ease of upgrade, and maintenance
- System plans for version control for database and software
- Appendices to display configuration files, backup procedures and/or any special procedures used to create the system, such as gateway installs

RECOMMENDED TECHNIQUES AND TOOLS

Word processing

SAMPLE

3.4.1a Technical Architecture Design Document

Table of Contents

- Introduction
- System Overview
- System Description
 - Data Model; entities, attributes, repository
 - Database(s); product, locking, commit, integrity
 - Gateway communications; products, installation
 - Server(s); development, production, application, data, inter/intra net
 - Workstations: client, application developer
 - Application; platform, version control, synchronization
 - Integrated tools; word, access, rich text
 - Application Access; network, Data Administration, database
 - Scalability

PHASE: 3. Design
STEP: 3.4 Design technical architecture
OUTPUT: 3.4.2 Checklist for Technical Architecture Installation

PURPOSE

To plan for installation of the technical architecture approved for the automated system. Since all pieces of the architecture must be formally tested and used during development of the product, a list must be maintained to ensure the proper tasks are accomplished. The steps should include determining the product to be ordered, and installing the product in accordance with 3.4.1.

Technical Architecture Design Document

CONTENT

- List of hardware and software needed for the project
- Final DIT EOC Equipment Registration Form <http://infoweb/dit/tid/eoc/forms/eocequipmentform.xls>
- A sequential list of tasks that must take place to ensure the hardware/software arrives in an orderly fashion with dependencies taken into account
- Resource assignments to assign responsibility for tasks to specific individuals
- Include any coordination meetings concerning the decision to purchase or install items
- List the tasks to test the architecture in a “production like” environment with specific statements of what signifies a successful test

RECOMMENDED TECHNIQUES AND TOOLS

- Word processing
- Project management tool

SAMPLE

Sample 3.4.2a Checklist for Technical Architecture Verification

ID	Task Name	Duration	Start	Finish	Predecessors	Resource	March	April	May
							Mar	Apr	May
1	Determine ordering mechanism	1d	4/12/99	4/12/99		Joe Smith		Joe Smith	
2	Order hardware	1d	4/13/99	4/13/99	1	Joe Smith		Joe Smith	
3	Order software	1d	4/13/99	4/13/99	1	Joe Smith		Joe Smith	
4	Configure hardware	1d	5/26/99	5/26/99	2FS+6w	Jane Doe			
5	Load software	1d	6/10/99	6/10/99	4FS+10d	Bob Jones			
6	Request IP addresses	1d	5/12/99	5/12/99	2FS+4w	Joe Smith			Joe Sm
7	etc.....	1d	4/12/99	4/12/99					

PHASE: 3. Design
STEP: 3.4 Design technical architecture
OUTPUT: 3.4.3 Approved System Management Plan

PURPOSE

To ensure that system management issues such as configuration management, performance, information security, assets, data, change, workload, output, and problems are updated from Step 2.5 and are considered throughout the System Development Life cycle. Note: not all elements are necessary for any single project.

CONTENT

A sign-off document to record decisions pertaining to the following areas:

Subject	Contents
Configuration Management	Reporting; Inventory; Software License Control; Modeling; Contingency
Performance Management	Capacity Considerations, Including Storage Requirements; Reporting; Service Level Monitoring; Configuration Considerations; Modeling; Load Balancing; Database performance tuning
Information Security Management	Authentication; Access Control; Information Security Policy Implementation, Encryption Requirements; User Administration; Physical Access/Location Control
Asset Management	Inventory; Book Value, etc.; Book Life; Depreciation Periods/Date of Purchase; Location
Data Management	Backup/Restore; Archive; Purge; Contingency; Disaster Recovery; Data Maintenance (reorganization); Log maintenance; Storage requirements and adjustments; Reporting
Change Management	Software Distribution (incl. Virus Control); Data Distribution; Business Impact Analysis; Capacity/Configuration Considerations; Version Control (incl. Roll Forward; Roll Backward); Coordination; Reporting
Workload Management	Scheduling; Priority; Monitoring resources; Business Policy Implementation
Output Management	Report Distribution; Report Format and Medium; Reprint Capability; Archival Capability
Problem Management	Technical Support Center (TSC); Change Management Tracking; Diagnosis/Resolution; Reporting/ Logging System; Escalation Policies; Impact Analysis (Services); Reporting
Support and Problem Resolution Management Responsibilities	Identifying potential support requirements and assignment of responsibilities for systems developed in-house as well as, for vendor supported products, the formation of a problem resolution management team

RECOMMENDED TECHNIQUES AND TOOLS

Techniques:

- Security Risk/Vulnerability Assessments (manual and automated)
- Automated Security Risk Assessment and Vulnerability software
- Review of lessons learned

Tools:

- Access control software (mainframe and distributed platforms)
- Encryption applications
- Automated audit trails and inventory applications
- Disaster recovery packages
- Data backup and restore packages
- Internet Security scanner (County-owned)
- Help software

SAMPLE:

Sample 3.4.3a Approved System Management Plan

SECTION I: IDENTIFICATION

Date Of Plan:

Business Entity--Office/Agency/Activity

Business Entity Point Of Contact--Individual in the business entity that has approval/signature authority

DIT Point Of Contact--DIT Project Manger

Statement Of Project-- Business need being supported/expected functionality, etc.

Hardware Baseline Configuration--platform used, including all significant components.

Software Baseline Configuration--Operating System including version number upon which the application will run

Interface Components--Listing of hardware components with associated software, including version identification, for interfaces with other systems, communication links, networks, databases, etc.

SECTION II: PROJECT PLAN:

Brief discussion of significant portions of the project plan to include project time line, budget, significant milestones.

SECTION III: ARCHITECTURE

Diagrams, schematics of functional architecture, physical topography, processes, etc.

SECTION IV: PERFORMANCE

Brief description of performance objectives as indicated in the approved project plan.

SECTION V: SECURITY ARCHITECTURE

Brief description of processes, procedures, and components which provide information security and continuance of operations.

SECTION VI: PROBLEM RESOLUTION

Brief description of the process to be used for problem resolution. A separate appendix should contain a listing of problems encountered, effect of the problem, and resolution, with brief justification for taking a particular course of action.

SECTION VII: CHANGE MANGEMENT

Record of changes to base-lines previously identified. Matrix can be contained in a separate appendix.

Date of Change	Change Identification	Approved by	Brief Description of Change

SECTION VIII: STATUS REPORTING

A brief description of reporting requirements, including financial, progress, and status reports. Copies of reports presented should be contained in a separate appendix.

SECTION IX: SIGN-OFF

We concur with the items in the System Management Plan:

_____ **DATE** _____
Branch Chief

_____ **DATE** _____
DIT Division Director

_____ **DATE** _____
User Agency Senior Staff Member

PHASE: 3. Design
STEP: 3.4 Design technical architecture
OUTPUT: 3.4.4 Network Infrastructure Plan

PURPOSE

To provide a detailed plan to govern the design, selection, installation and support for the hardware and software components of the data communication architecture. This output is used to update 2.5.3 Preliminary Network Infrastructure Plan

CONTENT

The plan should be presented with both text description and graphics, and should include:

- Summary of network architecture, including statement of adherence to County standards.
- Detailed description of network components: devices, media (fiber optics, copper, wireless, etc.).
- Identification of supported protocols (TCP/IP, IPX, and SNA).
- Identification of external entities and resources (organizations, servers, etc.).
- Processes for management of network bandwidth.
- Processes, guidelines and resource assignments for network disaster recovery.
- A sign-off document to record approval of Branch Chief, DIT Division Director and User Agency Division Director.

RECOMMENDED TECHNIQUES AND TOOLS

- Determine traffic volumes (existing vs. proposed).
- Establish response-time criteria.
- Determine protocol to be used.
- Determine bandwidth requirements.
- Identify user-interface.
- Identify data-flow and transmission (LAN vs. WAN).
- Identify security requirements (internal vs. external).
- Determine if site is mission critical.
- Plan device requirements: location, number, characteristics, etc.
- Plan network considerations: location, structure, etc.
- Determine cabling needs.
- Determine wire closet layout.
- Apply County standards.
- Make refinements.
- Obtain vendor sign-off on plan.

PHASE: 3. Design
STEP: 3.4 Design technical architecture
OUTPUT: 3.4.5 Business Continuity Plan

PURPOSE

To develop a plan to ensure continuous operations in the event of disasters (natural and otherwise), security breaches, and/or technical outages.

CONTENT

- **Business Continuity Tasks Including:**
 - Security Management
 - Authentication
 - Access Control
 - Auditing
 - Legal Issues
 - Security Policy Implementation
 - Physical Access/Location Control
 - Problem Management
 - Technical Support Center (TSC)
 - Diagnosis/Resolution
 - Reporting/Logging System
 - Escalation policies
 - Impact Analysis (Services)
 - Reporting
 - Security requirements for the process, encompassing all platforms (including internet and intranet if applicable) including:
 - Change Management
 - Software Distribution Virus Control
 - Data Distribution
 - Business Impact Analysis
 - Capacity/Configuration Considerations
 - Version Control (Roll Forward/Roll Backward/Coordination)
 - Reporting
 - Disaster recovery procedures including:
 - Data Management
 - Backup/Restore/Archive
 - Contingency
 - Recovery
 - Data Maintenance
 - Reporting

RECOMMENDED TECHNIQUES AND TOOLS

Information Security Manual

-
- PHASE:** 3. Design
- STEP:** 3.5 Confirm with user via system mock-up/prototype application
- OUTPUT:** 3.5.1 Confirmed Mock-Up/Prototype

PURPOSE:

The purpose of the Mock-up/Prototype is to demonstrate how the users will navigate the system; to simulate the yet-to-be-implemented application; to verify the previous Phase 2 Define Requirements, and Phase 3 Design; and to obtain user acceptance of the prototype (or required modifications) before designing the application components.

CONTENT:

- A prototype is primarily concerned with the user interface to the application, but also with the batch or printed outputs.
- The prototype must include mockups of the screens or windows as they will appear to the user or operator.
- The screens/windows should include as many of the actual physical components as possible – such as headers and data entry fields, as well as the required interface standards (title bar, menu bar, toolbar, scroll bars, etc.).
- The capabilities to scroll, select, enter data and move between windows (actual user interface) will be dependent on: negotiation with the user; the inherent capabilities of the software being used to produce the prototype (which may likely be the actual application development software or automated prototyping software); and resource availability.
- A paper model or mockup may be sufficient as long as the window's physical components and interface standards are accurately portrayed.
- In the case of a paper model, the interface and integration requirements will be specified and may include reference to outputs produced in prior tasks.
- Prototype reports will be prepared to mimic the actual appearance of the intended final outputs – headers, columns, sub totals, totals, page breaks etc, with representative sample data used.

RECOMMENDED TECHNIQUES AND TOOLS

Refer to the screen/window design specifications associated with the software (development tools) to be used. See GUI Standards

- CASE software available

SAMPLE

3.5.1a Prototype for Charges for CCRE

Sample 3.5.1a Prototype for Charges for CCRE

The screenshot shows a software application window titled "(JWS02)" with a menu bar containing "File", "Actions", "Windows", and "Help". The main window title is "CHARGES for WILLIAMS, DEBBIE (2000-08-29-14.35.40.793851)".

The form contains the following fields and sections:

- FX. Booking Nbr:** 35100242143541
- Doc#:** M000266
- Charge 1 of 2**
- Statute Data:**
 - Statute Code:** F/M: M
 - 18.2-121** (dropdown)
 - Desc:** ENTERING PROPERTY W/INT TO DAMAGE
 - Local Charge Code:** 26MG
 - Attempted Conspired None
- Offense Date:** 08/01/2000 **Time:** 00:00:00
- Offense Juris.:** FAIRFAX COUNTY (dropdown)
- Event/Incident/Case #:** (empty)
- Arrestee #:** 1
- Location of Offense:** (empty)
- Org. Code:** FXCO PD MASON STATION (dropdown) **Subcensus:** 521.05 (dropdown)
- Drug Type:** (empty dropdown)
- Weapons at Arrest:**
 - Weapon 1: Automatic:** (dropdown)
 - Weapon 2: Automatic:** (dropdown)
- Type of Criminal Activity:** (empty dropdown)
- Multiple Clearance Indicator:**
 - Multiple
 - Count Arrestee
 - N/A

On the right side of the window, there is a vertical toolbar with the following buttons: Close, Save, Refresh, New, Delete, Arrest, and Summary.

The status bar at the bottom left of the window reads "JWS Application".

PHASE: 3. Design
STEP: 3.6 Design application components
OUTPUT: 3.6.1 Design Specifications

PURPOSE:

To serve as a communication media between the eventual user owner of the application, agency business and IT analysts, and DIT programming and analyst staff; and to document the appearance and functioning of the application (windows, logic, programs, shared routines, objects, class libraries, interfaces, data conversions, etc.)

CONTENT:

Several methods are available and acceptable to specify the application components, and multiple methods may be used in conjunction with each other.

NOTE: The key requirement is that the method(s) selected must be appropriate to the parameters of the application (complexity, integration aspects, language, development tools, platform, etc); the requirements of the software to be used for the system development, and the communication requirements of the staff involved.

- Structured language (a subset of the application language or tool's logic)
- CASE Tool "Mini-specs"
- Transaction descriptions – purpose, map/window/screen IDs, program IDs (names), language or tool to be used, start, functions, transfers, special key and screen elements use
- Program specifications – flowchart, pseudo code, event logic or as specified in the development software or tool's documentation
- Data flow diagrams (DFD)
- Flowcharts
- Application window designs (including title bar, menu bar, toolbar, status bar, scroll bars, taskbar, etc)
- Interface requirements statement
- Identification of components that can be shared: code, and objects, and standardized routines
- Data base Design Chart

RECOMMENDED TECHNIQUES AND TOOLS:

Please see the "key requirement" under Content above.

Other considerations:

- Consider user/owner (stakeholders) agency sign-off to ensure acceptance and avoid later changes
- Existing documentation specifications for an application when an enhancement or new module is being specified
- Vendor provided documentation.
- Staff development experience and experience with preferred methods
- The requirements of the application development tool

SAMPLES:

3.6.1 Design Specifications

- PHASE:** 3. Design
- STEP:** 3.7. Acquire acceptance, training and production infrastructure resources
- OUTPUT:** 3.7.1 Acceptance and Training Agreements/Notifications/Purchase Requisitions

PURPOSE

To work with appropriate DIT Divisions and/or other County agencies to make the necessary project purchases for acceptance, training and production. These may include: hardware/software, network connection requests, drive space (storage) requests, staffing (to include contracting), vendor training (technical, end user), customized documentation and physical (hardware/staff) space in accordance with the guidelines and schedule developed for the project.

CONTENT

- Project expenditure plan.
- Documented notification and coordination with appropriate DIT Divisions:
 - Application network bandwidth requirements
 - Server type, Operating System, location and support requirements
 - Database platform, support requirements, baseline/ad-hoc report production
 - Backup, restore and Disaster Recovery
 - Training
 - TSC role for user support
 - Processes to implement upgrades/enhancements.
- Purchase requisition documents, if applicable.

RECOMMENDED TECHNIQUES AND TOOLS

- Coordination with DPSM, and DIT staff for training requirements and RFP specifications for training staff using Service Level Agreements (See 6.3.2a Service Level Agreement, if necessary).
- Coordination with DPSM, and DIT staff for training requirements and RFP specifications for training staff using Service Level Agreements (See 6.3.2a Service Level Agreement, if necessary).
- RFP, IFB, vendor quotes
- Spreadsheets
- DIT Memorandum No. 2, Procurement Procedures

PHASE: 3. Design

STEP: 3.8 Verify technical architecture is in place and functioning

OUTPUT: 3.8.1 Completed technical architecture checklist

PURPOSE

To ensure that the technical architecture that has been chosen for the automated system is functioning. All pieces of the architecture must be formally tested and used for the development of the product. The checklist created in 3.4.1 Technical Architecture Design Document must be monitored and progress noted.

CONTENT

- A notation on each task of the list stating the status and final successful completion based on the agreed upon test results from 3.4.2 Checklist For Technical Architecture Installation.

RECOMMENDED TECHNIQUES AND TOOLS

- Word processing
- Project management tool

- PHASE:** 4. Develop
- STEP:** 4.1 Create environments—networking, files, libraries, etc.
- OUTPUT:** 4.1.1 Operations Development Environment Checklist

PURPOSE

The purpose of this checklist, to be developed in conjunction with staff from DIT's Technical Infrastructure Division, is to ensure that the necessary pieces of the development process have been executed so that development work can begin. It organizes tasks and serves to communicate expectations. The list focuses on the tasks and people needed to accomplish the creation of the development environment. In listing the tasks, it forces a firm definition of the architecture and platform.

CONTENT

- List or Gantt of all tasks needed to begin development or modification of a project
- Order of tasks/expected start and stop dates
- Responsible person for each task in areas such as network, DBA, systems, programming, etc.
- Milestone points in the process for meetings and coordination including a startup meeting with all possible staff that may be involved
- Actual start/completion dates/completed indicator

RECOMMENDED TECHNIQUES AND TOOLS

- Word processing
- Project management tool

PHASE: 4. Develop

STEP: 4.2 Develop each component

OUTPUT: 4.2.1 Completed (Coded) Module/Program, Linked Modules and Objects

PURPOSE

This is the source/object of the automated system being developed around functional or activity oriented business functions. It is based on the specifications created in 3.6.1 Design Specifications, to provide the basis for an automated solution to a business need

CONTENT

- Source/object oriented code written for each module using a programming language that performs a business function based on the provided Design Specifications (3.6.1).

RECOMMENDED TECHNIQUES AND TOOLS

- Programming languages

- PHASE:** 4. Develop
- STEP:** 4.3 Perform quality assurance of code
- OUTPUT:** 4.3.1 Reviewed Code with Improvements or Efficiencies Identified

PURPOSE

To ensure a program or business object meets the program specifications and is in compliance with DIT standards, especially programming standards. Review progress to identify possible ideas for improvement at this point in system development.

CONTENT

- Compare 3.6.1 Design Specifications to 4.2.1 Completed (coded) Module/Program and Linked Modules and Objects.
- Document code improvements needed.
- Review development work to ensure compliance with DIT programming standards.

RECOMMENDED TECHNIQUES AND TOOLS

- Structured code walk through
- Validation of business objects

PHASE: 4. Develop

STEP: 4.4 Perform unit testing

OUTPUT: 4.4.1 Tested Program/Module/Business Object and Operational Network Components

PURPOSE

To determine whether the coded functions perform according to the specifications and the programming standards (naming standards, information security standards, GUI, and programming standards). The operational network is accessed by the application; this unit test does not represent complete network testing. The development of the Test Plan can be considered here.

CONTENT

A completed checklist of functions and specific edits that should be tested by the development programmer based on the specifications provided during the design phase and coding standards, See Output 3.6.1 Design Specifications. See Output 5.1.1 for guidance in development a Test Plan.

RECOMMENDED TECHNIQUES AND TOOLS

- Validation of objects and events
- Standards/Guidelines - ADSM, SMS, CICS, Naming Standards, Batch LSR/NSR
- Information security standards
- GUI standards
- Programming standards

SAMPLE

4.4.1a Program Checklist

PROGRAM CHECKLIST

Program name: _____

Date tested: _____

Tester: _____

Check each item which applies to your program and indicate the status of that action.

___ Network access: _____

___ PF3: _____

___ PF4: _____

___ Transfer to w/keys: _____

___ Numeric: _____

___ Required: _____

- PHASE:** 4. Develop
- STEP:** 4.4 Perform unit testing
- OUTPUT:** 4.4.2 Possible Ideas for Improvement To System

PURPOSE

To provide a formal or informal mechanism for the developer to communicate concerns to project team members.

CONTENT

A text document displaying the:

- Location of the areas of concern in the code/specification/coding standards
- Description of the concern
- Recommended solution

RECOMMENDED TECHNIQUES AND TOOLS

- Spreadsheet tool
- Word processing tool

SAMPLE

4.4.2a Trouble Report

Trouble Report Number: ATR-1056 Status: ESCALATED TO MANAGEMENT
Activity: LOG
Screen: S000000016-CREATE SUBMISSION

Title: RESERVED PLAN PROCESSING

Trouble Report Description: CURRENTLY, A RESERVED PLAN IS CREATED AND IS PROCESSED THROUGH LOG AND THEN WHEN THE ‘REAL’ SUBMISSION COMES IN YOU CAN FIND THE RESERVED PLAN AND CREATE A NEW SUBMISSION USING THE SAME BASE NUMBER. THIS IS FINE, HOWEVER, THE RESERVED PLAN REMAINS ACTIVE. THE REQUIREMENT AGREED TO DURING DESIGN WAS TO CHANGE THE LCS TO ‘USED’.

Expected Behavior: WHEN A SUBMISSION IS CREATED USING THE SAME BASE NUMBER AS A RESERVED PLAN, THE RESERVED PLAN SHOULD BE REMOVED FROM ALL ACTIVITIES (PROCESS LOG Y=> 1) AND THE LCS OF THE RESERVED PLAN SHOULD BE CHANGED TO USED. IF THIS IS DONE THEN IN THE SEARCH ENGINE THE USER CAN SEARCH ON LCS = USED TO DETERMINE THE LIST OF RESERVED PLAN NUMBERS THAT HAVE BEEN CREATED.

-
- PHASE:** 5. Test
- STEP:** 5.1 Develop applicable test plans
- OUTPUT:** 5.1.1 Test Plan

PURPOSE

To develop a comprehensive test plan in order to reasonably assure that the application functions properly and as expected as stated in 3.6.1 Design Specifications, incorporating different types of testing as needed including, but not limited to:

- Unit testing - programmer test of module
- Acceptance testing – user testing
- Usability testing - test and measure the product’s usability characteristics (user friendliness)
- Integration or Application testing – test of module(s) within application
- Regression testing - baseline test of all types of transactions
- Interface testing – test with interfacing applications
- Stress testing – test with normal production transaction volumes
- Disaster Recovery testing – testing of backup/recovery offsite

CONTENT

- Schedule indicating the dates that each test will take place
- Origin of test data
- Loading test data
- Assignments of staff and users to perform the testing
- Environment setup required to create the test environment
- Test Scenarios (what tests to be performed)
- List of components to be tested, ranked by risk
- Expected results
- Usability test
- Technique to be used for reporting & resolving problems
- Contingency plan if test fails to produce expected results

RECOMMENDED TECHNIQUES AND TOOLS

- Project Management Software
- Code/Unit test walk-through or peer reviews
- Database or word processing software to track scenarios and problem reports
- Usability survey

SAMPLE

- 5.1.1a Test Plan and Scenario
- 5.1.1b Usability Survey Suggested Questions

Sample: 5.1.1a Test Plan and Scenario

The following is a portion of a test plan used for Y2K testing.

ID	Task Name	Duration	Resource Initials	Start	Finish	Ma		
						S	M	T
1	Load Production System to Time Machine	1d	EAS FAMIS/CAS	Sun 3/21/9	Sun 3/21/9			
2	FISCAL YEAR END TEST	1d		Sun 3/21/9	Sun 3/21/9			
3	May/July TEST	4d		Sun 3/21/9	Wed 3/24/9			
4	Set system date to May 15th	1d	System Programr	Sun 3/21/9	Sun 3/21/9			
5	Modify parameter tables to allow run of 9800	1d		Mon 3/22/9	Mon 3/22/9			
6	Table Setting Update	1d	BPREP Sys.Adr	Mon 3/22/9	Mon 3/22/9			
7	Run Job 9800	1d	EAS FAM	Mon 3/22/9	Mon 3/22/9			
8	Open up May and July 1999, close all other post per	1d		Mon 3/22/9	Mon 3/22/9			
9	Table Setting Update	1d	FAMIS Sys.Adr	Mon 3/22/9	Mon 3/22/9			
10	Load Budgets (BPR1800)	2d		Mon 3/22/9	Tue 3/23/9			
11	Enter budget information	1d	BPREP Sys.Adr	Mon 3/22/9	Mon 3/22/9			
12	Run BPR0030,BPR0031, BPR0032, BOR1800	2d	EAS FAM	Mon 3/22/9	Tue 3/23/9			
13	Run Backup	1d	EAS FAM	Sun 3/21/9	Sun 3/21/9			
14	Run Posting Scenarios (May to July)	1d	FAMIS/CASPS Us	Wed 3/24/9	Wed 3/24/9			
15	Table Setting Update	1d	FAMIS/CASPS Ad	Wed 3/24/9	Wed 3/24/9			

SAMPLE TEST SCENARIO

Module #	Change Request #	Test Scenario
TGS 7XH	99.0520	Enter two invoices, one with an invoice date of 1999 and the other with an invoice date of 2000. Then, execute transaction 038 with a beginning date of 010199 and an ending date of 010101. Ensure both invoices are displayed properly.
RGS IISI/590	99.0540	Request report IISI/590, with a "from effective date" in 20 century, and a "to effective date" in the 21 st century. Ensure that records are returned on report.
TGS 7YI	99.0680	Using transaction K1B, set the next review date to be 2000. Then, in 1999, execute transaction 74Q for that Agency/Stockroom. Ensure that the item was not set to be replenished.

Sample 5.1.1b

Usability Survey Suggested Questions

Please answer the following questions and provide comments to help us improve our work.

1. How easy was it to perform this task? What would have made this task easier?

2. How well did the instructions prepare you for performing this task?

3. What did you particularly like or dislike about the instructions? Any suggestions on how to improve them.

4. Were there any words or acronyms that you did not understand? Please list them below

5. Did the on-line help meet your needs? If not, what suggestions do you have to improve this service?

6. Did the documentation meet your needs? If not, what suggestions do you have to improve this service?

7. We would like to be able to provide users with computer programs they can use without assistance from others. What changes would you like to see that would enable users to use this independently?

Other Comments

PHASE: 5. Test

STEP: 5.2 Perform applicable tests

OUTPUT: 5.2.1 Test Results Documentation

PURPOSE

To perform the required testing according to test plan and document the results. Compare test results with expected results to validate the new or modified application and make changes as necessary.

CONTENT

- Updated Testing Scenarios
- Comparison of Test Results: Expected vs. Actual
- Log of problem reports and action taken
- Problem reports describing correction needed to include action plan with solution programming, table entries, etc.
- Re-test schedule
- Log of test participants

RECOMMENDED TECHNIQUES AND TOOLS

- Test Scenarios replicating “live” data and processing.
- Updates to project schedule (re-tests) using MS Project
- Word processor or spreadsheet or database tools to capture comparison information
- Database to record and review resolution of problems.

SAMPLE

5.2.1 Problem Log

Problem Log

Test Date	Problem Reported	Action Needed	Responsible Party	Date Resolved
3/26/99	Issue w/CASPS test: Payments entered as 07/01/1999 are converting to 07/01/2099	1. Research problem, fix program. 2. Retest after fix.	1. J.Blakesley 2. D.Graham 3. P.Damm	3/29/99 3/29/99 3/29/99
4/13/99	Issue w/LPS test: date entered at 2000 was displayed as 2020	3. Screen print of screens w/error. 4. Research program, fix program. 5. Retest after fix.	4. B.Benson 5. J.Sanders 6. B.Benson	4/14/99 4/14/99 4/15/99

- PHASE:** 5. Test
- STEP:** 5.3 Obtain user sign-off
- OUTPUT:** 5.3.1 Memorandum of Acceptance; Signed Change Request;
Signed Migration Form

PURPOSE

To review test results with the user(s) of the system and obtain agreement that the system or modification is ready for migration to the production environment.

CONTENT

- User signature on change request, migration form, or memorandum authorizing implementation of work into production environment.

RECOMMENDED TECHNIQUES AND TOOLS

- Word processing software
- Database software report showing problem reports and resolution
- Outstanding problem reports noted as non-critical to system operations and signed by user

SAMPLE

5.3.1a Memorandum of Acceptance; Signed Change Request; Signed Migration Form

SAMPLE: 5.3.1a Memorandum of Acceptance; Signed Change Request; Signed Migration Form

MEMORANDUM

TO: (User Dept. Project Manager)

DATE:

FROM: (DIT Technical Manager)

SUBJECT: Project Name

The above named project/enhancement has been tested and is ready to be implemented into production as of (date). All future enhancements should be submitted via Change Request forms. Please indicate your approval to implement this project/enhancement by your signature and date below.

Project Manager

Date

MIGRATION FORM

Submitted By:		Migration Request #	
Date Submitted:			
Problem Report(s):		Change Request #	
ENTITY TO BE MIGRATED	DM to AM Migration Date and Initials	AM to PM Migration Date and Initials	

SPECIAL INSTRUCTIONS:

REASON FOR MIGRATION:

The following programs need to be compiled:

Authorized by: _____	Date: _____
_____	_____
_____	_____

PHASE: 6. Implement

STEP: 6.1 Plan production turnover

OUTPUT: 6.1.1 Production System Implementation Plan

PURPOSE

To develop a plan to organize and execute the implementation of software.

CONTENT

- Implementation schedule
- Staff Assignments
- Activity dependencies
- Contingency plans
- User support needed for check out of system once implemented
- Software migration plan/coordination (including software distribution)
- Migration of application software to production environment (including desktops and servers)
- Compiles, new copies
- Update of System Software tables
- Information security tasks
- Database administration tasks
- System Engineering tasks
- Operations tasks
- Network and Communication tasks
- Telephone Support Center tasks
- Data creation or conversion plan
- Implemented software
- Plan dates for completing evaluation

RECOMMENDED TECHNIQUES AND TOOLS

- Use project management software for implementation plan schedule
- Evaluation portion of Checklist, see sample 6.1.1a

SAMPLE: 6.1.1a 8. Evaluate portion of Checklist

	Step	Outputs	Planned Date
8.1	Accumulate and Check Documentation is in Order	8.1.1 Documentation Arranged According to SDLCS Checklist	_____
8.2	Ascertain Whether Project Met Objectives and Requirements	8.2.1 Comparison of Project Scope & Requirements with Outcome & Customer. Satisfaction	_____
8.3	Compare actual to plan (time & Budget)	8.3.1Planned vs. Actual Comparison Document	_____
8.4	Compare expected system performance with actual	8.4. 1 Expected and Actual Performance Comparison Document	_____
8.5	Evaluate system impact on business processes and (customer) service delivery	8.5.1 Resources Comparison Document 8.5.2 Infrastructure Resources Comparison Document 8.5.3 Process Measures Comparison Document	_____ _____ _____

8.6	Evaluate adequacy of business continuity plans/procedures	8.6.1 Analysis Document Of Adequacy Of Business Continuity Plans/Procedures	_____
8.7	Post-Implementation Review:	8.7.1 Post Implementation Review Document	_____

PHASE: 6. Implement
STEP: 6.1 Plan production turnover
OUTPUT: 6.1.2 Operations' Documentation

PURPOSE

To ensure that Production Control, Operations (DIT and/or Departmental), Systems Administration and Database Administration have the necessary information to execute the application and application software needed by the application.

CONTENT

- Application Overview
- Job details
- File details
- Dependencies
- Backup/recovery procedures
- Notification procedures in case of system outage
- Restart procedures
- On-call procedures/assignments
- Output distribution
- Application resources
- Restrictions: run time, resources, environmental
- Console messages & responses
- Information security considerations: physical security, access controls & audit trails
- Condition code documentation

RECOMMENDED TECHNIQUES AND TOOLS

- Automated scheduling software
- Automated access to job execution code, execution documentation, and parameter settings
- Problem reporting/management system for recording problems

PHASE: 6. Implement

STEP: 6.1 Plan production turnover

OUTPUT: 6.1.3 User's Manual

PURPOSE

To provide user department staff with detailed instructions on how to use the software.

CONTENT

- Functional description
- Screen layouts
- Report samples
- Error messages
- Problem resolution procedures
- Help procedures/assignments: e.g. Business (User) help desk, application staff, operations/production control, Technical Support Center

RECOMMENDED TECHNIQUES AND TOOLS

- Word processing software for narrative
- Intranet access for documentation

PHASE: 6. Implement
STEP: 6.1 Plan production turnover
OUTPUT: 6.1.4 Systems Abstracts

PURPOSE

To provide development and support staff with functional and technical information on the operation of the application.

CONTENT

- Application Overview
- Outputs from Design Phase 3.1.1 – 3.8.1
- Operations’ Documentation 6.1.2
- User’s Manual 6.1.3

RECOMMENDED TECHNIQUES AND TOOLS

- Word processing software for narrative
- Intranet access for documentation
- On-line availability of all system abstracts

SAMPLE

6.1.4a System Abstracts

- 1. Application Title**
This is the official name of the application. The high level qualifier(s), if appropriate, should also be included.
- 2. Agencies Involved/Served**
The sponsoring agency is listed first. Other agencies which have access to the application, whether inquiry or update capabilities should be included. Any modules of the application that provide County-wide or public access to the application should be indicated rather than listing each individual agency.
- 3. Purpose/Description**
A brief description of the modules or processing performed by the application as well as a description of the business functions aided by the automation.
- 4. Major Benefits**
These should be benefits as identified in the Information Technology Plan for this approved application.
- 5. Major Functions Supported**
This should list any major processing functions that the application performs. The frequency that the application functions are performed should be provided.

6. Application Development Methodology

For those applications that are developed by outside vendors, a brief description of the application development methodology and a reference to the complete methodology document should be provided.

7. Data Architecture

a. Inputs

A list of business documents used as inputs such as data entry forms, documents and/or screens should be included in this section.

b. Outputs

A list of outputs, such as screens, reports, checks, registers, invoices should be included in this section.

c. Files/Tables/Database Structure

A list of data structures and the type (sequential, VSAM, DB2, Oracle, etc.) that represent core business entities, (e.g., citizen, vendor, application) should be included in this section.

d. Major Data Elements

A list of key data elements within the core business entities identified in section 7.c should be provided in this section.

e. Application Volumes

1. Total Application Transactions

This should include one number for the total number of transactions per time period. If counts for transaction types can easily be identified, those may also be included.

2. Total Number of Records

This should include a list of major files/tables and the associated number of records/rows in each.

3. Data Retention/Purge Schedule

Any archival or purge schedules for the application should be described in this section

8a. Mainframe Computer Programs

The number of programs, reports, transactions and screens should be listed based on language. Any other mainframe languages should be specifically listed along with the number of components. A similar list should be prepared for the client/server application software.

a. Number of Batch Programs

1. Cobol:
2. SAS:
3. Easytrieve:
4. Other:

b. Total Hard-Copy Reports

c. On-Line Transactions

1. CICS:
2. UFO:
3. ADS(0):
4. Other:

d. Total On-Line Programs

e. Total On-Line Screens

f. Other

- 8b. Client/Server Application Software**
 - a. Number Of Windows**
 - b. Number Of Data Windows**
 - c. APIs**
 - d. Number Of Remote Procedure Calls**
 - e. Number Of Transactions**
 - f. Number Of Batch Programs**
 - g. Number Of Reports**
 - h. Stored Procedures**
 - i. Other**
 - j. Powerbuilder Components**

- 8c. Internet Applications**
 - a. Netdynamics Components**
 - b. Web.PB Components**
 - c. ASP Components**
 - d. Other**

A summary of information for each of the following items is sufficient with a reference to any diagrams, documents or models and the location where they can be retrieved.

- 1. Hardware/Software Utilized**
 - a. Description of Platform
 - b. Hardware Architecture
 - 1. Server Level
 - 2. Middle Tier Level
 - 3. Client Level
 - c. Software Packages/Tools & Purpose
 - d. Network Architecture
- 2. Other Technology**
 - a. Description
 - b. Reference here with description and/or elsewhere as a separate write-up to follow the same outline
- 3. Configuration Management**
 - a. Change Management Process
 - b. Tools
- 4. Automated Interfaces**
 - a. Batch
 - b. Online
- 5. Application History**
 - a. Developed By
 - b. Package Software Vendor
 - c. Implementation Date
 - d. Post Implementation Evaluation Date
 - e. Target Replacement Date
 - f. Comments

-
- PHASE:** 6. Implement
- STEP:** 6.2 Develop training plan & materials and provide training
- OUTPUT:** 6.2.1 Training Plan
6.2.2 Training Materials

PURPOSE

To provide user department, operations and production control staff with instructions on how to use the software. When necessary, certify that individuals have sufficient knowledge of software.

CONTENT

Training Plan

- Scope of training to be provided
- Staff to be trained
- Requirements for training

Training Manual

- Set-up training environment
 - Training Database
 - Training Exercises
 - Network Hookups
 - Logistics: Room, Equipment needed
 - Plan for extra assistance for staff with special needs
- Instructor preparation
 - Plan for trainer to learn application to be taught
 - Prepare and copy materials
 - Revision of materials
 - Dry run

Training Schedule

- Scheduling of students
- Plan for certification of staff taking class as applicable
- Hold training classes

Proficiency Evaluation

- Develop proficiency evaluation instrument
- Administer certification where applicable
- Problem resolution procedures

RECOMMENDED TECHNIQUES AND TOOLS

- Word processing software for training plan and materials
- Class registration software
- Online procedure for proficiency evaluation

SAMPLE

6.2.1a Generic Training Plan for Fairfax County Business Information Systems

Sample 6.2.1a

Generic Training Plan for Fairfax County Business Information Systems

1. Planning
 - 1.1. Conduct a Needs Analysis
2. Design
 - 2.1. Know The User Demographics
 - 2.2. Develop Training Objectives
 - 2.3. Define Desired Outcomes
 - 2.4. Select the Learning Method
 - 2.5. Select the Training Approach
 - 2.6. Develop the Instructional Design
3. Development
 - 3.1. Develop Training Materials
 - 3.2. Develop a Training Database to Systems
 - 3.3. Develop a Prototype
 - 3.4. Technical Testing
4. Implementation
 - 4.1. Apply Training Techniques
 - 4.2. Deliver Training
 - 4.3. Perform Administrative Functions
5. Evaluation
 - 5.1. Measure response to course content
 - 5.2. Skill Demonstration
 - 5.3. Calculate Measurable Results
 - 5.4. Track ongoing follow-through

PHASE: 6. Implement
STEP: 6.3 Perform system implementation and production turnover
OUTPUT: 6.3.1 Production Turnover Sign-Off Document

PURPOSE

To review the implemented application with the users and obtain agreement that the application or modifications are functioning as required.

CONTENT

- Summary: Resolution of implementation issues
- Summary: Outstanding issues and plan of action
- Change Request/Memorandum summarizing the software implemented, user requirements met, and user signature line.
- Memorandum Sign-off by Data Center.

RECOMMENDED TECHNIQUES AND TOOLS

- Word processing software

SAMPLE

6.3.1a Production Turnover Sign-Off Document

MEMORANDUM

TO: *User Department Division Director or Project Manager (Depending on the size of the project)*

FROM: *DIT Division Director or DIT Technical Manager*

DATE:

SUBJECT: *Project Name*

The above named project has been completed satisfactorily in compliance with the Design Specifications (See Output 3.6.1 *Design Specifications*) and implemented into production as of (date). Please indicate your agreement that the project is complete satisfactorily and should be closed, with your signature and date.

All future enhancements should be submitted via DIT Change Request forms in compliance with DIT Policy Memorandum # 9, Change Management.

Project Manager

Date

-
- PHASE:** 6. Implement
- STEP:** 6.3 Perform system implementation and production turnover
- OUTPUT:** 6.3.2 Signed Service Level Agreement/Vendor Maintenance Agreement

PURPOSE

To ensure that all participants involved in implementing and supporting this Information Technology project, including representatives from each participating DIT Division and user agency, and all vendors, meet to negotiate, document and sign an agreement. This may be either the Service Level Agreement (SLA) or Vendor Maintenance Agreement (VMA). The SLA is used internally to document the roles and responsibilities of County agencies or DIT Divisions in implementation and support of this project, see 6.3.2a. For non-Fairfax County participants, the VMA should be used for the same purpose, see 6.3.2b

CONTENT

Name of Project: Date:

Participants in Project Implementation and Support

Specific Responsibilities of Each, including Frequency

- a review of the maintenance support contract with the vendor,
- identifying TID or vendor database, server and workstation system support responsibilities,
- development of the SLA.

Signature of Senior Representative of Each Participant

SAMPLE

6.3.2a Service Level Agreement

6.3.2b Vendor Maintenance Agreement

Sample 6.3.2a Service Level Agreement

Date: November 2000

HMIS SERVICE LEVEL AGREEMENT, Version 1.1

I. INTRODUCTION

This document shall serve as a Service Level Agreement (SLA) between DIT and DAHS for HMIS and VISION technical support activities. The purpose of the SLA is to clearly define the specific technical support duties and responsibilities of DIT and DAHS. The SLA can, and will be modified in the future as HMIS and VISION support requirements change.

II. OVERVIEW

Health Department Hours of Operation

HMIS must be fully operational and available during the following time periods:

Monday through Thursday 8AM – 8PM,

Friday 8AM – 4:30 PM.

VISION must be operational and available Monday through Friday, from 8 AM to 6 PM.

DIT must provide 48 hours prior notice if it is necessary to take down the HMIS server for maintenance purposes during the above mentioned time periods. If a system error occurs which requires immediate HMIS downtime, DIT staff must first notify the DAHS Help Desk on 324-7566 during business hours, or Ruth Benker after 4:30 PM. DIT will broadcast a message to HMIS users prior to taking the system down at any time.

It should be noted that the traditional back to school time period (August – September) is a critical time period for the Department of Health; therefore it is imperative that HMIS be available during the months of September and August. May and June are also periods of high activity for the Department of Health, as a result, HMIS should be available at all times during this period as well.

III. DIT Hours of Operation

DIT operates a 24/7(24 hours 7 days a week) data center. The TSC hours of operation are Monday through Friday 7AM to 5PM. HMIS users must first contact their OSM if they experience system problems during business hours; the OSM will then contact the DAHS Help Desk to report a system problem. The OSM must call 222-3535 if they require assistance after 5 PM.

HMIS will not be available on the 2nd and 4th Sunday of each month to facilitate DIT's standard system maintenance activities. DIT staff will call Ruth Benker directly if HMIS downtime is expected due to problems that are a result of standard system maintenance activities. The On-Call TSC staff will be contacted for emergency assistance.

IV. System Backups

The HMIS files and the operating system files are backed up to tape by ADSM every night, with a tape retention of 4 versions. Standard AIX backups of the HMIS files also take place Monday through Saturday. On Monday the HMIS AIX backups are taken offsite. Therefore, six versions are always available offsite with additional versions onsite when the cycle begins again on Mondays. MKSYSB backups are performed monthly and whenever a system upgrade is done.

Sample for 6.3.2a Service Level Agreement, Page 2

V. Requests for System Upgrades/New Servers etc...

Prior notification (minimum 2 weeks) is required from DAHS for HMIS server installation or replacement requests. These activities include operating system installation, userids and passwords, as well as network node additions (printers, workstations and/or servers). Userids, passwords, printers and workstation requests will require at least 3 –5 days to complete, timeframes for HMIS server and operating system upgrades will be coordinated with appropriate DAHS and Health Department staff.

Userids, passwords, printers and network node additions (printers, workstations and/or servers) for VISION will be the responsibility of DAHS-IT and VDH-OIM.

DIT AIX Server Support Responsibilities - HMIS

Perform OS Installation, Configuration, Maintenance & Upgrades.

Perform 3rd Party Software Installation, Configuration, Maintenance & Upgrades.

Configure Disks & Setup File Systems.

Monitor and troubleshoot OS & Hardware Component Problems.

Perform backup and recovery.

Ensure Y2K Compliance - OS & Hardware

Provide capacity planning & performance management support

Enterprise Network & OS

Provide hardware & OS maintenance – contract setup and administration.

Provide Enterprise Network support including – maintenance, requests for connections, and upgrades.

DAHS-IT will reimburse DIT for all hardware and related costs

for Enterprise network support activities.

Provide wiring, hubs, routers, switches, cabling, jacks, and related activities.

DAHS-IT will reimburse DIT for all hardware, services and related costs

- A. Provide Firewall, TCP/IP addresses, and perform all conversions (token ring to Ethernet).
- B. Provide a Disaster Recovery Site.
- C. Provide HMIS Server OS Userid & Password.
- D. Maintain HMIS Server Inventories.
- E. Process all PR's & PO's required for updates and/or repairs to hardware equipment, operating systems and 3rd Party software – appropriate funding codes will be provided by DAHS if necessary.
- F. Update the TSC concerning problem status.
- G. Update QUINTUS record describing problem resolution.
- H. Participate in joint budget preparation activities with DAHS.
- I. TSC Responsibilities
 1. Provide System Status Message Updates for major System Outages every 30 minutes.
 2. Coordinate all support activities with DIT Staff.
 3. Coordinate Activities with DAHS Help Desk Staff
 4. Notify DIT senior management of major system outages.
 5. Serve as Single Point of Contact (SPOC) for all requests, problem status reports and related activities.
 6. Open/update calls in QUINTUS.

VI. DAHS Support Activities - HMIS

- A. Perform application support activities including performance, trouble shooting, and upgrades.
- B. Perform application data maintenance activities including data compression and validation.
- C. Provide desktop Support – NIC & TCP/IP installation, domain name installation, and Server Naming convention.

Sample for 6.3.2a Service Level Agreement, Page 3

- D. Provide other application-related support activities including user IDs & passwords, icon setup, drive mappings and updates.
- E. Provide application software maintenance including contract setup and administration.
- F. Maintain desktop inventories.
- G. Perform application test activities for Disaster Recovery.
- H. Participate in joint budget preparation activities with DIT

VIII. DIT S40 Globalyst Server Support Responsibilities - VISION

DIT will perform system backups as specified in the VDH-OIS VISION system backup documentation. DIT will also provide network and security support (i.e., firewall) as defined in the VISION system documentation.

DIT will provide on an as needed basis, assistance to DAHS-IT in file management and script changes in the UNIX environment. Assistance is subject to available resources and existing priorities in DIT.

VDH-OIM will have access to the VISION server from 8 AM to 4:30 PM, Monday through Friday. Requirements for access at other times will be handled on a case by case John Peterson (DAHS-IT) will be the primary point of contact for VDH-OIM for these activities.

IX. TSC Responsibilities

- 1. Provide System Status Message Updates for major System Outages every 30 minutes.
- 2. Coordinate all support activities with DIT Staff.
- 3. Coordinate Activities with DAHS Help Desk Staff.
- 4. Notify DIT senior management of major system outages.
- 5. Serve as Single Point of Contact (SPOC) for all requests, problem status reports and related activities.
- 6. Open/update calls in QUINTUS.

X. DAHS/VDH-OIM S40 Globalyst Server Support Responsibilities – VISION

The Virginia Department of Health is responsible for hardware and OS installation, maintenance and upgrades. This activity will be coordinated through DAHS-IT with John Peterson as the primary- point of -contact.

A. DAHS Help Desk Responsibilities

- 1. Contact TSC for Assistance/Problem Status Updates.
- 2. Update Health Department Staff on Problem Status.
- 3. Open/Update calls in QUINTUS and assign to workgroup TSC.
- 4. Notify DAHS & Health Department Senior Management of major system outages
- 5. Contact VDH-OIM for technical assistance to resolve VISION server problems.

XI. Conclusion

Representatives of DAHS, DIT-BSD, DIT-NCS and the Department of Health have agreed to the organization-specific duties and responsibilities discussed in this document. The SLA however, is a “living/breathing” document, therefore it will be modified as user support and system requirements change. Please refer to the SLA in the future for guidance concerning HMIS and/or VISION system problems, requirements and updates.

Signatures

For DAHS

For DIT

PHASE: 7. Support

STEP: 7.1 Develop necessary documentation for application support

OUTPUT: 7.1.1 Documentation of Responsibilities, Procedures and Assignments for Application Support

PURPOSE: To document responsibilities, procedures and assignments for the support of applications assigned to DIT, and to obtain user/owner agency approval of application changes.

CONTENT:

Documented changes of – data maintenance, system and business requirements; special requests, enhancements, upgrades and issues; documenting corrective actions, solutions and contingency plans (including work-arounds); and documenting performance (adherence to agreements, recommendations for revisions, contract modifications, etc).

1. Application Computer System Change Request (Change Request) prepared in accordance with DIT memorandum No. 9
2. Change Request Log (by application by fiscal year)
3. Service Level Agreement (as applicable), See 6.3.2a
4. Vendor maintenance agreement (as applicable), See 6.3.2b
5. Documentation includes Change Requests for data maintenance; changes of system and business requirements, special requests, enhancements, upgrades and issues, and system emergencies.
6. Software distribution plan and agreements

RECOMMENDED TECHNIQUES AND TOOLS:

1. Change Requests.

Applications support staff must comply with the DIT Memo No. 9 Change Management, which "... identifies the policies and procedures which have been established to ensure that any change made to a production system, regardless of the system's platform, is performed on a manner that ensures its efficiency, effectiveness, reliability and integrity."

Change Requests are required for system changes which are needed to:

- Maintain data integrity
- Ensure system meets business requirements
- Address user special requests/ enhancements/ upgrades/ issues
- Address system emergencies

Quintus Change Management. The Technical Support Center (TSC) software (Quintus) includes a Change Management module (or focus) which includes the same Change Request data fields which can be used instead of the manual form to track application changes. The software includes fields to identify the application, the change request, justification, the customer, dates, approval, etc. Access to Quintus and use of the Change Management module must be coordinated with the TSC.

2. Change Request Log.

DIT Memo No. 9, Change Management, requires that a change log be maintained for every application system. The log will contain the following:

- A brief description of the change,
- The date the change request was made, and
- The date by which the change must be implemented.

3. Product maintenance agreements.

The designated support person (e.g. Branch Chief, Project Leader) must maintain information on software, hardware maintenance agreements to ensure validity, document costs and warranty periods, for input into proposed budgets and expenditure plans etc. Copies of agreements should be kept with other system support documents and purchasing materials with applicable notes made in tickler and calendar files.

4. Other.

Additional data, statistics may be retrieved, calculated and maintained to assist the supporting staff with maintenance of an application. Such data may include The Monitor for CICS (TMON) data and application performance data (transaction response times, CPU cycles, I/Os etc).

- PHASE:** 7. Support
- STEP:** 7.2 Provide technical/functional/helpdesk/training assistance
- OUTPUT:** 7.2.1 Service Provided
7.2.2 Documentation of Service

PURPOSE

To provide and document technical, functional, help desk and training assistance provided by applications staff at the request of owner/sponsoring agency and staff, and to make adjustments and improvements in system documentation, training materials, etc.

CONTENT See recommended techniques and tools.

RECOMMENDED TECHNIQUES AND TOOLS

- User meetings – forums, focus groups etc.
- “How To” hints
- Web pages documentation
- Newsletters
- System broadcast messages
- Technical Support Center pre-connect phone messages;
- Use of Quintus Change Management Focus
- Operations’ Documentation (6.1.2)
- User’s Manual (6.1.3)
- Systems Abstracts (6.1.4)
- Training Plan (6.2.1)
- Training Materials (6.2.2)

Additional (not documented elsewhere in these Standards)

- Applicable memorandums of agreement documenting the assistance provided
- Technical Support Center HelpQ Workgroups with staff USERIDs
- Notification to the TSC re application details (HelpQ, updated USERIDs, schedule information, system availability, terminal restrictions and associations etc).

PHASE: 7. Support
STEP: 7.3 On-going maintenance support
OUTPUT: 7.3.1 On-Going Maintenance Support

PURPOSE

The purpose of this section is to address on-going support once a project is migrated to production and is in maintenance status. This section addresses small modifications and maintenance that are implemented for an application.

CONTENT

Content of any of the following sections could apply here depending on the level of maintenance effort.

1. Step 2.2 – Identify desired business functions including processes
2. Step 2.7 – Compile requirements and document changes, with user approval
3. Step 3.3 – Design physical data structure
4. Step 3.6 – Design application components
5. Step 4.2 – Develop each component
6. Step 4.3 – Perform quality assurance of code
7. Step 4.4 – Perform unit testing
8. Step 6.1 – Plan production turnover
9. Step 6.2 – Develop training plan & materials and provide training
10. Step 6.3 – Perform system implementation and production turnover

RECOMMENDED TECHNIQUES AND TOOLS

All applicable techniques and standards documented in the above sections should be used including the following:

- Applications support staff must comply with the DIT Policy Memo No. 9 Change Management
- Standards/Guidelines - ADSM, SMS, CICS, Naming Standards, Batch LSR/NSR
- Information security standards
- GUI standards
- Programming standards
- Web development standards

- PHASE:** 8. Evaluate
- STEP:** 8.1 Accumulate documentation and put in order
- OUTPUT:** 8.1.1 Documentation Arranged According to SDLCS Checklist

PURPOSE

To assist in preparing for the Post Implementation Review

CONTENT

In the Introduction to the System Development Life Cycle Standards, Project Managers were advised to keep an organizing device, arranged according to the SDLCS Checklist. This output is to assist project managers in checking that all documentation is complete and in order.

- PHASE:** 8. Evaluate
- STEP:** 8.2 Ascertain whether project met objectives and requirements
- OUTPUT:** 8.2.1 Comparison of Project Scope and Requirements with Outcome and Customer Satisfaction

PURPOSE

To ascertain whether project objectives have been met

CONTENT

Receives information from:

- Planned: 1.2.2 Statement of Scope and Objectives
2.6.1 Final and Approved Project Management Plan
2.7.1 Signed Requirements Document
2.7.2 Document Requirement Changes with User Approval
- Actual: 6.1.4 Systems Abstract
6.3.1 Production Turnover Sign-Off Document
8.2.1a Outcome End User Survey
8.2.1b End User Satisfaction Survey
8.2.1c Impact of System--As-Is and After Implementation Measures

Compares planned to actual information and draws conclusions.

RECOMMENDED TECHNIQUES AND TOOLS

The planned outcomes should be compared to the actuals.

SAMPLE

- 8.2.1a Outcome End User Survey
- 8.2.1b End User Satisfaction Survey
- 8.2.1c Impact of System--As-Is and After Implementation Measures

Sample 8.2.1a Outcome End User Survey

Outcome End User Survey

Has this system *name of system* achieved what it set out to do as stated below? Please identify what you think for each statement. *PMs will insert brief description of the project goals*

What is the new system's impact on you, compared to how you did it before?

	Worse	Same	Better
More cumbersome			
Faster to use			
Harder to learn			
Easier to get help			
	Yes	Sometimes	No
The same words are used in different ways			
I understood the language used, including acronyms e.g. WAN			

Sample 8.2.1b End User Satisfaction Survey

End User Satisfaction Survey

Statement	Agree	Neutral	Disagree
1. DIT staff did not share responsibility for the project equally with us			
2. DIT staff shared decision making equally with us			
3. DIT staff were open to the contribution of others			
4. The technical staff was not knowledgeable			
5. When there were differences between us, we were not able to sit down and hammer them out			
6. When systems and major system enhancements were installed, they were usually well-tested and bug free.			
7. DIT kept us adequately informed on project progress and status			
8. The systems and major system enhancements DIT installed did not meet our needs			

Sample 8.2.1c

Impact of System--As-Is and After Implementation Measures

Requirement	As Is	After Implementation
Time to respond to constituents' requests	Time to respond to request ___	Time to respond to request ___
Accuracy of information given to constituents	Survey to constituents showed ___ errors per response	Survey to constituents showed ___ errors per response
Ability to sort and analyze citizen inquiries	Yes/No	Yes/No
Number of hours per week per site spent by County staff in user support	___ hours	___ hours

PHASE: 8. Evaluate
STEP: 8.3 Compare actual to plan (time and budget)
OUTPUT: 8.3.1 Planned vs. Actual Comparison Document

PURPOSE

To evaluate projects on actual performance, as compared to planned performance, reporting on what was done well and what could have been improved.
To expand the knowledge base on improving application development and enhancement projects, duration, level of effort, and cost.

CONTENT

Receives information from:

Planned: 2.6.1 Final and Approved Project Management Plan

Actual: 6.3.1 Production Turnover Sign-Off Document

7.1 Develop necessary documentation for application support

7.1.1 Documentation of responsibilities, procedures and assignments for application

7.2 Provide technical/functional/helpdesk/training assistance Documentation of Service;

Compares planned to actual information and draws conclusions.

RECOMMENDED TECHNIQUES AND TOOLS

Evaluation Committee of major stakeholders to do analysis and make recommendations

SAMPLE

Project Identification Section

Project Name:

DIT Point of Contact:

Business Function Point of Contact:

Date of this Document:

Results Section:

Proposed Project Start Date:

Actual Project Start Date:

Proposed Duration of Project:

Actual Duration of Project:

Estimated Cost of Project:

Actual Cost of Project:

Proposed Level of Effort:

Actual Level of Effort:

Project Function Area Results

Each significant function area or activity, especially those with deviations from the proposed schedule, should be separately documented and discussed. The deviation should be identified and the cause and effect discussed. Supporting documentation, if too bulky, could be placed in separate corresponding Annexes.

Area/function Identification:

Estimated Effort:

Actual Effort:

Discussion of deviations from the plan should be discussed here with charts, diagrams, matrixes, etc. to explain the cause and results of the deviation. For example:
 Sample: 8.3.1a Planned vs. actual comparison document, Page 2

Object Counts, Unit Test Duration Per Activity

The actual object counts were much greater than those originally estimated:

Activity	Menus (#)		Data Windows (#)		Background Process (#)		Unit Testing (Hrs)	
	Est.	Actual	Est.	Actual	Est.	Actual	Est.	Actual
Log	12	6	20	30	20	120	8	400
Tax Map	0	3	0	8	0	36	8	200
BP	0	6	0	29	0	100	21	40
Duplicate	1	1	3	2	8	12	5	15
Relate	1	1	3	5	7	30	7	20
Validate	4	16	29	37	33	352	20	780
Total	18	33	55	111	68	650	69	1,455

Discussion: The actual object counts were much greater than those originally estimated, probably because the increased complexity, and hence counts, were caused by the amount of intelligent processing and business parameter checks resident in the application. This is especially true for background business processes and unit testing. Also, additional requirements not calculated in the original estimate are present in the post production review. Original estimates were calculated prior to the process specifications being completed. Many of these additional requirements and enhancements were uncovered at that time.

- PHASE:** 8. Evaluate
- STEP:** 8.4 Compare expected system performance with actual
- OUTPUT** 8.4.1 Expected and Actual Performance Comparison Document

PURPOSE

Ensure required system performance is achieved, whether on-line or batch and that the system performance meets user expectations as expressed in the requirements phase

CONTENT

Planned: Receives information from Outputs:

- 2.7.1 Signed Requirements Document
- 3.4.1 Technical Architecture Design Document
- 3.4.3 Approved Systems Management Plan
- 3.4.4 Network Infrastructure Plan

Actual: Receives information from

- 5. Test:
 - 5.1.1 Test Plan
 - 5.2.1 Test Results Documentation
 - 5.3.1 Memorandum of Acceptance; Signed Change Request; Signed Migration Form
- 7. Support
- 7.2 Output: Application Specific Log of Change Requests

RECOMMENDED TECHNIQUES AND TOOLS

Evaluation Committee of major stakeholders to do analysis and make recommendations:

- System specifics derived from performance monitoring tools
- User survey to obtain written feedback and/or user focus groups

SAMPLE

Performance Statistics

Transaction Identifier	Average Response Time	# of Transactions	Average CPU per Transaction	Average I/O per Transaction
W013				
W0B4				
WJ25				

PHASE: 8. Evaluate

STEP: 8.5 Evaluate system impact on business processes and (customer) service delivery

OUTPUT: 8.5.1 Resources Comparison Document

PURPOSE

To evaluate the resources (staff, time, budget) consumed by the original process as compared to those consumed by the new business process.

CONTENT

System impact on business processes:

Planned : Original process resource requirements (staff, time, budget):

Receives information from:

2.1.1 Existing Business Process and/ or Workflow Model

Actual: Receives information from:

5.1.1 Test Plan; 5.2.1 Test Results Documentation;

5.3.1 Memorandum of Acceptance; Signed Change Request; Signed Migration Form;

7.2 Provide technical/functional/helpdesk/training assistance

RECOMMENDED TECHNIQUES AND TOOLS

Evaluation Committee of major stakeholders to perform analysis and make recommendations:

- Compare documented system impact on the identified business processes to those formerly used by the same process. However, the former and current functions may not be the same; if it is possible, compare them (such as a case in which a current function is an aggregate of three former functions)
- This evaluation should only be carried out some months after the system has been stabilized and has been running smoothly

SAMPLE

Actual Resources (Staff, Time, Budget) Vs. Former Resource Requirements

Activity	Time to Complete		Staff Time		Budget	
	Former	Current	Former	Current	Former	Current
Function 1						
Function 2						
Function 3						
Function 4						
Function 5						
Function 6						
Function 7						

PHASE: 8. Evaluate

STEP: 8.5 Evaluate system impact on business processes and (customer) service delivery

OUTPUT: 8.5.2 Infrastructure Resources Comparison Document

PURPOSE

To compare the infrastructure resources needed to support the original or prior business process to those proposed for the current application, to those actually required.

CONTENT

- Original or prior business process:
 - 2.1.1 Existing Business Process and/or Workflow Model
- Proposed business process:
 - 2.6.1 Final and Approved Project Management Plan
- Actual: Receives information from
 - 5.1.1 Test Plan(s);
 - 5.2.1 Test Results Documentation;
 - 5.3.1 Memorandum of Acceptance; Signed Change Request; Signed Migration Form
 - 7.1.1 Documentation of Responsibilities, Procedures and Assignments for Application Support Output

RECOMMENDED TECHNIQUES AND TOOLS

- Evaluation Committee of major stakeholders to do analysis and make recommendations:
- Compare the infrastructure resources needed to support the original or prior business process to those proposed for the current application, to those actually required.

SAMPLE

**Infrastructure Resources Required To Support Business Processes Vs. Design Specifications
 Vs. Prior Business Processes**

Infrastructure Resource	Prior Infrastructure Resource	Proposed Infrastructure Resource	Current Infrastructure Resource	Action to be Taken
Storage				
Network				
Environmental				
Printers				
Space Requirements				
Processor				
Staffing				

PHASE: 8. Evaluate

STEP: 8.5 Evaluate system impact on business processes and (customer) service delivery

OUTPUT: 8.5.3 Process Measures Comparison Document

PURPOSE

To compare actual process measure vs. designed process measure vs. former process measure (whether manual or automated); actual Quantifiable and Intangible Benefits vs. anticipated

CONTENT

Former process measure:

2.1.1 Existing Business Process and/or Workflow Model

Designed process measure:

2.2.1 Business Process Redesign (BPR) Document;

3.6.1 Design Specifications

Actual: 5.1.1 Test Plan(s);

5.2.1 Test Results Documentation;

5.3.1 Memorandum of Acceptance; Signed Change Request; Signed Migration Form

7.1.1 Documentation of Responsibilities, Procedures and Assignments for Application Support Output

Anticipated benefits: 2.6.1 Final and Approved Project Management Plan

Actual benefits: Preliminary identification of benefit trends

RECOMMENDED TECHNIQUES AND TOOLS

Evaluation Committee of major stakeholders to do analysis and make recommendations:

- Compare process measures actually achieved by system to those contained in the design and, to those of the former automated system or manual process, if available.

SAMPLE

Sample 8.5.3a

Process Measures Comparison Document

Process Measures	Prior Process Measure	Proposed Process Measure	Current Process Measure	Action to be Taken
Wait for Service				
% Correct				
# Cases Processed Per Day				
% Processed within 7 Days				
Time To Close Case				

PHASE:	8. Evaluate
STEP:	8.6 Evaluate adequacy of business continuity plans/procedures
OUTPUT:	8.6.1 Analysis Document of Adequacy of Business Continuity Plans/Procedures

PURPOSE

To ensure all relevant business continuity procedures are in place for this system. These include: regularly scheduled backup of critical data including off-site storage and retrieval and resumption planning

CONTENT

- 1.1.1 Feasibility and Risk Analysis; this should also include an evaluation by the customer as to the relative criticality of the business processes contained in this system to the overall County scheme of critical processes.
- 3.4.3 Approved Systems Management Plan

RECOMMENDED TECHNIQUES AND TOOLS

Security Risk/Vulnerability Analysis
Continuance Of Operations Plan (COOP) (Very high-level)

SAMPLE

Project/Plan Identification

- Project/Plan Name
- Project/Plan Owner
- Date of Plan

Results of Security Risk/Vulnerability Analysis (Copy should be attached)

- Identification of Critical Data
- Statement as to importance to Plan/Project to Fairfax County (i.e. how long could the County go without the data/process being in operation)

Back/Up Requirements

- Back up schedule, (e.g. will be backed-up every cycle as part of normal DIT procedures.)
- Off-site back-up requirements (i.e. specify what must be stored off-site/ available to restore operations in the time specified by the "owner")

Restore Requirements

- Example will be included in overall DIT Disaster Recovery procedures.

Example of Security Risk/Vulnerability Analysis

- Identification of Critical Data
- Identification of actions which could cause:
 - Loss of data/system integrity
 - Loss of confidentiality of data
 - Loss of ability to operate
- Prioritization by probability of action happening and the resulting amount of damage
- Countermeasures to be implemented to prevent acts from happening
- Risks to be accepted (countermeasures that cannot or will not be implemented)

Sign-off/acceptance by "Owner".

- PHASE:** 8. Evaluate
- STEP:** 8.7 Post-implementation review: Critique how methodology worked for this project
- OUTPUT:** 8.7.1 Post Implementation Review Document

PURPOSE

To determine whether the technology investment is yielding the expected benefits to the users by means of the processes, products or services provided by DIT and to identify what action should be taken if it is not. As important, the purpose is also to evaluate the System Development Life Cycle Standards and project management methodologies and recommend improvements.

CONTENT

3 to 6 months after project completion, post-implementation review should take place with these elements:

1. Project history:
 - a. Existing automation, if any, (including product if applicable)
 - b. Project and Functional Requirements from 2.7.1 Compile Requirements in to Single Document Signed by Users
 - c. An executive overview of the technical solution selected to satisfy the project requirements, drawing from: 2.7.1 Signed Requirements Document, 3.4.1 Technical Architecture Design Document.
 - d. Describe changes from the original design that occurred during the course of project development using 2.7.2 Compilation of Requirement Changes Approved by User
 - e. Use of System Development Life Cycle Standards and appropriateness of selected outputs
2. Impact of the System

Present the impact of the system from the point of view of the user, user management, representatives of all branches of DIT involved in the project and the Steering Committee or senior management, as well as whether Project Mission and Objectives and Quantifiable and Intangible Benefits have been achieved.

 - a. 8.2 Ascertain whether project met objectives and requirements including customer and end-user satisfaction from 1.2.2 Statement of Scope and Objectives, 2.7.1 Signed Requirements Document, 6.1.4 Systems Abstract.
3. Costs and Benefits
 - a. A comparison of **costs**, actual and planned and explain the major differences from 8.1.1 Documentation Arranged according to SDLCS Checklist
 - b. A comparison of the **original process measures** from 8.3.1 Planned vs. Actual Comparison Document.
4. Lessons Learned
 - a. Things that went well with project and lessons learned
 - b. System specific lessons with any suggested changes or enhancements (hardware and/or software)
 - c. Strengths and weakness that could be applicable beyond this specific project such as: to the project management and system development processes, including the System Development Life Cycle Standards, development of requirements, requirements change management tracking; the contracting methodology used, training issues, software, technology, project team, , standards and guidelines that might be helpful in future.
5. Conclusions
 - a. What went well
 - b. Improvements needed
 - c. Recommendation for action

RECOMMENDED TECHNIQUES AND TOOLS

Post Implementation Review Team appointed by Project Management Team

NOTES:

SYSTEM DEVELOPMENT LIFE CYCLE STANDARDS
GLOSSARY OF TERMS

System Development Life Cycle	The phases or sequence of steps followed in the development of a new application, enhancement of an existing application, or implementation of a new technology. The System Development Life cycle covers applications from preliminary planning through support. The application development phases are Preliminary Plan, Define Requirements, Design, Develop, Test, Implement, Support, and Evaluate.
System Development Life Cycle Standards (SDLCS)	The Fairfax County application development standard. This approach emphasizes communication and consistency throughout the development process. The standards foster a partnership between the user and DIT staff, and ensure that basic procedures are followed and documented.
Architecture	Architecture is the collection of all components and sub-components that are required to support and deploy an effective information technology system. These components include hardware, software, networking, communications, protocols, security, languages and other relevant technologies, as well as standards and policies. Architecture also defines the dependencies, connections and interactions between the framework components and functional, operational and performance requirements of each subsystem or application.
Benchmark	A standard by which something can be measured or judged, such as a test used to compare performance.
Business Process	The systematic sequence of actions used to produce a product or achieve an end.
Business Process (Improvement) Analysis	A high-level analysis of business processes. The analysis is used to understand the whole and identify ways of improving component processes. The goal of this analysis is to improve system performance and/or customer service.
Business Process Reengineering (BPR)	Any radical change in the way in which an organization performs its business activities. BPR involves a fundamental re-think of the business processes, followed by a redesign of business activities to enhance

	all or most of its critical measures - costs, quality of service, staff dynamics, etc..
Computer Aided Software Engineering (CASE)	An automated computer software system that assists in the development of software from the design through the implementation stage.
CASE Tools	Software tools to help in the application of Computer Aided Software Engineering to a software project.
Concurrence	An agreement among major stakeholders in opinion or on design features.
Commercial-Off-The-Shelf (COTS)	Commercially available software that may meet the requirements of the project, usually requiring some modifications.
CRUD	Actions performed on data: Create, Read, Update, and Delete.
Computer System Change Requests (CSCRs)	Forms used to ensure communication between the requesting agency and the information technology personnel assigned to the design, development and/or maintenance of the computer system.
Data Dictionary	A repository of data about data, that is meta-data. A data dictionary contains information such as a list of all files in the database, the number of records in each file, and the names and types of each field, as well as descriptive text about the data. Data dictionaries do not contain any actual data from the database, only information for managing it.
Data Model	The product of the database design process which aims to identify and organize the required data logically and physically. A data model states what information is to be contained in a database, how the information will be used, and how the items in the database will be related to each other. For example, a data model might specify that a customer is represented by a customer name and credit card number and a product as a product code and price, and that there is a one-to-many relation between a customer and a product. (See <i>Logical Data Model</i>)
Data Structures	An organization of information, usually in memory, for better algorithm efficiency, such as queue, stack, linked list, heap, dictionary, and tree. It may include redundant information, such as length of the list or number of nodes in a sub tree

Data Type	The classification of a particular type of information. The available data types vary from one programming language to another, and from one database application to another. However, the following usually exist in some form: Integer, Floating Point, Text, Dates, Boolean (T/F, Yes/No). A computer uses special internal codes to keep track of the different types of data it processes.
De-normalization	The process of combining two or more tables that are frequently accessed together or adding redundancy. Improves performance by tailoring the database structure for one specific application's use, usually at the expense of flexibility. (See <i>Normalization</i>)
Dependencies	In project management, tasks that are dependent, subordinate, determined or conditioned by other tasks. Task dependencies are depicted on PERT charts. (See <i>PERT Chart</i>)
Entity	A single person, place, or thing about which data can be stored. In data modeling (a first step in the creation of a database), an entity is some unit of data that can be classified and have stated relationships to other entities.
Facilitated Session	A meeting conducted by a person (facilitator) who acts as a catalyst for those in attendance to achieve concurrence. The facilitator listens, asks questions, provides ideas, suggests alternatives, and identifies possible resources.
Flow chart	A graphical representation of a process or program logic.
Flow-charting	The process of designing a flow chart for a process or program.
Gantt Chart	A chart that depicts progress in relation to time, often used in planning and tracking a project. Automated Gantt charts store more information about tasks, such as the individuals assigned to specific tasks, and notes about the procedures. Charts may be adjusted frequently to reflect the actual status of project tasks. Gantt charts, while giving a clear illustration of project status; do not indicate dependencies among tasks. The PERT chart, is designed for this purpose. (See <i>PERT chart</i>)
Gateway	A gateway is a network point that acts as an entrance to another network. On the Internet, a node can be either a

gateway node or a host (end-point) node. Both the computers of Internet users and those that serve pages to users are host nodes. The computers that control traffic within a network or at the local Internet service provider (ISP) are gateway nodes.

Invitation for Bid (IFB)

A request made to prospective suppliers (bidders) for their price quotation on specific goods and services desired by Fairfax County. An IFB will contain specifications as well as contractual terms and conditions applicable to the procurement.

Interface

The point of interaction or communication, between a computer and any other entity, such as a printer or human operator. An interface consists of a set of operating system commands, graphical display formats, and other devices provided by a computer or a program,

Intranet

An Intranet is a private network that is contained within an enterprise. It may consist of many inter-linked local area networks and may also use leased lines in the wide area network. Typically, an Intranet includes connections through one or more gateway computers to the outside Internet. The main purpose of an Intranet is to share company information and computing resources among employees. An Intranet can also be used to facilitate working in groups and for teleconferences.

Joint Requirements Definition

The process of defining requirements for a system by a group of representatives of all stakeholders (end users, management, technical staff).

Local Area Network (LAN)

A computer network that spans a relatively small area. Most LANs are confined to a single building or group of buildings and connect workstations and personal computers. LANs are capable of transmitting data at very fast rates, much faster than data can be transmitted over a telephone line; but distances are limited, and there is also a limit on the number of computers that can be attached to a single LAN. (See also Wide Area Network (WAN))

Logical Data Model

The logical data model should contain all the attributes and their relationships. It is a blueprint for the physical database design and should meet business objectives as well as provide good system performance. (Compare with *Data Model*)

Milestone

An important event in the development or history of a project.

Normalization	The elimination of redundancy and inconsistent dependency in relational table designs that takes place in 5 progressive steps.
Object-Oriented (OO).	Having to do with or making use of objects; an object in this sense is a component containing both data and instructions for the operations to be performed on that data. In object-oriented programming, these reusable components are linked together in various ways to create applications.
Peer Reviews	An industry best-practice for detecting software defects early and learning about software artifacts. Peer Reviews are composed of software walkthroughs and software inspections. The elements of Peer Reviews include the structured review process, standard of excellence product checklists, defined roles of participants, and forms and reports.
PERT Chart:	Performance Evaluation Review Technique, also called a precedence network. A PERT chart is a project management tool used to schedule, organize, and coordinate tasks within a project. The PERT chart is sometimes preferred over the Gantt chart, because it clearly illustrates task dependencies. On the other hand, the PERT chart can be much more difficult to interpret, especially on complex projects. (See <i>Gantt Chart</i>)
Physical Database Design	Based on the logical data model, the physical database design specifies how the data will be physically stored and accessed, depending on the particular database management system employed.
Project Management Plan (PMP)	A detailed description of an organization's strategies for how a project will be carried out.
Protocol	The special set of rules that allow two systems or devices to communicate with each other.
Responsibility Assignment Matrix	The relationship between the project organization and the Work Breakdown Structure to ensure that each element of the project's scope of work is assigned to an individual.

Request For Proposal (RFP)	A request for an offer from prospective vendors that will indicate in general terms that which is sought to be procured. The RFP will specify the evaluation factors to be used and will contain other contractual terms and conditions applicable to the procurement.
Risks	Identification and assessment of the possible negative impacts of the project on business operations, labor, machine resources, schedules, and costs, including unintended consequences. Two types of risks normally found in a project: Work Package Risk, associated with the achievement of specific goals, and Overall Risk, associated with the project as a whole.
Scalability	Scalability is the ability of a computer application or product (hardware or software) to continue to function well as it, or its context, is changed in size or volume in order to meet a user need.
Scope	The boundaries of a given project which have been agreed upon by the major stakeholders.
Sequential Data Structures	Organizing data in a prescribed ascending or descending sequence. Searching sequential data requires reading and comparing each record, starting from the top or bottom of file.
Stakeholders	An individual or group that has an interest, a right or ownership in the project. I.e. employees, owners, community groups, citizens, suppliers, agencies, and contractors.
Testing	The process of finding out how well something works. In computer hardware and software development, testing is used at key checkpoints in the overall process to determine whether objectives of each phase are being met.
Test Walk-Through	A test before the final acceptance or evaluation to verify that the training environment is ready for learning to take place.
Training Plan	A plan for an instructional endeavor with a specific objective to be met within a prescribed time and dollar limitation. Plans include material to be covered and how instruction will be delivered. Includes Objective, Focus,

Roles, Methods and Short and Long Term Goals of the training.

Transmission

Sending data over a communications line.

Virtual Sequential Access Method (VSAM)

A data storage system used in IBM mainframes. VSAM was designed to improve access time by searching indexes instead of actual files, and organizing data efficiently.

Wide Area Network (WAN)

Wide Area Network - a computer network that covers a relatively large geographical area. Typically, a WAN consists of two or more local area networks (LANs). Computers connected to a wide-area network are often connected through public networks, such as the telephone system. They can also be connected through leased lines or satellites. The largest WAN in existence is the Internet. (See *Local Area Network (LAN)*)

Work-Around

A temporary fix or bypass of a problem in a system.

Work Breakdown Structure (WBS)

A framework for achieving the technical objectives of a product. WBS defines the product or products to be developed or produced. It relates the elements of work to be accomplished to each other and to the end product.

Workflow

The tasks, procedural steps, organizations or people involved, required input and output information, and tools needed for each step in a business process.