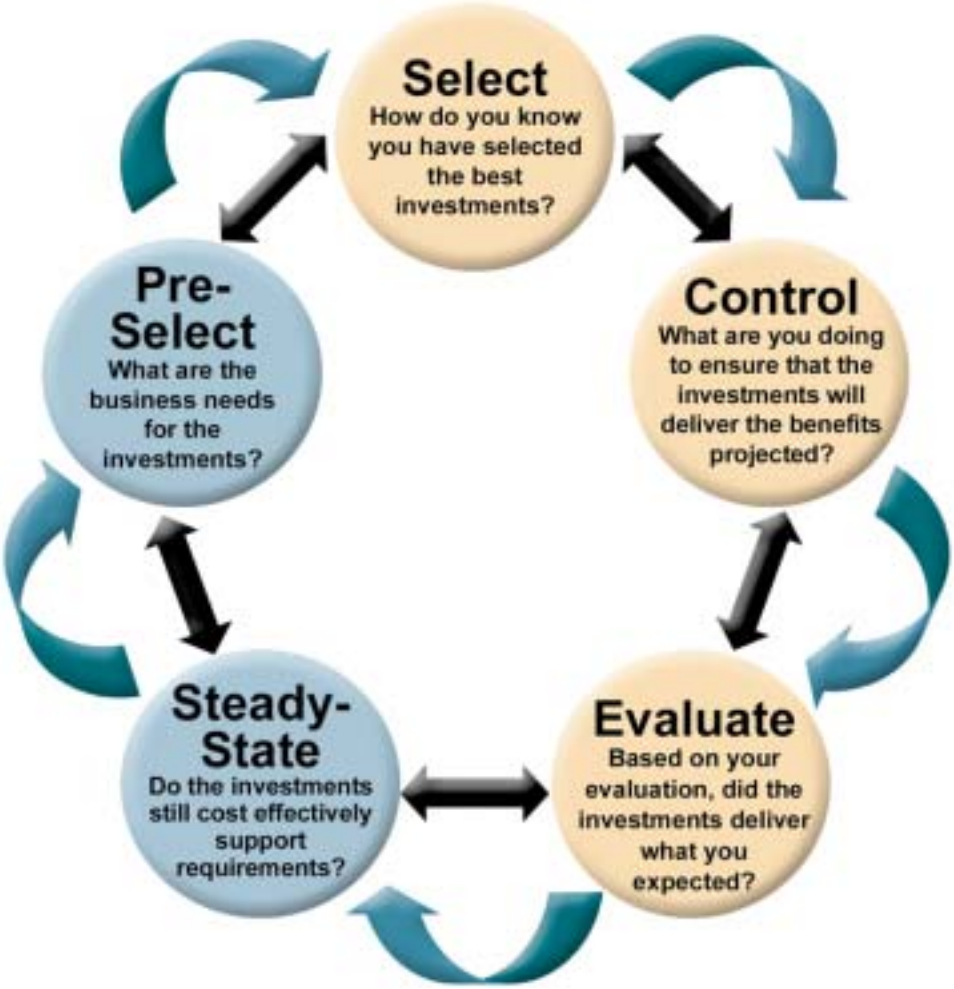
UNITED STATES DEPARTMENT OF AGRICULTURE

INFORMATION TECHNOLOGY CAPITAL PLANNING AND INVESTMENT CONTROL GUIDE



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OFFICE OF THE CHIEF INFORMATION OFFICER

UNITED STATES DEPARTMENT OF AGRICULTURE

TABLE OF CONTENTS

Executive Summary ..... ES - 1
Chapter 1—Introduction ..... 1 - 1
1.1 Purpose ..... 1 - 1
1.2 Legislative Background and Associated Guidance ..... 1 - 1
1.3 Points of Contact ..... 1 - 3
1.4 Scope ..... 1 - 3
1.5 Thresholds for Major IT Investments ..... 1 - 3
1.6 Roles and Responsibilities ..... 1 - 3
1.7 Process Overview ..... 1 - 4
1.8 Process Coordination ..... 1 - 4
1.9 Document Structure ..... 1 - 4
Chapter 2—Pre-Select Phase ..... 2 - 1
2.1 Purpose ..... 2 - 1
2.2 Entry Criteria ..... 2 - 1
2.3 Process ..... 2 - 1
2.4 Exit Criteria ..... 2 - 5
Chapter 3—Select Phase ..... 3 - 1
3.1 Purpose ..... 3 - 1
3.2 Entry Criteria ..... 3 - 1
3.3 Process ..... 3 - 1
3.4 Portfolio Management ..... 3 - 4
3.5 Exit Criteria ..... 3 - 4
Chapter 4—Control Phase ..... 4 - 1
4.1 Purpose ..... 4 - 1
4.2 Entry Criteria ..... 4 - 1
4.3 Process ..... 4 - 1
4.4 Exit Criteria ..... 4 - 8
Chapter 5—Evaluate Phase ..... 5 - 1
5.1 Purpose ..... 5 - 1
5.2 Entry Criteria ..... 5 - 1
5.3 Process ..... 5 - 1
5.4 Exit Criteria ..... 5 - 5
Chapter 6—Steady-State Phase ..... 6 - 1
6.1 Purpose ..... 6 - 1
6.2 Entry Criteria ..... 6 - 1
6.3 Process ..... 6 - 1
6.4 Exit Criteria ..... 6 - 2
Appendix A—Board Procedures ..... A - 1
Appendix B—CPIC Process Checklist ..... B - 1
Appendix C—Mission Needs Statement ..... C - 1
C.1 Purpose ..... C - 1
C.2 Mission Need Statement Template ..... C - 1
Appendix D—Steady-State Investment Review Template ..... D - 1
D.1 Purpose ..... D - 1
D.2 Steady-State Investment Review Template ..... D - 1
Appendix E—Cost-Benefit Analysis ..... E - 1
E.1 Purpose ..... E - 1
E.2 Process ..... E - 1

Appendix F—Risk Assessment....F - 1
F.1 Purpose....F - 1
F.2 Process....F - 1
Appendix G—Performance Measurement....G - 1
G.1 Purpose....G - 1
G.2 Process....G - 1
Appendix H—Project Management....H - 1
H.1 Purpose....H - 1
H.2 Components....H - 1
Appendix I—Earned Value Analysis....I - 1
I.1 Purpose....I - 1
I.2 Process....I - 1
Appendix J—Post-Implementation Reviews....J - 1
J.1 Purpose....J - 1
J.2 Process....J - 1
Appendix K—Strategic Investment Criteria and Bonus Point Evaluation Tools....K - 1
Appendix L—eGovernment....L - 1
L.1 Purpose....L - 1
L.2 USDA's eGovernment Environment....L - 1
Appendix M—OMB Exhibit 300....M - 1
Appendix N—Cyber Security Infrastructure Guide....N - 1
Appendix O—Telecommunications Reference Manual....O - 1
Appendix P—I-TIPS Requirements by Phase....P - 1
P.1 Pre-Select Phase....P - 1
P.2 Select Phase....P - 1
P.3 Control Phase....P - 1
P.4 Evaluate Phase....P - 2
P.5 Steady-State Phase....P - 2
Appendix Q—Quarterly/Milestone Control Review Checklist....Q - 1
Appendix R—Glossary of Terms and Acronyms....R - 1
R.1 Glossary of Terms....R - 1
R.2 Acronyms....R - 6
Appendix S—References....S - 1

UNITED STATES DEPARTMENT OF AGRICULTURE

EXECUTIVE SUMMARY

INFORMATION TECHNOLOGY CAPITAL PLANNING AND INVESTMENT CONTROL GUIDE

In 2002, the United States Department of Agriculture (USDA) will invest over $1.3 billion in information technology (IT) assets and services. The success of these IT investments directly influences the ability of component agencies within USDA to execute business plans and fulfill missions. For example:

- The Food and Nutrition Service is heavily dependent upon Electronic Benefit Transfer (EBT) to carry out its $15 billion Food Stamp Program. About 75 percent of food stamp benefits are currently being issued via EBT.
- The Rural Development mission area is highly dependent upon its information systems to manage its $60 billion loan portfolio.

The Key Components

Recognizing both the importance of IT investments to the organization and its role in supporting the success of these investments, the Office of the Chief Information Officer (OCIO) is engaged in an ongoing effort to establish, maintain, and support an IT investment analysis and decision-making environment. This environment consists of three key components: executive decision-makers, supporting tools, and repeatable processes. Each is described below:

- **Executive decision-makers**—Consists primarily of the Executive Information Technology Investment Review Board (EITIRB) and executive working groups appointed by the EITIRB. These bodies oversee the process and are stakeholders in the success of USDA.
- **Tools**—USDA uses a variety of tools to manage its IT investments. However, the primary tool is the Information Technology Investment Portfolio System (I-TIPS). I-TIPS is a government-standard, Web-based computer system for recording and monitoring IT investments.[1] The OCIO maintains and supports I-TIPS.
- **Processes**—Capital Planning and Investment Control (CPIC) is USDA's primary process for (1) making decisions about which initiatives and systems USDA should invest in and (2) creating and analyzing the associated rationale for these investments.[2] As summarized below, this guide describes the CPIC process in detail.

This Guide

The *USDA Information Technology Capital Planning and Investment Control Guide* identifies the processes and activities necessary to ensure that USDA's investments in IT are well thought out, cost-effective, and support the missions and business goals of the organization. It is based on guidance from both the Office of Management and Budget (OMB) and the Government Accounting Office (GAO). It also incorporates "lessons learned" from USDA's iterations through the process over the last three years.

At the highest level, the CPIC process is a circular flow of USDA's IT investments through five sequential phases. As shown in **Figure ES-1**, these phases are:

- **Pre-Select Phase**—Executive decision-makers assess each proposed investment's support of USDA's strategic and mission needs. Project Managers compile the information necessary for supporting a detailed proposal assessment.
- **Select Phase**—Investment analyses are conducted and the EITIRB chooses the IT projects that best support the mission of the organization, support USDA's approach to enterprise architecture, and are prepared for success.
- **Control Phase**—USDA ensures, through timely oversight, quality control, and executive

1 The specific manner is which I-TIPS is to be used in conjunction with the Capital Planning and Investment Control (CPIC) is identified within this guide.

2 As currently defined, this process affects major information systems that collectively comprise more than 57 percent of the Department's annual IT budget (or about $740 million).

review, that IT initiatives are executed or developed in a disciplined, well-managed, and consistent manner.

- **Evaluate Phase**—Actual results of the implemented projects are compared to performance, identify any project changes or modifications that may be needed, and revise the investment management process based on lessons learned.
- **Steady-State Phase**—Mature systems are assessed to ascertain their continued effectiveness in supporting mission requirements, evaluate the cost of continued maintenance support, assess potential expectations to assess investment performance. This is done to assess the project's impact on mission

technology opportunities, and consider retirement or replacement options.

Each of these five phases is structured in a similar manner using a set of common elements. These common elements provide a consistent and predictable flow and coordination of activities within each phase.

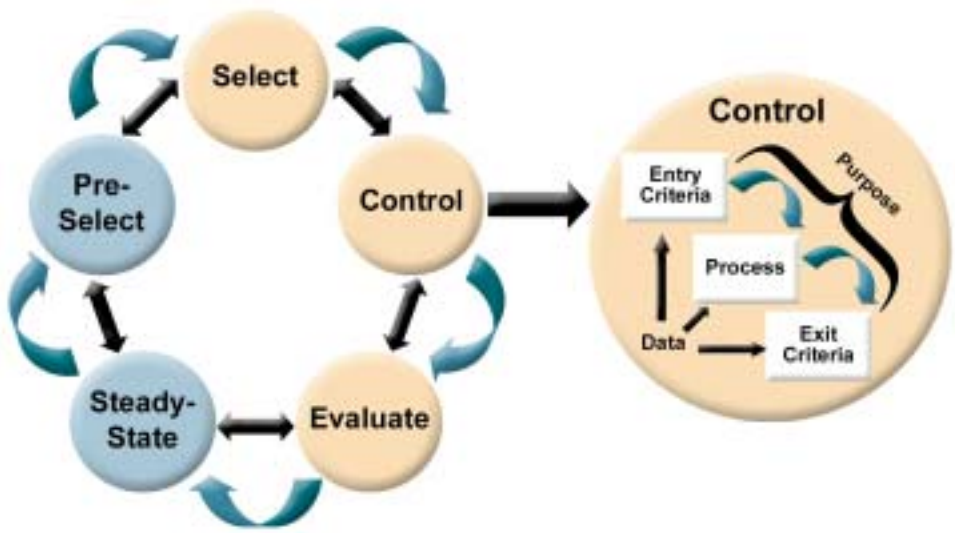


Figure ES-1. The Five CPIC Phases and the Common Elements Within Each Phase

Beyond the detailed CPIC process and activity description, this Guide also includes:

- A charter for the EITIRB and the associated operating procedures necessary to conduct investment reviews
- A template for evaluating the mission need of a new IT investment proposal
- Guidance on how to:
  - ▲ Complete a Cost-Benefit Analysis (CBA)
  - ▲ Conduct a risk assessment for IT capital planning
  - ▲ Develop performance measures for IT projects
  - ▲ Manage IT projects
  - ▲ Conduct earned value analysis
  - ▲ Conduct a Post-Implementation Review (PIR)
- The scoring criteria to be used by the executive working groups and EITIRB during investment reviews
- A glossary of terms and acronyms used throughout this document
- A list of references used to create this document.

For further information on IT investment management or USDA's CPIC process, please

contact Dan Stoltz in the OCIO at either (202) 720- 9080 or at Dan.Stoltz@usda.gov.

CHAPTER 1—INTRODUCTION

1.1 PURPOSE

This document describes the United States Department of Agriculture (USDA) Information Technology (IT) Capital Planning and Investment Control (CPIC) process. As such, it outlines a framework for USDA to manage its IT investment portfolio better. This investment management process allows USDA to optimize the benefits of scarce IT resources, address the strategic needs of USDA, and comply with applicable laws and guidance.

Major investments, while small in number, constitute about half of USDA's IT investment costs each year and can have significant impacts on the efficient and effective operation of USDA agencies and services. **Figure 1-1** shows the size of the major systems budget relative to the entire IT budget for fiscal year (FY) 2001.

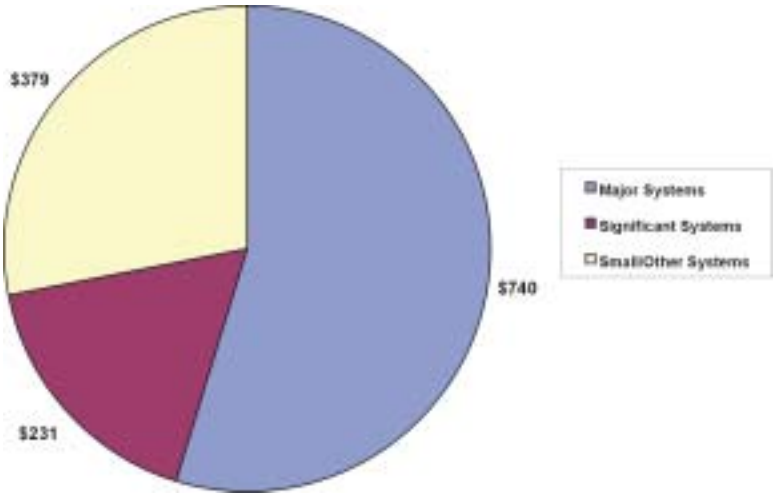


Figure 1-1. USDA FY 2001 IT Investments Budget (in Millions of Dollars as of March 15, 2001)

The CPIC is a structured, integrated approach to managing IT investments. It ensures that all IT investments align with the USDA mission and support business needs while minimizing risks and maximizing returns throughout the investment's lifecycle. The CPIC relies on a systematic pre-selection, selection, control, and on-going evaluation process to ensure each investment's objectives support the business and mission needs of the Department (see **Figure 1-2**).

Through sound management of these investments, the Executive Information Technology Investment Review Board (EITIRB) determines the IT direction for USDA, and ensures that agencies manage IT investments with the objective of maximizing return to the Department and achieving business goals.

1.2 LEGISLATIVE BACKGROUND AND ASSOCIATED GUIDANCE

Five recent statutes require Federal agencies to revise their operational and management practices to achieve greater mission efficiency and effectiveness. These laws include:

- The Chief Financial Officer (CFO) Act of 1990
- The Government Performance and Results Act of 1993 (GPRA)
- The Federal Acquisition Streamlining Act of 1994 (FASA)
- The Paperwork Reduction Act of 1995 (PRA)
- The Clinger-Cohen Act of 1996 (CCA)
- The Government Paperwork Elimination Act of 1998 (GPEA).

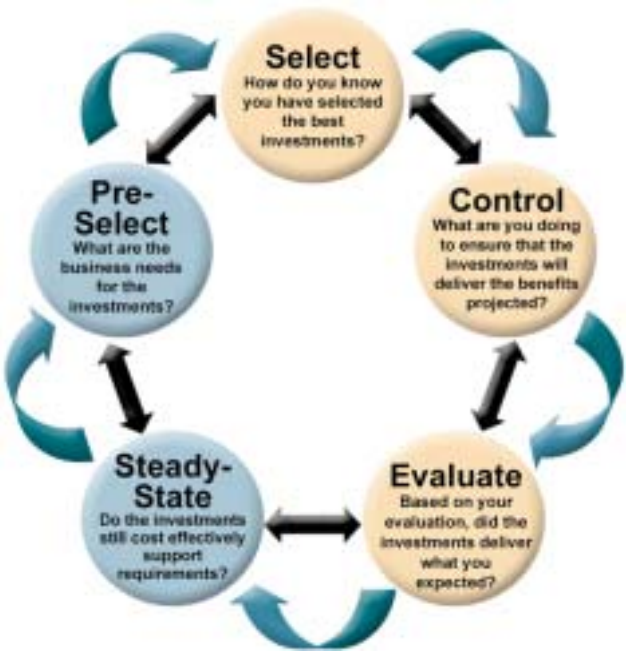


Figure 1-2. CPIC Information and Process Flow

This CPIC Guide is based upon the IT aspects of these laws, and focuses specifically on the CCA requirements. The CCA's objective is that senior managers use a CPIC process to systemically maximize the benefits of IT investments. The Act further describes CPIC as follows:

- "The Head of each executive agency shall design and implement in the executive agency a process for maximizing the value and assessing and managing the risk of the information technology acquisitions of the executive agency" and
- "The process shall:
  1. Provide for the selection of information technology investments to be made by the executive agency, the management of such investments, and the evaluation of the results of such investments;
  2. Be integrated with the processes for making budget, financial, and program management decisions within the executive agency;
  3. Include minimum criteria to be applied in considering whether to undertake a particular investment in information systems, criteria related to the quantitatively expressed projected net risk-adjusted return on investment and specific quantitative and qualitative criteria for comparing and prioritizing alternative information systems investment projects;
  4. Provide for identifying information systems investments that would result in shared benefits or costs for other Federal agencies of State or local governments;
  5. Require identification of quantifiable measurements for determining the net benefits and risks of a proposal investment; and
  6. Provide the means for senior management to obtain timely information regarding the progress of an investment, including a system of milestones for measuring progress, on an independently verifiable basis, in terms of cost, capability of the system to meet specified requirements, timeliness, and quality."

Beyond the legislative background, there is extensive guidance from the Federal Chief Information Officer (CIO) Council, the Office of Management and Budget (OMB), the General Accounting Office (GAO), and others in the area of IT investment management. A list of investment management reference guides and memos is

identified in **Appendix S**. The policy and processes described in this Guide are consistent with this guidance.

1.3 Points of Contact

The CPIC process is primarily supported and maintained by the USDA Office of the Chief Information Officer (OCIO). For further information about this Guide or the CPIC process, please contact Dan Stoltz in the OCIO at either (202) 720-9080 or at Dan.Stoltz@usda.gov.

1.4 Scope

All IT projects within USDA must comply with this CPIC guidance. Exemptions to this guidance are granted only in exceptional circumstances. However, not all IT projects must be reviewed by the EITIRB. Only those IT projects that are considered to be "major" and strategic investments for the Department are required to be included in the EITIRB executive portfolio. It is expected that each individual USDA agency will have a similar CPIC process, manage its own portfolio, and create associated thresholds. At a minimum, each agency is expected to use the CPIC process to manage its "significant" investments.

The thresholds for a project to be considered "major" are described in the following section.

1.5 Thresholds for Major IT Investments

Major IT systems meet at least one of the following criteria:

- Total lifecycle costs greater than $50 million
- Significant multiple-agency impact
- Mandated by legislation or executive order, or identified by the Secretary as critical
- Require a common infrastructure investment
- Department strategic or mandatory-use system
- Significantly differs from or impacts on the Department infrastructure, architecture, or standards guidelines.

These investments are considered to be strategic for the Department and, thus, have a greater documentation burden, including being individually reported to OMB on an Exhibit 300. They are also included in the EITIRB executive portfolio.

1.6 Roles and Responsibilities

The following decision-making bodies and personnel have been assigned the responsibilities listed below.

- **Key Decision-Making Bodies**—The governing and approval bodies responsible for ensuring that proposed investments meet USDA strategic, business, and technical objectives.
- **EITIRB**—Responsible for reviewing and approving strategic investments at USDA. It is staffed by the sub cabinet members and is chaired by the Deputy Secretary and vice-chaired by the CIO. (See **Appendix A—Board Procedures** for the EITIRB Charter).
- **Executive Working Group(s) (EWG)**—Responsible for assessing how well potential major investments meet a predetermined set of capital planning decision criteria and providing recommendations to the EITIRB. The EITIRB appoints Executive Working Groups as needed.
- **OCIO**—Responsible for setting IT policy, reviewing investments, and making recommendations.
- **Key Agency Personnel**—The agency personnel responsible for investment management and successful completion of the CPIC:
- **Agency Head**—Responsible for signing CPIC documentation before submission to OCIO.
- **Agency Sponsor**—Responsible for providing executive sponsorship of the investment; should be a senior level executive within the applicable mission area or agency.
- **Project Sponsor/Functional Manager**—Responsible for the strategic business processes under development or enhancement and for ensuring their integrity; also serves as the primary user interface to the OCIO, EWG, and EITIRB.
- **Project Manager**—Responsible for successful management and completion of one or more IT investments.
- **IT Manager**—Responsible for serving as the primary point of contact for technology issues.

- **Contracting Specialist**—Responsible for serving as the primary acquisition support for the investment and interface between the investment and the Office of Procurement and Property Management (OPPM).
- **Capital Planning Analyst**—Responsible for serving as the primary interface for capital planning between the investment and OCIO.
- **Budget Analyst**—Responsible for serving as the primary interface between the investment and the Office of Budget and Program Analysis (OBPA).

1.7 Process Overview

The CPIC is a fluid, dynamic process in which proposed and ongoing projects are continually monitored throughout their lifecycle. Successful investments and those that are terminated or delayed are evaluated both to assess the impact on future proposals and to benefit from any lessons learned. The CPIC contains five phases (Pre-Select, Select, Control, Evaluate, and Steady-State). As detailed in this document, each phase contains the following common elements:

- **Purpose**—Describes the objective of the phase;
- **Entry Criteria**—Describes the phase requirements, and thresholds for entering the phase;
- **Process**—Describes the type of justification, planning, and review that will occur in the phase; and
- **Exit Criteria**—Describes the actions necessary for proceeding to the next phase.

Completing one phase is necessary before beginning a subsequent phase. Each phase is overseen by the EITIRB, which ultimately approves or rejects an investment's advancement to the next phase. This ensures that each investment receives the appropriate level of managerial review and that coordination and accountability exist. Exceptions to CPIC requirements must be identified in the IT investment's project plan.

USDA agencies and staff offices that have new IT investment proposals meeting the "major" IT investment criteria should prepare an investment proposal according to the guidelines provided in this document. The proposal's length and level of detail should be commensurate with the system's size or impact. These proposals will enter the CPIC process. They will be analyzed by OCIO for quality and conformance to policies and guidelines and reviewed against the applicable strategic investment criteria. OCIO prepares an investment analysis and forwards it, along with the agency investment proposal to an EWG. The EWG review the proposals and OCIO analysis and scores the investment initiative. A recommendation is then prepared and forwarded to the EITIRB for approval/disapproval action. Approval, if granted, is an approval of concept, indicating that the agency or staff office has done the preparatory work necessary to fully justify the investment, and has the mechanisms in place to manage the investment through acquisition, development, implementation, and operation. The investment must still compete for funding through the agency budget process.

1.8 Process Coordination

Investments that have been approved must move through processes to obtain investment funding. The agency is responsible for preparation of budget and/or Working Capital Fund requests for its investment submissions. The agency is also responsible for preparation and submission of IT acquisition moratorium waiver requests when acquisitions for a given investment exceed the current moratorium threshold.

1.9 Document Structure

This document is divided into six chapters and 15 appendices as described below:

- **Chapter 1—Introduction.** Describes the CPIC purpose, scope, thresholds, roles, process, and document structure.
- **Chapter 2—Pre-Select Phase.** Provides a process and mechanism to assess an investment's support of agency strategic and mission needs.
- **Chapter 3—Select Phase.** Provides tools to ensure that IT investments are chosen that best support the agency's mission and that support USDA's approach to enterprise architecture.
- **Chapter 4—Control Phase.** Provides guidance to ensure that IT initiatives are conducted in a disciplined, well-managed, and

consistent manner, which promote the delivery of quality products and result in initiatives that are completed within scope, on time, and within budget.

- **Chapter 5—Evaluate Phase.** Provides guidance on comparing actual to expected results once a project has been fully implemented.
- **Chapter 6—Steady-State Phase.** Provides a means to assess mature systems to ascertain their continued effectiveness in supporting mission requirements and to evaluate the cost of continued support or potential retirement and replacement.
- **Appendices:**
- **Board Procedures**—Provides the EITIRB Charter that includes its roles and responsibilities.
- **CPIC Process Checklist**—Provides a checklist of the process steps investments must complete for each CPIC phase.
- **Mission Needs Statement**—Provides a template for evaluating the mission need(s) for a new IT investment.
- **Steady-State Investment Review Template**—Provides a template for evaluating investments in the Steady-State Phase.
- **Cost-Benefit Analysis**—Provides guidance on completing a Cost-Benefit Analysis (CBA)
- **Risk Assessment**—Provides guidance on conducting a risk assessment for IT capital planning.
- **Performance Measurement**—Provides guidance on developing performance measures for IT investments.
- **Project Management**—Provides guidance on managing IT investments.
- **Earned Value Analysis**—Provides guidance on conducting earned value analysis.
- **Post-Implementation Reviews**—Provides guidance on conducting a Post-Implementation Review (PIR).
- **Strategic Investment Criteria and Bonus Point Evaluation Tools**—Provides the scoring criteria used by an EWG and the EITIRB during the annual investment review.
- **eGovernment** – Provides guidance on eGovernment information to support the investment.
- **OMB Exhibit 300** - This is the basic format for submitting the investment package.
- **Cyber Security Infrastructure Guide** - Provides guidance concerning cyber security information to support the investment.
- **Telecommunications Reference Manual** – Provides guidance on telecommunications information to support the investment.
- **I-TIPS Requirements by Phase**—Provides a summary of the data required in the Information Technology Investment Portfolio System (I-TIPS) for each CPIC phase.
- **Quarterly/Milestone Control Review Checklist**—Lists the critical areas the Control Review Team discusses during each Quarterly/Milestone Review.
- **Glossary of Terms and Acronyms**—Provides definitions for terms and acronyms used throughout this document.
- **References**—Provides a list of references used to develop this document.

CHAPTER 2—PRE-SELECT PHASE

2.1 PURPOSE

The Pre-Select Phase provides a process to assess a current investment's support of agency strategic and mission needs and to provide initial information to further support investments. It is during this phase that the business/mission need is identified and relationships to the Department and/or agency strategic planning efforts are established. There are significant information requirements and a potential expenditure of funds in the preliminary planning phase to prepare for review and selection of IT investments. The Pre-Select Phase provides an opportunity to focus efforts and further the development of the initiative's concept. It also allows project teams to begin the process of defining business requirements and associated system performance metrics, performance measures, benefits, and costs, as well as subsequent completion of a business case and project planning efforts in preparation for inclusion in the Department's investment portfolio.

2.2 ENTRY CRITERIA

Prior to entering the Pre-Select Phase, investments must have a concept to address the mission need that is anticipated to include an IT component and meet at least one of the threshold criteria identified in section **"**1.5—Thresholds for Major IT Investments."

2.3 PROCESS

During the Pre-Select Phase, mission analysis results in the identification of a mission need necessitating consideration of an IT alternative. The mission analysis and corresponding development of the Mission Needs Statement (see **Appendix C—Mission Needs Statement**) are closely linked to the strategic planning process of the USDA and sponsoring agency. Following mission analysis, the Functional Manager further develops the proposed solution's concept. Objectives are established, evaluation criteria are defined, concept alternatives are identified, and an alternative analysis approach is documented as part of the concept management plan to support concept and mission need approval. A preliminary business case with budget estimates and associated CBA is also completed.

Table 2-1 provides a summary of the Pre-Select Phase process, as well as the individual(s) and/or group(s) responsible for completing each process step. Each step is detailed following the table.

Process Step	Responsible Individual(s) or Group(s)
Identify Project Sponsor.	Agency Head
Conduct mission analysis.	Functional Manager
Develop concept.	Functional Manager
Prepare preliminary business case.	Functional Manager
Prepare investment review submission package.	Project Manager Functional Manager Agency Sponsor
Review/approve investment submission.	Agency Head
Review initiative and recommend appropriate action.	OCIO EWG
Make final investment decisions.	EITIRB

Table 2-1. Pre-Select Phase Process Flow

1. Identify Project Sponsor

The Agency Head identifies a Project Sponsor for each accepted proposal. The Project Sponsor will normally be the same person as the Functional Manager but if the investment is crosscutting, strategic, or high visibility, the Project Sponsor may be different from the Functional Manager. The Project Sponsor should be a senior individual in the organization with requisite management, technical, and business skills to lead the investment or supervise a designated Project Manager.

The Project Sponsor is the business leader responsible to the EITIRB for the investment as it continues through the CPIC process. Commercial and government best practices show that IT investments championed by a business leader have the best chance for successful deployment. This commitment by the Project Sponsor to the EITIRB represents accountability for the investment.

2. Conduct Mission Analysis

Mission analysis is a strong, forward-looking, and continuous analytical activity that evaluates the capacity of the Department's and/or agency's assets to satisfy existing and emerging demands for services. Mission analysis enables the Department and/or agency to determine and prioritize the most critical capability shortfalls and best technology opportunities for improving the USDA's overall security, capacity, efficiency, and effectiveness in providing services to customers.

Mission analysis is conducted within the framework of both the Department's and the sponsoring agency's enterprise architecture and long-range strategic goals. In turn, mission analysis contributes strongly to the evolution of strategic planning and USDA IT architecture development. (See **Appendix C—Mission Needs Statement** for a template on how to conduct mission analysis).

Consequently, mission analysis yields the identification of critical needs the Department should address. It estimates the resources the agency and/or Department will likely be able to commit to each mission need, in competition with other needs, within the constraint of a realistic projection of future agency budget authority. The resource estimate becomes a "placeholder" until the mission need is approved. More accurate resources quantification is conducted during the investment analysis if the investment is selected as part of the Department's portfolio. The resource estimate is a function of the benefit to the agency and the mission area, the cost of not addressing the need (e.g., poor customer responsiveness, increased maintenance cost, lost productivity, etc.), and the likely extent of required changes to the agency's infrastructure.

If the mission analysis reveals a non-IT solution (e.g., a rulemaking/policy change, operational procedural change, or transfer of systems between sites) that can satisfy a capability shortfall and can be achieved within approved budgets, it can be implemented without proceeding further in the CPIC process.

A mission analysis should identify the business drivers (i.e. agency mission, vision, goals, objectives, and tactical plans.) Business drivers often involve the need to assist customers in a particular service area such as farm loans.

Once the key business drivers have been identified, a business requirements analysis is conducted. The business requirements analysis identifies how personnel conduct business activities in order to fulfill mission requirements, meet objectives and perform their tactical plans.

All Mission Needs Statements will emerge from a structured mission analysis. However, any individual or organization may propose a mission need based on a perceived capability shortfall or technological opportunity. Examples of potentially valid needs that could originate outside USDA lines of business include those related to socioeconomic and demographic trends, the environment, statutory requirements, or an industry-developed technological opportunity. These shortfalls and opportunities should be identified to the appropriate Functional Manager who will determine how mission analysis should be conducted to validate, quantify, and prioritize the proposed need.

USDA lines of business conduct mission analysis within their areas of responsibility. The principal activities of mission analysis are:

- Identify and quantify projected demand for services based on input from diverse sources

such as the agriculture/rural community; architecture and strategic planners for services needed in the future; and integrated project teams (IPTs) in the form of performance and supportability trends of fielded systems. Identify and quantify projected technological opportunities that will enable the USDA to perform its mission more efficiently and effectively.

- Identify and quantify existing and projected services based on information from field organizations, the enterprise architecture, and IT asset inventory that defines what is in place and what is approved for implementation.
- Identify, analyze, and quantify capability shortfalls (i.e., the difference between demand and supply) and technological opportunities to increase quality of service, efficiency, and effectiveness.
- Identify the user and customer base affected.
- Prepare a Mission Needs Statement that summarizes the mission analysis for inclusion with the Pre-Select CPIC packet submission.

When mission analysis identifies a capability shortfall or technological opportunity, the results are summarized in a Mission Needs Statement. The Mission Needs Statement must clearly describe the capability shortfall and the impact of not satisfying the shortfall, or the technological opportunity and the increase in efficiency it will achieve. The Mission Needs Statement also must assess the criticality and timeframe of the need, and roughly estimate the resources the agency should commit to resolving it based on worth, criticality, and the scope of likely changes to the agency's IT asset base. This information forms the basis for establishing the priority of this need in competition with all other agency and/or Department needs.

3. Develop Concept

Concept development provides the opportunity for further examination of a proposed solution. It focuses on an analysis of alternatives to meet the mission need and initial planning for entering into the Select Phase. Key components include analysis of alternatives and an examination and redesign of business practices.

The following activities are conducted during concept development:

- Assess Mission Needs Statement.
- Identify business objectives based on mission analysis and Mission Needs Statement.
- Discuss the proposed investment in relation to the OMB's "Pesky Questions:"
  - Does the investment in major capital asset support core/priority mission functions that need to be performed by the Federal Government?
  - Does it have to be undertaken by the requesting agency because no alternative private sector or government source can more efficiently support the function?
  - Does the investment support work processes that have been simplified or otherwise redesigned to reduce costs, improve effectiveness, and make maximum use of commercial-off-the-shelf (COTS) technology?
- Identify high-level performance measures. (Additional detailed performance measures will be developed as part of the Select Phase.)
- Determine key selection criteria to evaluate concept alternatives that support high-level performance measures and business objectives.
- Ensure solution aligns with agency standards for Enterprise Architecture Planning, Security & Privacy, and eGovernment Planning.
- Identify alternatives that will be analyzed to support mission need and business objectives.
- Conduct preliminary planning and develop a Concept Management Plan addressing Select Phase preparation, alternative analysis approach, and business redesign/reengineering. (Raines' Rules requires that before new systems are fielded the business process owners must simplify or otherwise redesign their existing processes before they invest in new IT to support the process.) Plans for redesign or Business Process Reengineering (BPR) should be presented as part of the Pre-Select submission.

4. Develop Preliminary Business Case

The business case provides the necessary information to build support and make funding decisions for an investment. While the primary

emphasis of the Pre-Select Phase is on mission and strategic needs analysis, it also requires the Functional Manager to begin identifying alternative solutions and developing an order of magnitude estimate of costs and benefits (both quantitative and qualitative) that may be realized by a given investment. Initial business case development activities include a preliminary budget estimate and preliminary CBA, as discussed below.

- **Prepare preliminary budget estimate**—The preliminary budget estimate should provide an estimate of costs necessary to support more detailed planning and concept development prior to investment selection, and provide an order of magnitude estimate of budget requirements to support a five-year budget plan and lifecycle costing.
  - As part of the preliminary budget estimate, a preliminary Security and Telecommunications Infrastructure Analysis should be performed to determine estimated baseline costs for these two cost elements. This information should be included with the investment's preliminary budget estimate. Detailed information concerning the preparation of a security and telecommunications infrastructure analysis can be found in **Appendix N—Cyber Security Infrastructure Guide** and **Appendix O—Telecommunications Reference Manual**
- **Prepare Preliminary CBA**—The preliminary CBA will provide initially anticipated costs and benefits of the proposed investment. Costs should be the same as those identified in the budget estimate and benefits should be aligned with the investment objectives and high-level performance measures.

5. Prepare Investment Review Submission Package

The Project Manager, Functional Manager, and Agency Sponsor prepare the Pre-Select submission package in preparation for USDA's annual investment review.

- Introduction and brief overview of mission need
- Mission Needs Statement
- OMB's "Pesky Questions" Analysis
- Concept Management Plan
- Preliminary CBA and budget estimate
- Address eGov, EA, and Telecommunications scoring factors.

The format for submitting the Investment Package summary is the revised OMB Exhibit 300 found in Appendix M. Other supporting investment documentation to evaluate other key areas is located in the Appendix Section of this document and should be attached, as needed, to the Exhibit 300. Note that projects that provide insufficient business case documentation will not be included in the IT Investment Portfolio or forwarded to the Office of Management and Budget as part of USDA's IT request.

6. Review/Approve Investment Submission

The Agency Head reviews the investment submission and requests the Functional Manager and/or Agency Sponsor to update the package or make changes as needed. The Agency Head then approves the investment submission and forwards it to the OCIO.

7. Review Initiative and Recommend Appropriate Action

The OCIO reviews the package and provides any comments and/or questions to the agency. The agency addresses the issues and sends an updated package to the OCIO. The OCIO forwards the updated package with its assessment to an EWG for review. The EWG assesses the investment with an emphasis on mission alignment and the proposed concept management plan. This information is then linked to future portfolio selection decisions. The EWG lastly forwards their investment recommendations to the EITIRB for the final decision.

8. Make Final Investment Decisions

The EITIRB reviews the EWG's recommendation and makes the final investment decisions. If the EITIRB approves the EWG's recommendation, the Agency Sponsor moves forward with alternative analysis, detailed CBA, and risk assessment, and begins to prepare for the investment's portfolio selection.

2.4 EXIT CRITERIA

Prior to exiting the Pre-Select Phase, investments must obtain EITIRB approval for the mission need and concept.

CHAPTER 3—SELECT PHASE

3.1 PURPOSE

In the Select Phase, USDA ensures the IT investments that best support the mission and USDA's approach to enterprise architecture, are chosen and prepared for success (i.e., have a good project manager, are analyzing risks, etc.). Individual investments are evaluated in terms of technical alignment with other IT systems and projected performance as measured by Cost, Schedule, Benefit, and Risk (CSBR). Milestones and review schedules are also established for each investment during the Select Phase.

In this phase, USDA prioritizes each investment and decides which investments will be included in the portfolio. Investment submissions are assessed against a uniform set of evaluation criteria and thresholds. The investment's CSBR are then systematically scored using objective criteria and the investment is ranked and compared to other investments. Finally, the EITIRB selects which investments will be included in the Department's portfolio.

3.2 ENTRY CRITERIA

Prior to entering the Select Phase, investments must have obtained EITIRB approval for the mission need and concept.

3.3 PROCESS

The Select Phase begins with an investment concept (approved during the Pre-Select Phase) and moves through the development of the business case, acquisition plan, risk analysis, performance measures, and a project plan. These plans lay a foundation for success in subsequent phases. The Select Phase culminates in a decision whether to proceed with the investment.

Table 3-1 provides a summary of the Select Phase process, as well as the individual(s) and/or group(s) responsible for completing each process step. Each step is detailed following the table.

Process Step	Responsible Individual(s) or Group(s)
Review the Mission Needs Statement and update if needed.	Functional Manager
Approve Integrated Project Team membership.	Agency Head
Identify funding source and obtain agency approvals.	Project Sponsor
Develop major investment supporting materials.	Project Sponsor
Prepare IT investment review submission.	Project Sponsor
Review/approve investment submission.	Agency Head
Review initiative and recommend appropriate action.	OCIO EWG
Make final investment decisions.	EITIRB

Table 3-1. Select Phase Process Flow

1. Review the Mission Needs Statement and Update if Needed

The Functional Manager reviews the Mission Needs Statement and other documentation completed during the Pre-Select Phase and makes any necessary changes. Next, the Functional Manager develops quantifiable performance measures that focus on outcomes where possible (see **Appendix G—Performance Measurement**). The Functional Manager also describes the qualitative improvements in measurable terms such as customer satisfaction. These performance measures will form a basis for judging investment success.

2. Approve Integrated Project Team Membership

The Agency Head approves the selection of the IPT members that will assist the Project Sponsor and Project Manager in the initiative's

development. The IPT brings together expertise from functional areas as required by the specifics of the initiative. A Capital Planning Analyst from the OCIO Information Resource Management (IRM) office will work with and provide guidance to the IPT throughout the process.

Serving on the IPT will normally be an additional duty but initiative size or potential impact may increase commitment. The IPT should consist of functional experts in the following areas:

- Functional Manager with program experience
- IT Manager with experience in proposed technology
- Telecommunications specialist
- Cyber security specialist
- Agency Budget Analyst
- Contracting Specialist.

Additional staff may be added from other functional areas as needed.

3. Identify Funding Source and Obtain Approvals

The Project Sponsor identifies a potential funding source for the EITIRB to continue investment support. The Project Sponsor then gets approval from the offices listed in **Table 3-2**, as needed, depending upon the investment's characteristics. The members of the IPT should assist in coordinating these actions within their respective functional areas.

Office	Characteristic that triggers office approval request
OCIO	Investment exceeds agency threshold.
Office of Chief Financial Officer (OCFO)	Investment involves an appropriation, accounting, or financial system.
OPPM	IT system more than $25 million or Office of Operations system more than $50 million.
Contracting Officer	Determining acquisition strategy, i.e.,, capability to use the Office of Small and Disadvantaged Business Utilization programs for procurement.
Office of General Counsel	Legal review of solicitation documents more than $500,000.
OBPA	Ensure investment is included in budget submission.

Table 3-2. Approval Requirements

4. Develop Major Investment Supporting Materials

The Project Sponsor ensures, that for each investment, the following studies are completed and the results are submitted to the OCIO:

- Business Profile:
  - Business Case with Performance Measures (see **Appendix G—Performance Measurement**) and mission needs statement
  - Functional Requirements
  - Feasibility Study.
- Risk Profile:
  - Risk Assessment and Mitigation Plan (see **Appendix F—Risk Assessment**)
  - Initiative Pilot/Prototype Plans.
- Financial Profile:
  - Return on Investment (ROI) and CBA (see **Appendix E—Cost-Benefit Analysis**)
  - Update lifecycle cost projections
  - Alternatives Analysis
  - Funding Source Identification.
- Technological Profile:
  - Technical Requirements
    - Security Plan (see Appendix N – Cyber Security Infrastructure Guide

for instructions on preparing security plan documentation)

- Telecommunications Plan (see Appendix O—Telecommunications Reference Manual for instructions on preparing telecommunications documentation)
- Enterprise Architecture Plan (see http://www.ocio.usda.gov/irm/e_arch/index.html
- eGovernment Plan
- Relationship to Existing Systems (Dependencies).

- Management and Planning Profile
  - Project Plan, including a list of team members
  - Telecommunications Risk and Mitigation Plan
  - Integrated Logistics Plan (if required)
  - Acquisition Plan and strategy
  - Independent Verification and Validation (IV&V) Documentation (if warranted).

A "Concept of Operations," is developed to describe how the new system will work and satisfy business requirements.

Focus should be placed on the functional integration of Department level IT Enterprise Architecture Planning, Telecommunications Planning, and eGovernment Planning.

5. Prepare IT Investment Review Submission

The Project Sponsor also prepares the submission package in preparation for USDA's annual investment review. The format for submitting the Investment Package summary is the revised OMB Exhibit 300 found in Appendix M. Key elements of the 300 submission are listed below. Other supporting investment documentation to evaluate other key areas are located in the Appendix Section of this document and should be attached, as needed, to the Exhibit 300. Note that projects that provide insufficient business case documentation will not be included in the IT Investment Portfolio or forwarded to the Office of Management and Budget as part of USDA's IT request.

- Introduction and brief overview of the investment
- Mission Needs Statement
- Acquisition strategy
- Initial project plan with estimated costs listed for each work breakdown structure (WBS)
- CBA and budget estimate, including risk-adjusted ROI and net present value (NPV) calculations
- Risk
- Security (see **Appendix N—Cyber Security Infrastructure Guide** for instructions on preparing security plan documentation)
- Performance goals
- Architecture, including IT accessibility for persons with disabilities (Section 508)
- Telecommunications Plan (see **Appendix O—Telecommunications Reference Manual** for instructions on preparing telecommunications plan documentation)
- Secretarial priority.

6. Review/Approve Investment Submission

The Agency Head reviews the investment submission and requests the Project Sponsor, Functional Manager, and/or Agency Sponsor to update the package or make changes as needed. The Agency Head then approves the investment submission and forwards it to the OCIO.

7. Review Initiative and Recommend Appropriate Action

The OCIO reviews the investment based on the established criteria. The OCIO provides any comments and/or questions to the agency. The Functional Manager works with the OCIO to address the issues and furnish details as requested, and sends an updated package to the OCIO. The OCIO forwards the updated package, along with its assessment, to an EWG for review. The EWG reviews the investment for compliance with Departmental strategic, legislative, and budgetary goals. The EWG uses standard criteria to objectively compare investments based on the data presented, and scores projects using the criteria listed in **Appendix K—Strategic Investment Criteria and Bonus Point Evaluation Tools**. The EWG then forwards their investment recommendations to the EITIRB for the final decision.

8. Make Final Investment Decisions

The EITIRB reviews the EWG's recommendation and makes the final investment decisions. If the EITIRB approves the EWG's recommendation, then the decision is implemented and a review schedule for the Control Phase is established in concert with the OCIO and EWG. The initiative then moves to the Control Phase.

3.4 Portfolio Management

To support the Department's portfolio management efforts, assessors should note substantiating evidence for their investment evaluations and scores as much as possible. Additionally, the EWG members should establish an acceptable ratio of high, medium, and low risk investments to achieve organizational objectives and future needs. The balance between the various risks of the Technical, Operational, Financial, and Organizational components are part of portfolio selection. The EWG and EITIRB should consider the ratio in different categories of investments—based on their functionality. Additionally, both the EWG and EITIRB should take a strategic view of their recommendations. This view should:

- Use a broad understanding of the environment and the Department's need in identifying which investments produce the maximum results per the CCA
- Consider public and Congressional interest in IT investment decisions
- Determine which investments are of particular interest to the Department (through its strategic goals and policies), Administration, and Congress
- Consider Enterprise Architecture, eGovernment, and Telecommunications Frameworks when analyzing Department portfolio's.
- Consider the results of not selecting the investment
- Evaluate mandatory investments in terms of the overall pool and whether the investment must be made now or in the future
- Consider whether the investment meets minimum legal requirements or goes beyond legal mandates, leading to unnecessary costs.

3.5 Exit Criteria

Prior to exiting the Select Phase, investments must have:

- Established performance goals and quantifiable performance measures
- Developed a project plan which details quantifiable objectives including an acquisition schedule, project deliverables, and projected and actual costs
- Identified costs, schedule, benefits, and risks
- Established security, telecommunications, Section 508 (IT accessibility), and architecture goals and measures
- Established an EWG and EITIRB investment review schedule for the Control Phase
- Obtained EITIRB approval to enter the Control Phase.

The Functional Manager may further develop IT investments not approved by the EWG and EITIRB for inclusion at a subsequent review.

CHAPTER 4—CONTROL PHASE

4.1 PURPOSE

The objective of the Control Phase is to ensure, through timely oversight, quality control, and executive review, that IT initiatives are conducted in a disciplined, well-managed, and consistent manner. Investments should be closely tracked against the various components identified in the Risk Assessment and Mitigation Plan developed in the Select Phase. This phase also promotes the delivery of quality products and results in initiatives that are completed within scope, on time, and within budget. During this process, senior managers regularly monitor the progress/performance of ongoing IT investments against projected cost, schedule, performance, and delivered benefits.

Although USDA usually selects new investments annually, the Control Phase is an ongoing activity. It requires the continuous monitoring of ongoing IT initiatives through the development or acquisition lifecycle. USDA reviews occur before the annual budget preparation process. Additionally, periodic summary reviews are completed based on the review schedule completed during the Select Phase.

The Control Phase is characterized by decisions to continue, modify, or terminate a program. Decisions are based on reviews at key milestones during the program's development lifecycle. The focus of these reviews changes and expands as the investments move from initial concept or design and pilot through full implementation and as projected investment costs and benefits change. The reviews focus on ensuring that projected benefits are being realized; cost, schedule and performance goals are being met; risks are minimized and managed; and the investment continues to meet strategic needs. Depending on the review's outcome, decisions may be made to suspend funding or make future funding releases conditional on corrective actions.

4.2 ENTRY CRITERIA

Prior to entering the Control Phase, investments must have:

- Established performance goals and quantifiable performance measures
- Developed a project plan which details quantifiable objectives, including an acquisition schedule, project deliverables, and projected and actual costs
- Identified costs, schedule, benefits, and risks
- Established security, telecommunications, Section 508 (IT accessibility), and architecture goals and measures
- Established an EWG and EITIRB investment review schedule for the Control Phase
- Obtained EITIRB approval to enter the Control Phase.

Once the investment enters the Control Phase, the IPT will monitor the investment throughout development and report investment status to the investment's sponsors and oversight groups.

4.3 PROCESS

During the Control Phase, an investment progresses from requirements definition to implementation. Throughout the Phase, agency CIOs provide the OCIO and the EWG with investment reviews to assist them in monitoring all investments in the portfolio. Investment reviews provide an opportunity for Project Managers to raise issues concerning the IT developmental process, including security, telecommunications, enterprise architecture alignment, eGovernment (GPEA compliance) and Section 508 concerns.

The ability to adequately monitor IT initiatives relies heavily on the outputs from effective investment execution and management activities. The EWG, in coordination with the OCIO, develops a master milestone review calendar for evaluation and approval by the EITIRB. The OCIO maintains a control review schedule for all initiatives in the Department's IT investment portfolio and monitors investments quarterly. **Appendix Q** provides an outline of the items agencies must address in writing for each quarterly or milestone control review. The EWG and EITIRB review investments at their discretion or if the cost, schedule, or performance varies more than 10 percent from expectations.

The EWG and EITIRB reviews are based on factors including the strategic alignment, criticality,

scope, cost, and risk associated with all initiatives. The Project Sponsor establishes milestones as part of the investment baseline against which performance will be measured throughout the Control Phase. Agencies are expected to uphold these milestones; OMB will hold agencies responsible for meeting milestones as originally indicated in the baseline. After establishing the milestones, the Project Sponsor revises the project plan as required to meet the approved milestones. It is recommended that the project plan include a system pilot during the Control Phase because piloting helps reduce risk and provides a better understanding of costs and benefits.

Table 4-1—provides a summary of the Control Phase process, as well as the individual(s) and/or group(s) responsible for completing each process step. Each step is detailed following the table.

Process Step	Responsible Individual(s) or Group(s)
Establish and maintain initiative and security costs, schedule, and technical baselines.	Project Sponsor
Maintain current initiative and security costs, schedule, technical, and general status information.	Project Sponsor
Assess initiative progress against performance measures.	Project Sponsor IPT Agency Sponsor
Prepare annual investment review submission package.	Project Sponsor
Review/approve investment submission.	Agency Head
Review initiative and recommend appropriate action.	OCIO Functional Manager EWG
Make final investment decisions.	EITIRB
Work with Project Sponsor to develop solutions.	OCIO EWG Project Sponsor

Table 4-1. Control Phase Process Flow

1. Establish and Maintain Initiative and Security Costs, Schedule, and Technical Baselines

The Project Sponsor establishes the project management and executive plans, procedures, and practices to support initiative monitoring activities. The Project Sponsor coordinates with the Integrated Project Team (IPT) to identify any new or existing internal risks based upon review of the Work Breakdown Structure (WBS), Project Plan, Risk Checklist, and stakeholder interviews. Financial, Technical, Operational, Schedule, Legal and Contractual, and Organizational Risks should be identified and monitored. The Project Sponsor provides periodic updates to the OCIO and/or EWG on the investment's status and security costs, schedule, and technical baselines. The Project Sponsor ensures that the project has been planned realistically. Key personnel and Subject Matter Experts (SME's) for functional areas should be identified and labor costs quantified. The Project Sponsor develops a project plan including project metrics, a Work Breakdown Structure (WBS), and a schedule with firm milestones.

2. Maintain Current Initiative Cost and Security Costs, Schedule, Technical, and General Status Information

The Project Sponsor collects actual information on the resources allocated and expended throughout the Control Phase. The Project Sponsor ensures that the investment still aligns with the Agency Mission, Strategic Planning, Enterprise Architecture Planning, Telecommunications Planning, and eGovernment Planning. The Project Sponsor compares the actual information collected to the estimated baselines developed during the

Select Phase and identifies root causes for any differences. The Project Sponsor reviews the security and telecommunications infrastructure analyses for accuracy and updates cost information based on actual acquisitions or additional items included since the Select Phase (see Appendix for Telecom and Cyber Security Infrastructure Guide). The Project Sponsor also maintains a record of any changes to the initiative's technical components, including hardware, software, security, and communications equipment. Technical component changes may trigger a new architecture review.

3. Assess Initiative Progress Against Performance Measures

As part of the periodic milestone reviews during the Control Phase, the Project Sponsor and IPT determine whether there is still a business case to continue the initiative. The Project Sponsor and IPT determine if the project team is managing investment cost and schedule variance, mitigating future variances, and providing expectation of future performance based upon work accomplished to date. The Project Sponsor establishes whether current cost and schedule projections align with investment implementation (e.g., based upon an assumption of baseline actual costs 10 % greater than actuals, what are the expectations of future performance)? If the case continues to be valid, the Project Sponsor and the IPT re-screen the initiative to assess its progress against planned cost, schedule, and technical baselines. The primary purpose of this assessment is to ensure the initiative is on schedule and to help identify issues or deficiencies that require corrective action. In some instances, where the business case may no longer exist or be as strong, or if significant changes to the cost, schedule, and technical baselines are required, it may also be necessary to re-score the initiative.

To begin the control screening stage, the Project Sponsor updates the documentation set with data on planning and risk information and initiative performance, as detailed in **Table 4-2**.

Planning and Risk Information	Initiative Performance
Investment description	Requirements changes
Project organization	Risk and mitigation list
Security review	Current project organization
Risk assessment and mitigation plan	Current estimate to complete
Initiative budget estimates	Planned vs. actual costs, schedule, and staffing
Initiative timeframe	Current deliverable assignments
Key milestone schedule	Updated technical approach
Identified tasks	Updated architecture
Resource identification	Security risk and mitigation
Work product and deliverable requirements	Telecommunications risk and mitigation
Technical approach and architecture	Initiative action-items
Telecommunications plan	Quality assurance audits
Quality and configuration management activities.	Updated project plan
	Earned value analysis.

Table 4-2. Control Screening Stage Data Requirements

The Project Sponsor and the IPT next answer two basic questions for the OCIO, EWG, and EITIRB:

- Is there still a need for the initiative?
- Does the initiative meet and will it continue to meet its planned cost, schedule, technical, telecommunications, and security baselines?

In order to answer these questions, the Project Sponsor and agency IPT need apply the Department's control screening criteria (see **Appendix K—Strategic Investment Criteria and Bonus Point Evaluation Tools.**) If the initiative cannot be assessed affirmatively against the

control screening criteria, the initiative should be re-scored.

Using the control screening criteria to answer the questions on whether the initiative has met expectations will support the decision on whether to continue with the investment, and identify any deficiencies and corrective actions needed. Updated investment information is submitted to the OCIO and EWG. The OCIO and EWG expect the Project Sponsor to determine whether the investment is meeting expectations by addressing these questions quarterly and updating the baseline status prior to the scheduled milestone reviews. Additionally, each year the investment will undergo a comprehensive control review during the annual investment review. The results of these more detailed reviews are used by the EWG and EITIRB during preparation of the Department's IT investment portfolio.

At the conclusion of control screening, the Project Sponsor and IPT determine whether the investment should be re-scored by considering the investment status (cost, schedule, risk, and architecture) and the extent to which the investment is on target or varies from the planned baselines. The level of variance determines the criticality of re-scoring the investment. Re-scoring is strongly recommended for investments that vary more than 10 percent from the original baseline in cost or schedule or if the investment risks or architectural alignment has deviated from baseline assumptions. Indicators of increased risk or architectural complexity include a high number of development change requests, reduced levels of stakeholder involvement and commitment, or significant deviation of architectural components from the baseline or the Information System Technology Architecture (ISTA) or security architecture. **Table 4-3** presents the framework that the Project Sponsor and IPT employ to recommend which IT initiatives should be re-scored.

	I High Variance (>10%)	**II Medium Variance (5-10%)**	**III Low Variance (<5%)**
Benefit			
Cost			
Schedule			
Risk (describe the type, level, impact, and probability of major risk factors)			
Architecture (describe the degree of consistency with the agency and Departmental baseline and planned EA IT accessibility and security architecture)			
Recommended Action	**Re-Scoring Strongly Recommended**	**Re-Scoring May Be Recommended**	**Re-Scoring Not Likely to Be Necessary**

Table 4-3. Re-Scoring Framework

The Project Sponsor and agency IPT should be judicious in determining whether an investment should be re-scored, since it can be a time-consuming and resource intensive activity. For example, an investment may vary dramatically from the original baseline in one category, but if the Project Manager has a sound plan to address the variance, re-scoring may not be needed. The OCIO and EWG should also consider the effect a dramatic variance in one category may have on

another category but which may not be reflected in the assessment. For example, if an investment is deviating from original technical or architectural plans, a variance in the original cost is likely and should be reflected in the variance section of the control data sheet. Additionally, the requirement for the investment may have been overtaken by events (e.g., architectural changes or regulatory changes) and the OCIO and EWG may determine if it is appropriate to re-score the initiative to determine whether it is still viable.

Based on the initiative status and identified variances, the Project Sponsor, Functional Manager, or Agency Sponsor decides whether the initiative should be re-scored. If needed, the Project Sponsor, assisted by the agency IPT, re-scores the investment and submits a revised scorecard. The revised scorecard is reflected in an initiative Control Status Report, prepared by the Project Sponsor, Functional Manager, or Agency Sponsor, and includes recommended corrective actions for the OCIO and EWG to review. Re-scored initiatives may compete against other new initiatives as part of the Select Phase. As in the Select Phase, the scorecard and other factors will assist the EWG and EITIRB in determining the investment's future status. It is expected that most initiatives will not need to be re-scored and will move forward for status review and decision.

4. Prepare Investment Review Submission Package

Each investment in the Control Phase will be evaluated during the annual investment review. The format for submitting the Investment Package summary is the revised OMB Exhibit 300 found in Appendix M. Key elements of the 300 submission are listed below. Other supporting investment documentation to evaluate other key areas are located in the Appendix Section of this document and should be attached, as needed, to the Exhibit 300. Note that projects that provide insufficient business case documentation will not be included in the IT investment Portfolio or forwarded to the Office of Management and Budget as part of USDA's IT request.

- Introduction and brief overview of the investment
- Cost vs. baseline
- Schedule vs. baseline
- Performance vs. baseline
- Validated/updated CBA
- Risk
- Security (see Appendix N—Cyber Security Infrastructure Guide for instructions on preparing security plan documentation)
- Architecture, including IT accessibility for persons with disabilities (Section 508)
- Telecommunications Plan (see Appendix O – Telecommunications Reference Manual for instructions on preparing telecommunications plan documentation)
- Secretarial priority.

5. Review/Approve Investment Submission

The Agency Head reviews the investment submission and requests the Project Sponsor, Functional Manager, and/or Agency Sponsor update the package or make changes as needed. The Agency Head then approves the investment submission and forwards it to the OCIO.

6. Review Initiative and Recommend Appropriate Action

The OCIO assesses the investment's progress using a methodology similar to the procedures used during the Select Phase. The OCIO provides any comments and/or questions to the agency. The Functional Manager works with the OCIO to address the issues and furnish details as requested, and sends an updated package to the OCIO. The OCIO forwards the updated package, along with its assessment, to the EWG for review. The EWG reviews the investment and determines whether the investment has experienced any of the following potential risk factors:

- A particular task is significantly behind schedule or over budget
- Requirements and work scope are constantly changing
- A particular task on the critical path was missed, with no work around
- A major milestone, decision, or work product was missed or will be significantly delayed
- The initiative's functionality does not adequately support the mission, business, or security functions

- A major technical problem with the selected technology has surfaced as part of the change control process, and the problem resolution

- does not allow the investment to be developed as specified

The organizational environment has changed and the current IT initiative is not part of the solution for meeting the business needs.

The EWG determines whether to provide continued support to the investment and forwards its recommendations to the EITIRB for the final decision.

Based upon the comments of the EWG and the OCIO, the Functional Manager and IPT may be required to conduct an Alternatives Analysis for ongoing support, which should answer the following questions: Is the investment still feasible (i.e., is it still meeting its performance requirements?), Have performance gaps been identified and tracked, and has a mitigation plan been initiated to overcome the gaps?

7. Make Final Investment Decisions

If the EITIRB approves an EWG's recommendation, then the decision is implemented and the initiative continues in the Control Phase or moves to the Evaluate Phase, as required. If the EITIRB does not approve the EWG recommendation, the initiative is moved back to the EWG review phase to be reassessed.

8. Work with Project Sponsor to Develop Solutions

Once the EITIRB has approved an EWG recommendation that the IT investment be accelerated, modified, or cancelled, the OCIO and EWG should work closely with the Project Sponsor to develop a solution to any problems or issues resulting from the decision. The Project Sponsor, in coordination with the OCIO and EWG, should address the results or changes of the project risk assessment for the initiative in its transition from Select to Control Phase. Plans should be identified to eliminate, mitigate or manage identified risks (e.g., financial, acquisition and technical). The control scorecard should be the source for identifying the primary issues resulting from the decision. Once the OCIO, EWG, and Project Sponsor have agreed to the corrective actions, they discuss and document the criteria that will be used to resume funding. This documentation is maintained as part of the investment's record and the results are evaluated during the next annual Control Phase review or during the Evaluate Phase. Prior to the next scheduled review date, the Project Sponsor updates the investment information and initiates another preliminary assessment. This formal monitoring of investment progress, and the determination of risks and returns, continues throughout the Control Phase.

4.4 EXIT CRITERIA

Prior to exiting the Control Phase, investments must have:

- Completed investment development
- Confirmed the PIR schedule
- Obtained EITIRB approval to enter the Evaluate Phase.

CHAPTER 5—EVALUATE PHASE

5.1 PURPOSE

The purpose of the Evaluate Phase is to compare actual to expected results after an investment is fully implemented. This is done to assess the investment's impact on mission performance, identify any investment changes or modifications that may be needed, and revise the investment management process based on lessons learned. As noted in GAO's *Assessing Risks and Returns: A Guide for Evaluating Federal Agencies' IT Investment Decision-Making*, "the Evaluation Phase 'closes the loop' of the IT investment management process by comparing actuals against estimates in order to assess the performance and identify areas where decision-making can be improved."

The Evaluate Phase focuses on outcomes:

- Determining whether the IT investment met its performance, cost, and schedule objectives
- Determining the extent to which the IT capital investment management process improved the outcome of the IT investment.

The outcomes are measured by collecting performance data, comparing actual to projected performance and conducting a Post Implementation Review (PIR) to determine the system's efficiency and effectiveness in meeting performance and financial objectives. The PIR includes a methodical assessment of the investment's costs, performance, benefits, documentation, mission, and level of stakeholder and customer satisfaction. The PIR is conducted by the agency, and results are reported to the OCIO, EWG, and EITIRB to provide a better understanding of initiative performance and assist the Project Sponsor in directing any necessary initiative adjustments. Additionally, results from the Evaluate Phase are fed back to the Pre-Select, Select, and Control Phases as lessons learned.

5.2 ENTRY CRITERIA

The Evaluate Phase begins once a system has been implemented and the system becomes operational or goes into production. Any investment cancelled prior to going into operation must also be evaluated. Prior to entering the Evaluate Phase, investments must have:

- Completed investment development
- Confirmed the PIR schedule
- Obtained EITIRB approval to enter the Evaluate Phase.

5.3 PROCESS

In the Evaluate Phase, investments move from implementation or termination to a PIR and the EITIRB's approval or disapproval to continue the investment (with or without modifications). From the time of implementation, the system is continually monitored for performance, outages, maintenance activities, costs, resource allocation, defects, problems, and system changes. System stability is also periodically evaluated. During the PIR, actual performance collected is compared to performance projections made during the Select Phase. Then lessons learned for both the investment and the CPIC process are collected and fed back to prior CPIC phases.

Table 5-1 provides a summary of the Evaluate Phase process, as well as the individual(s) and/or group(s) responsible for completing each process step. Each step is detailed following the table.

Process Step	Responsible Individual(s) or Group(s)
Conduct PIR and present results.	Project Sponsor
Prepare annual investment review submission package.	Project Sponsor
Review/approve investment submission.	Agency Head
Review initiative's PIR results and recommend appropriate action.	OCIO EWG
Make final investment decisions.	EITIRB
Evaluate IT capital investment management process.	Agency OCIO EWG EITIRB

Table 5-1. Evaluate Phase Process Flow

1. Conduct PIR and Present Results

The PIR's timing is usually determined during the Control Phase. The PIR for a newly deployed initiative generally should take place approximately six months after the system is operational. In the case of a terminated system, it should take place immediately because the review will help to define any "lessons learned" that can be factored into future IT investment decisions and activities. In either case, before starting the PIR, the Project Sponsor develops a PIR plan that details the roles, responsibilities, and investment start and end dates for all PIR tasks.

At the heart of the PIR is the IT investment evaluation in which the Project Sponsor looks at the impact the system has had on customers, the mission and program, and the technical capability. As a result of the PIR, the Project Sponsor provides an IT Initiative Evaluation Data Sheet to the OCIO, as presented in **Table 5-1**.

The IT investment evaluation focuses on three areas:

- **Impact to stakeholders**—The Project Sponsor typically measures the impact the system has on stakeholders through user surveys (formal or informal), interviews, and feedback studies. The evaluation data sheet highlights results.
- **Ability to deliver the IT performance measures (quantitative and qualitative)**—The system's impact to mission and program should be carefully evaluated to determine whether the system delivered expected results. This information should be compared to the investment's original performance goals. This evaluation and comparison should also include a review of the investment's security and telecommunications infrastructure performance measures.
- **Ability to meet baseline goals**—The following areas should be reviewed to determine whether the investment is meeting its baseline goals:
  - **Cost**—Present actual lifecycle costs to date;
  - **Return**—Present actual lifecycle returns to date.
  - **Funding Sources**—Present actual funds received from planned funding sources;
  - **Schedule**—Provide original baseline and actual initiative schedule;
  - **Architectural Analysis**—Determine whether the initiative supports the Department's approach to enterprise architecture standards or what modifications are required to ensure initiative compliance outside the original architectural baseline;
  - **IT Accessibility Analysis**—Determine whether the initiative addresses accessibility for persons with disabilities, how the requirements were managed, and impact on the architecture;
  - **Telecommunications Analysis**—Determine whether the initiative adhered

to the Department's telecommunications standards and performance measures or what modifications are required to ensure initiative compliance outside the original baseline (for more information see Appendix O—Telecommunications Reference Manual).

- **Risk Analysis**—Identify initiative risks and how they were managed or mitigated, as well as their effects, if any; and
- **Systems Security Analysis**—Identify initiative security risks and how they were managed or mitigated as well as security performance measures (for more information see Appendix N—Cyber Security Infrastructure Guide).

SAMPLE INITIATIVE EVALUATION SHEET				
General information				
Title:				
Description:				
Project Sponsor:				
OMB Code:				
PIR Conducted By:				
Date of PIR:				
Performance Measures				
Item	Baseline	Actual	Variance	Comments
Quantitative				
Financial				
Non-Financial				
Baseline Status				
Item	Baseline	Actual	Variance	Comments
Lifecycle Cost				
Lifecycle Return				
Schedule				
Architectural Analysis				
Architectural Assessment				
IT Accessibility Analysis				
IT Accessibility Assessment				
Telecommunications Analysis				
Telecommunications Assessment				
Risk Analysis				
Risk Assessment				
Security Analysis				
System security risk assessment/mitigation review. Additional mitigation strategies and counter measures (if needed).				
Stakeholder Assessment				
General Comments				
Lessons Learned				
Project Management Assessment				
Technical Assessment				

Figure 5-1. IT Initiative Evaluation Data Sheet

After the post-implementation data has been collected and reviewed, the Project Sponsor prepares and makes a formal PIR presentation to the OCIO. (For initiatives with a variance of

greater than 10 % from the original baseline the initiative may need to be re-scored in light of changing business, organizational, financial, or technical conditions; these new scores are included in the PIR.) The presentation should summarize the initiative evaluation and provide a summary of recommendations for presentation to an EWG and the EITIRB.

2. Prepare Annual Investment Review Submission Package

Each investment in the Evaluate Phase will be assessed during the annual investment review. To prepare for the annual investment reviews, the Project Sponsor develops a package of materials that address the PIR strategic investment criteria, the strategic investment criteria for security and infrastructure/architecture, and the bonus point for Secretarial priority. The format for submitting the Investment Package summary is the revised OMB Exhibit 300 found in Appendix M. Key elements of the 300 submission are listed below. Other supporting investment documentation to evaluate other key areas are located in the Appendix Section of this document and should be attached, as needed, to the Exhibit 300. Note that projects that provide insufficient business case documentation will not be included in the IT Investment Portfolio or forwarded to the Office of Management and Budget as part of USDA's IT request.

- Introduction and brief overview of the investment
- PIR
- Validated/updated CBA
- Security (see Appendix N—Cyber Security Infrastructure Guide for instructions on preparing security plan documentation)
- Architecture, including IT accessibility for persons with disabilities (Section 508)
- Telecommunications Plan (see Appendix O—Telecommunications Reference Manual for instructions on preparing telecommunications plan documentation)
- Secretarial priority.

3. Review/Approve Investment Submission

The Agency Head reviews the investment submission and requests the Project Sponsor, Functional Manager, and/or Agency Sponsor to update the package or make changes as needed. The Agency Head then approves the investment submission and forwards it to the OCIO.

4. Review Initiative's PIR Results and Recommend Appropriate Action

The OCIO reviews the PIR results and provides any comments and/or questions to the agency. The Functional Manager works with the OCIO to address the issues and furnish details as requested, and sends an updated package to the OCIO. The OCIO forwards the updated package, along with its evaluation, to an EWG for review. The EWG reviews the investment and makes a recommendation that the investment's Project Sponsor take one of the following actions:

- Continue the investment as planned
- Terminate the investment
- Modify the investment as recommended.

5. Make Final Investment Decisions

The EITIRB reviews an EWG's recommendation and makes the final investment decision. The resulting decision is then relayed by letter to the Under/Assistant Secretary, Agency Head, and Project Sponsor.

6. Evaluate IT Capital Investment Management Process

An EWG may also recommend that the OCIO revise the CPIC process based on PIR results. A summary of the PIR activities and lessons learned are then presented by the OCIO to the EWG and EITIRB.

Following the completion of each phase, the OCIO and agencies document the strengths and weaknesses of the CPIC process. The information gathered in this evaluation is used to improve the CPIC process, by maintaining and improving the factors associated with improved initiative success rates and revising or removing the non-value added steps. These process improvements are discussed as a regular agenda item for the EWG. Agencies can use **Table 5-2** to record observations and forward them to the OCIO as necessary. Agencies can add appropriate comments as deemed necessary. The following

are examples of things agencies can consider when addressing each phase:

- Initiative Development
  - Documentation set
  - General/descriptive information
  - Financial information
  - Security/ISTA models.
- Screen
  - Viability criteria
  - Viability considerations
  - Initiative designation.
- Score
  - Mission criteria
  - Risk
  - ROI.
- Pre-Select
  - Agency process
  - OCIO/EWG review
  - EITIRB endorsement.
- Select
  - Agency process
  - OCIO/EWG review
  - EITIRB endorsement
  - Security review.
- Control
  - Milestone review format
  - OCIO/EWG/corrective actions
  - Security analysis.
- Evaluate
  - PIR content
  - PIR execution
  - PIR recommendations
  - Security performance.
- Steady-State
  - System assessment
  - Technology assessment
  - Operations and Maintenance (O&M) review.

To capture lessons learned, the Project Sponsor develops a management report and submits it to the OCIO. All failures and successes are collected and shared to ensure that future initiatives learn from past experiences. A high-level assessment of management techniques, including organizational approaches, budgeting, acquisition and contracting strategies, tools and techniques, and testing methodologies, is essential to establish realistic baselines and to ensure the future success of other IT initiatives. The management report, including lessons learned, follows the outline provided in **Figure 5-2**.

The OCIO schedules formal and informal sessions to review the management report and collect additional information about the overall effectiveness of the process. The OCIO works with the Project Sponsor, Agency Portfolio Managers, and an EWG to conduct trend analyses of the process, validate findings, and adjust the process accordingly. The OCIO also sponsors workshops and discussion groups to improve the CPIC process and ensure lessons learned are applied throughout the Department. The OCIO then works with the agency to develop, recommend, and implement modifications to improve the process.

5.4 Exit Criteria

Prior to exiting the Evaluate Phase, investments must have:

- Conducted a PIR
- Established an Operations and Maintenance (O&M) and operational performance review schedule
- Obtained EITIRB approval to enter the Steady-State Phase.

	Initiative Development	Screen	Score	Pre-Select	Select	Control	Evaluate	Steady-State
Was each phase conducted at the appropriate time in the process?								
Was the data content sufficient to move forward to the next phase in the process?								
Were there enough resources (i.e., people) allocated for each phase in the process? Were the right types of people and expertise involved?								
Was there an acceptable level of information flow?								
Was I-TIPS able to support the activity in each phase in the process?								
List suggested corrective actions for any phase in the process.								
Comments:								

Table 5-2. IT Process Evaluation Data Sheet

INVESTMENT MANAGEMENT REPORT
Initiative Title:
Project Sponsor:
Date of PIR:
Background (Description of Project)
Management Approach
Organizational Structure
Resources
Acquisition Strategy
Contracting Strategy
Security Strategy
Documentation
Technical Approach
Architecture (description, adherence to ISTA, and IT accessibility requirements, security, telecommunications, and architecture standards)
Development (if applicable)
Testing
Lessons Learned
List of lessons learned
Recommended best practices

Figure 5-2. Investment Management Report Data Sheet

CHAPTER 6—STEADY-STATE PHASE

6.1 PURPOSE

The Steady-State Phase provides the means to assess mature investments, ascertain their continued effectiveness in supporting mission requirements, evaluate the cost of continued maintenance support, assess technology opportunities, and consider potential retirement or replacement of the investment. The primary review focus during this Phase is on the mission support, cost, and technological assessment. Process activities during the Steady-State Phase provide the foundation to ensure mission alignment and support for system and technology succession management.

6.2 ENTRY CRITERIA

Prior to entering the Steady-State Phase, investments must have:

- Conducted a PIR
- Established an (O&M) and operational performance review schedule
- Obtained EITIRB approval to enter the Steady-State Phase.

6.3 PROCESS

During the Steady-State Phase, mission analysis is used to determine whether mature systems are optimally continuing to support mission and user requirements. An assessment of technology opportunities and an O&M Review are also conducted. **Appendix D** provides a template for conducting Steady-State investment reviews.

Table 6-1 provides a summary of the Steady-State Phase process, as well as the individual(s) and/or group(s) responsible for completing each process step. Each step is detailed following the figure.

Process Step	Responsible Individual(s) or Group(s)
Analyze mission.	Project Sponsor Agency Sponsor
Assess user/customer satisfaction.	Project Sponsor
Assess technology.	Project Sponsor
Review O&M.	Project Sponsor Agency Sponsor
Prepare investment review submission package.	Project Sponsor
Review/approve investment submission.	Agency Head
Review initiative and recommend appropriate action.	OCIO EWG
Make final investment decisions.	EITIRB

Table 6-1. Steady-State Process Flow

1. Analyze Mission

The Project Sponsor and Agency Sponsor conduct a mission analysis to determine if the system is continuing to meet mission requirements and needs and supports the USDA's evolving strategic direction. The mission analysis process identified in the Pre-Select Phase and the Mission Needs Statement provide a framework to assist in the mission analysis for the Steady-State Phase. This includes an analysis of performance measures accomplishment.

2. Assess User/Customer Satisfaction

The Project Sponsor assesses user and customer satisfaction with, and acceptance and support for, the existing system. There are several means to conduct the user/customer assessment, including conducting a user/customer survey, assessing comments and user/customer community inputs, or analyzing usage trends. Some or all of these activities may be beneficial in determining

continued support for the system, additional user/customer need, or improvement opportunities. This information should be used to assess and update the investment's performance measures.

3. Assess Technology

The Project Sponsor assesses the continuing ability of the investment to meet the system's performance goals.

The Project Sponsor assesses the technology and determines potential opportunities to improve performance, reduce costs, support the USDA enterprise architecture, and to ensure alignment with USDA's strategic direction. The Project Sponsor monitors and maintains the existing technology and determines technology refresh schedules. An assessment of security and telecommunications should also be supplied.

4. Review O&M

The Project Sponsor and Agency Sponsor conduct an O&M review to assess the cost and extent of continued maintenance and upgrades. The O&M review should include a trend analysis of O&M costs and a quantification of maintenance releases. Costs for government full-time equivalents (FTEs) should be included in all cost estimates and analysis.

5. Prepare Investment Review Submission Package

In preparation for the annual investment review, the Project Sponsor updates actual costs and benefits for the investment and prepares the Steady-State submission package. The format for submitting the Investment Package summary is the revised OMB Exhibit 300 found in Appendix M. Key elements of the 300 submission are listed below. Other supporting investment documentation to evaluate other key areas are located in the Appendix Section of this document and should be attached, as needed, to the Exhibit 300. Note that projects that provide insufficient business case documentation will not be included in the IT Investment Portfolio or forwarded to the Office of Management and Budget as part of USDA's IT request.

Introduction and brief overview of existing system

- Mission Analysis Summary
- User/Customer Assessment Summary
- Performance Measures Assessment
- Technology Assessment
- O&M Cost Analysis
- Updated CBA.

6. Review/Approve Investment Submission

The Agency Head reviews the investment submission and requests the Project Sponsor, Functional Manager, and/or Agency Sponsor update the package or make changes as needed. The Agency Head then approves the investment submission and forwards it to the OCIO.

7. Review Initiative and Recommend Appropriate Action

The OCIO reviews the investment submission with an emphasis on strategic mission alignment, cost, technology succession, and performance measures. The OCIO provides any comments and/or questions to the agency. The Functional Manager works with the OCIO to address the issues and furnish details as requested, and sends an updated package to the OCIO. The OCIO forwards the updated package, along with its assessment, to an EWG for review. The EWG reviews the investment to determine whether it can optimally continue to support mission/user requirements and the Department's strategic direction. The EWG determines whether the investment should continue in the Steady-State Phase, return to a previous phase due to the extent of system modifications, be replaced, or be retired. The EWG then forwards its recommendations to the EITIRB.

8. Make Final Investment Decisions

The EITIRB approves or disapproves the EWG's recommendation and directs the Project Sponsor how to proceed.

6.4 EXIT CRITERIA

Prior to exiting the Steady-State Phase, investments must have obtained the EITIRB's direction whether to dispose, retire, or replace the system.

APPENDICES

APPENDIX A—BOARD PROCEDURES

The reviews by senior-level Boards are integral to the success of USDA's CPIC process. The Boards ensure compliance with guidance from Congress, OMB, and GAO, as well as apply sound business practices to the planning, acquisition, and operation of large IT investments. The following sections contain the EITIRB Charter.

A.1 EITIRB CHARTER

I. Purpose

The purpose of this Charter is to define the authority, membership, roles and responsibilities of the Executive Information Technology Investment Review Board (EITIRB), and its relationships to other internal and external bodies.

II. Background

The Clinger-Cohen Act dramatically changes the way Federal agencies must acquire and manage information technology (IT). The Act expands upon the requirement, initially introduced by the Government Performance and Results Act (GPRA), that agency IT investments be directly linked to, and supportive of, program objectives.

The Clinger-Cohen Act requires executive agencies to develop a capital planning and investment control process for making technology, budget, financial and program management decisions. While each phase of a sound investment process has its own requirements for successful implementation, there are some overall organizational attributes which are critical to successful investment evaluation:

- Senior management attention
- Overall mission focus
- A comprehensive, enterprise-wide approach to technology investment.

III. Authority

On July 1, 1996, Secretary Glickman approved the establishment of the EITIRB to coordinate and prioritize the Department's IT investments, and to provide a critical link between IT and agency missions. The EITIRB, made up of senior-level managers, will ensure that USDA technology investments are managed as strategic business resources supporting efficient and effective program delivery. Additionally, the Board will assure that the Department's IRM Program remains in compliance with the requirements of the Clinger-Cohen Act, GPRA, and other legislation which addresses information technology issues.

IV. Membership

The EITIRB is comprised of the Department's senior managers, as follows:

- Deputy Secretary—Chair
- Chief Information Officer—Vice-Chair and Executive Secretary
- Chief Financial Officer
- General Counsel
- Director of the Office of Budget and Program Analysis
- Under Secretary for Farm and Foreign Agricultural Service
- Under Secretary for Food, Nutrition, and Consumer Service
- Under Secretary for Food Safety
- Under Secretary for Natural Resources and Environment
- Under Secretary for Research, Education, and Economics
- Under Secretary for Rural Development
- Assistant Secretary for Administration
- Assistant Secretary for Marketing and Regulatory Programs

At the Board's discretion, ex-officio members may be named to provide specialized expertise and advice.

V. Roles and Responsibilities

The EITIRB will approve new information technology investments and evaluate existing projects and operational systems to create a USDA IT investment portfolio which best supports the Department's missions and program delivery processes. The Board will use a standard set of criteria, developed by the OCIO and approved by the Board, to assemble this portfolio and evaluate

agency and Department-wide IT initiatives. Criteria will include a consideration of Departmental or Government-wide impact, visibility, cost, risk, architecture, and standards.

In the scope of EITIRB activities, information technology investment encompasses all investments involving information technology and information resources as defined in the Clinger-Cohen Act, including equipment, IRM services, information or application system design, development, and maintenance, regardless of whether such work is performed by government employees or contracted out.

VI. Meetings and Communications

EITIRB meetings will be held quarterly or more frequently subject to the call of the Chair, as circumstances warrant. The Executive Secretary will prepare the agenda for all meetings, prepare and distribute minutes of all meetings, and perform other scheduling, correspondence, and communications functions for the EITIRB. An agenda and notice of meeting will be provided to EITIRB members by the Executive Secretary 10 working days prior to meetings. Attendance at meetings may be in person or any other two-way, interactive communications means, such as conference call or video teleconference. Members may also be represented by a designated alternate at the Deputy level and may have a proxy cast their votes.

The minutes of each meeting will be recorded and distributed by the Executive Secretary. Draft minutes will be distributed to Board members within 5 working days of each meeting. Final minutes will be distributed along with the agenda for each upcoming meeting.

VII. Voting

The EITIRB shall make decisions, including revisions to this charter, by voting. In order for a vote to occur, a quorum must be present. A quorum shall consist of two-thirds of the voting members in person or by proxy. Each member shall have one vote; the Chair shall retain the right to abstain from voting.

VIII. Key Relationships

The CIO will maintain a close relationship with the IRM Council, the IRM Council Board, and other appropriate organizations within and outside USDA, and solicit their advice and counsel for selecting issues to bring before the EITIRB.

APPENDIX B—CPIC PROCESS CHECKLIST

Pre-Select Phase—What are the business needs for the investments?

- ❑ The Agency Head identifies a Project Sponsor.
- ❑ The Functional Manager conducts a mission analysis.
- ❑ The Functional Manager develops the investment's concept.
- ❑ The Functional Manager prepares the preliminary business case.
- ❑ The Functional Manager and the Agency Sponsor prepare the annual investment review submission package.
- ❑ The Agency Head reviews and approves the investment submission.
- ❑ The OCIO and EWG review the initiative and recommend an appropriate action to the EITIRB.
- ❑ The EITIRB makes the final investment decisions.

Select Phase—How do you know you have selected the best investments?

- ❑ The Functional Manager reviews and updates the Mission Needs Statement.
- ❑ The Agency Head approves IPT membership.
- ❑ The Project Sponsor identifies the funding source(s) and obtains agency approvals.
- ❑ The Project Sponsor develops supporting materials for major investments.
- ❑ The Project Sponsor prepares the investment review submission.
- ❑ The Agency Head reviews and approves the investment submission.
- ❑ The OCIO and EWG review the initiative and recommend an appropriate action to the EITIRB.
- ❑ The EITIRB makes the final investment decisions.

Control Phase—What are you doing to ensure that the investments will deliver the benefits projected?

- ❑ The Project Sponsor establishes and maintains initiative and security costs, schedule, and technical baselines.
- ❑ The Project Sponsor maintains current initiative and security costs, schedule, technical, and general status information.
- ❑ The Project Sponsor, IPT, and Agency Sponsor assess the initiative's progress against performance measures.
- ❑ The Project Sponsor prepares the annual investment review submission package.
- ❑ The Agency Head reviews and approves the investment submission.
- ❑ The OCIO and EWG review the initiative and recommend an appropriate action to the EITIRB.
- ❑ The EITIRB makes final investment decisions.
- ❑ The OCIO and EWG work with the Project Sponsor to develop solutions to identified issues.

Evaluate Phase—Based on your evaluation, did the investments deliver what you expected?

- ❑ The Project Sponsor conducts a PIR and presents results to the OCIO, EWG, and EITIRB.
- ❑ The Project Sponsor prepares the annual investment review submission package.
- ❑ The Agency Head reviews and approves the investment submission.
- ❑ The OCIO and EWG review and assess the PIR results and recommend an appropriate action to the EITIRB.
- ❑ The EITIRB makes final investment decisions.
- ❑ The agency, OCIO, EWG and EITIRB evaluate the IT capital investment management process.

Steady State Phase—Do the investments still cost-effectively support requirements?

- ❑ The Project Sponsor and the Agency Sponsor analyze the mission.

- The Project Sponsor assesses user/customer satisfaction.
- The Project Sponsor conducts a technology assessment.
- The Project Sponsor and the Agency Sponsor review O&M costs.
- The Project Sponsor prepares the annual investment review submission package.
- The Agency Head reviews and approves the investment submission.
- The OCIO and EWG review the initiative and recommend an appropriate action to the EITIRB.
- The EITIRB makes final investment decisions.

APPENDIX C—MISSION NEEDS STATEMENT

C.1 PURPOSE

The Mission Needs Statement (MNS) is completed during the Pre-Select Phase. It is a summary document that describes the operational problem and presents the major decision factors that an EWG and EITIRB should evaluate in considering the need and proposed investment.

The following section provides a template for preparing the Mission Need Statement. Detailed quantitative and analytical information should be included as attachments.

C.2 MISSION NEED STATEMENT TEMPLATE

General Instructions for Completing the Mission Need Statement

The Mission Need Statement is created during the Pre-Select Phase. It must analytically justify: (1) the need for action to resolve a shortfall in the agency's ability to provide the services needed by its users or customers, or (2) the need to explore a technological opportunity for performing agency missions more effectively. The Mission Needs Statement must be derived from rigorous mission analysis (i.e., continuous analysis of current and forecasted mission capabilities in relationship to projected demand for services) and must contain sufficient quantitative information to establish and justify the need. Extensive performance analysis should be completed and capability shortfalls should be identified before preparing the Mission Need Statement.

1. Administrative Information

A. MNS Title:		
B. MNS Number:		
C. Originator:		
D. Originator's Organization:		
E. Originator's Phone Number:		
F. Sponsoring Line of Business:		
G. Sponsor's Focal Point:		
H. Sponsor's Focal Point Phone Number:		
I. Submission Date:		
J. Revision Number:		
K. Revision Date:		
Signature:	Agency Head	Date

2. Impact on USDA Mission Areas

Briefly describe the impact of the capability shortfall or technological opportunity with respect to performance metrics, goals, or standards in USDA mission areas. Performance goals are delineated in the USDA and agency strategic plan, business plans, and annual performance plan prepared in compliance with GPRA (Public Law 103-62). This should be linked directly to the USDA strategic plan and the agency strategic plan.

3. Needed Capability

Describe the functional capability needed or technological opportunity. Describe needed capability in terms of functions to be performed or services to be provided. Cite any Congressional, Secretary, or other high-level direction, such as international agreements, to support the needed capability. Cite any statutory or regulatory authority for the need. Provide validated growth projections based on operational analysis.

This is not a description of an acquisition program (i.e., this is not the details of a particular hardware or software solution). Do not describe needed capability in terms of a system or solution but rather focus on the business/mission aspects.

4. Current and Planned Capability

Describe quantitatively the capability of systems, facilities, equipment, or other assets currently deployed or presently planned and funded to meet the mission need. Where applicable, use tables to present the information. If this Mission Need Statement proposes to replace an existing investment, provide existing system name and OMB number. References should be made to the existing architecture and asset inventory. Provide back up data in attachments.

5. Capability Shortfall

Describe the capability shortfall and explain the performance analysis that was used to identify and quantify the extent of the shortfall over time. Define the ability of the current technology to meet the business requirements in support of the mission. Identify changes between current state and future state of technology, and provide recommendations for closing gaps between the two. Define, in detail, the specific limitations of current facilities, equipment, or service to meet projected demand and the needed capability. Explain the criteria used to measure performance. Include appropriate graphs, tables, and formulas to define the extent of the shortfall. Identify databases and other data sources upon which the analysis is based. Identify models and methodologies used to quantify the shortfall.

Alternately, describe the technological opportunity in terms of improved USDA productivity, facility availability, operational effectiveness, or improved efficiency. In attachments, explain the analysis used to quantify the magnitude of the opportunity, and identify and describe databases, models, and methodologies used to support the analysis.

Provide specific operational and performance analyses, quantitative projections, maintenance indicators, reports, recommendations, or other supporting data, as attachments.

6. Impact of Not Approving the Mission Need

Describe the impact if this capability shortfall is not resolved relative to the USDA's ability to perform mission responsibilities. Define the expected change in mission performance indicators if the capability shortfall is not resolved.

Include as attachments appropriate graphs, tables, and formulas used to quantify the impact on performance. Identify databases, other sources of data, models, and methodologies used to support the impact analysis. Explain performance analyses used to quantify the impact of not implementing the opportunity, and identify the external factors (such as validated growth projections) used to support the analysis.

7. Benefits

Summarize the mission analysis determination of benefits. Describe the benefits accrued by the needed capability or technological opportunity. Benefits may accrue from more efficient operations, improved responsiveness to customers, lower operational costs, or other savings.

The summary of accrued benefits should describe ground rules and assumptions, benefits, estimating methods, sources, and models. Include as attachments appropriate graphs, tables, and formulas used to quantify the benefits.

8. Timeframe

Identify when the capability shortfall will seriously affect the Department's ability to perform its mission if no action is taken. Establish when action must be taken to avoid the adverse impact on services that will result. Explain the performance analysis used to quantify the extent of the impact over time.

9. Criticality

State the priority of this mission need relative to other Departmental needs. First, define the priority of this need relative to other needs within the mission area, and then define the priority relative to needs across all mission areas. Characterize whether the mission need identifies internal USDA capability shortfalls or mainly shortfalls in servicing the customer community.

10. Long Range Resource Planning Estimate

Provide a rough estimate of the resources that will likely be committed to this mission need in competition with all others, within the constraint of realistic projections of future budget authority.

APPENDIX D—STEADY-STATE INVESTMENT REVIEW TEMPLATE

D.1 PURPOSE

Investments are reviewed during the Steady-State Phase to ascertain their continued effectiveness in supporting mission requirements, evaluate the cost of continued maintenance support, assess technology opportunities, and consider potential retirement or replacement of the investment. The following section provides a template for the package of materials required for a Steady-State Investment Review. Detailed quantitative and analytical information should be included as attachments.

D.2 STEADY-STATE INVESTMENT REVIEW TEMPLATE

Investment Title—Name/title of investment

Agency—Name of sponsoring agency or activity

1. Administrative Information

A. Date of PIR	Date of the most recent PIR or the date of system deployment/implementation	
B. Originator	Name, phone number, and e-mail address of document originator	
C. Project Sponsor	Name, phone number, and e-mail address of the Project Sponsor	
D. Submission Date	Date of initial document origination	
E. Revision Number	Document revision number	
F. Revision Date	Date of latest revision	
Signature		
	Agency Head	Date

2. Introduction/Overview of Existing System

Provide a brief summary of the investment to include mission areas supported, key capabilities, customer/user base, key system or infrastructure interfaces, and dependencies.

3. Mission Analysis

Provide a summary of the mission analysis to determine if the system is continuing to meet mission requirements and needs, and to supports the USDA's evolving strategic direction. This should include a discussion of the mission needs being supported. The mission analysis process identified in the Pre-Select Phase and the Mission Needs Statement (see **Appendix C—Mission Needs Statement**) provides a framework to assist in the mission analysis for the Steady-State Phase.

Include the investment's performance measurement projected baseline and actual performance measurement information to determine if the investment is continuing to provide realizable benefits.

4. User/Customer Assessment

Assess user and customer satisfaction. Include a discussion of results of user/customer surveys, user/customer community inputs, or analysis of usage trends. Supporting documentation, reports, or graphs should be provided as an attachment. Some or all of these activities may be beneficial to assist in determining continued support for the system, additional user/customer needs, or improvement opportunities.

5. Performance Measures Assessment

Assess investment performance against approved performance measures. Performance data is collected, evaluated, and compared to performance projections made during the Select Phase. The evaluation should indicate needed adjustments to the IT investment or performance

measures. Supporting documentation should be provided as an attachment.

6. Technology Assessment

Assess the technology to determine potential opportunities to improve performance, reduce costs, support the USDA enterprise architecture, and ensure alignment with USDA's strategic direction. Describe quantitatively the capability of systems, facilities, equipment, or other assets currently deployed or presently planned and funded to meet the mission need. Where applicable, use tables to present the information and provide any back-up data in attachments. References should be made to the existing architecture and asset inventory.

7. O&M Cost Analysis

Conduct an O&M review to assess the cost and extent of continued maintenance and upgrades. The O&M review should include a trend analysis of O&M costs and a quantification of maintenance releases. Include any supporting graphs and spreadsheets. Costs for government FTEs should be included in all cost estimates and analysis.

8. Recommendations

Describe agency recommended actions—continue in the Steady-State Phase, terminate or dispose of the existing system, or consider new investment alternatives.

APPENDIX E—COST-BENEFIT ANALYSIS

E.1 PURPOSE

Current laws and regulations require agencies to conduct a CBA prior to deciding whether to initiate, continue, or implement an IT investment. The level of detail required varies and should be commensurate with the size, complexity, and cost of the proposed investment. This appendix provides a layout of a CBA for a very large, complex, and costly IT investment. A scaled down version is appropriate for a smaller, less costly investment.

The CBA supports decision-making and helps ensure resources are effectively allocated to support mission requirements. The CBA should demonstrate that at least three alternatives were considered and the chosen alternative is the most cost-effective, within the context of budgetary and political considerations. Possible alternatives include:

- In-house development versus contractor development,
- In-house operation versus contractor operation,
- Current operational procedures versus new operational procedures, or
- One technical approach versus another technical approach.

The CBA should include comprehensive estimates of the projected benefits and costs for each alternative. Costs, tangible benefits, and intangible benefits (benefits which cannot be valued in dollars) should be included. Intangible benefits should be evaluated and assigned relative numeric values for comparison purposes. Sunk costs (costs incurred in the past) and realized benefits (savings or efficiencies already achieved) should not be considered since past experience is relevant only in helping estimate future benefits and costs. Investments should be initiated or continued only if the projected benefits exceed the projected costs.

A CBA should be performed for each investment alternative to enable the evaluation and comparison of alternatives. However, some mandatory systems will not provide net benefits to the government. In such cases, the lowest cost alternative should be selected. If functions are to be added to a mandatory system, though, the additional functions should provide benefits to the government.

E.2 PROCESS

A CBA should be completed or updated at the following lifecycle milestones:

- Proposal initiation (Pre-Select Phase)
- EITIRB proposal consideration (Select Phase)
- EITIRB initiative review (annually during the Control Phase)
- Initial fielding (Evaluation Phase)
- Post-Implementation Review (Evaluation Phase)
- Operations and Maintenance review (Steady-State Phase)
- Annually for “major system” CPIC review.

The Project Sponsor ensures the CBA is done. The Project Sponsor can obtain expertise from the IPT in systems development and operation, budget, finance, statistics, procurement, architecture, and work processes, as needed.

The CBA process can be broken down into the following steps:

1. Determine/define objectives
2. Document current process
3. Estimate future requirements
4. Collect cost data for alternatives
5. Choose at least three alternatives
6. Document CBA assumptions
7. Estimate costs
8. Estimate benefits
9. Discount costs and benefits
10. Evaluate alternatives
11. Perform sensitivity analysis
12. Compare investments.

Each of these steps is detailed in the following sections. The numerical examples provided are

from a variety of sources and do not relate to one specific investment.

1. Determine/Define Objectives

The CBA should include a problem definition; pertinent background information such as staffing, system history, and customer satisfaction data; and a list of investment objectives that identify how the system will improve the work process and support the mission.

2. Document Current Process

The current process should be thoroughly documented and address these areas:

- **Customer Service**—Each customer's role and services required should be clearly documented and quantified, if possible (e.g., in an average month, a customer inputs two megabytes (MB) of data and spends 10 hours on database maintenance).
- **System Capabilities**—Resources required for peak demand should be listed. For example, 100 MBs of disk storage space and Help Desk personnel to support 50 users.
- **System Architecture**—The hardware, software, and physical facilities required should be documented, including information necessary for determining system costs, expected future utility of items, and the item owner/lessor (i.e., government or contractor). **Table E-1—**displays the information desired.
- **System Costs**—Current costs provide the CBA baseline. **Figure E-2—Cost Elements for Systems** addresses the cost elements for most systems. However, a particular system may not include all elements identified within a category and may include some activities not shown.

Hardware	Software	Physical Facilities
Manufacturer Make/Model/Year Cost Power requirements Expected life Maintenance requirements Operating characteristics (e.g., size, speed, capacity, etc.) Operating systems supported	Manufacturer Name Version number Year acquired License term Hardware requirements Cost (annual or purchase)	Location Size Capacity Structure type Availability Annual cost

Table E-1. System Architecture Information Requirements

Cost Category	Cost Elements
Equipment, Leased or Purchased	Supercomputers, mainframes, minicomputers, microcomputers, disk drives, tape drives, printers, telecommunications, voice and data networks, terminals, modems, data encryption devices, and facsimile equipment.
Software, Leased or Purchased	Operating systems, utility programs, diagnostic programs, application programs, and commercial-off-the-shelf (COTS) software.
Commercial Services	Commercially-provided services, such as teleprocessing, local batch processing, on-line processing, Internet access, electronic mail, voice mail, centrex, cellular telephone, facsimile, and packet switching.
Support services (Contractor Personnel)	Commercially-provided services to support equipment, software, or services, such as maintenance, source data entry, training, planning, studies, facilities management, software development, system analysis and design, computer performance evaluation, and capacity management.

Table E-2. Cost Elements for Systems (Page 1 of 2)

Cost Category	Cost Elements
Supplies	Any consumable item designed specifically for use with equipment, software, services, or support services identified above.
Personnel (compensation and benefits)	Includes the salary (compensation) and benefits for government personnel who perform IT functions 51percent or more of their time. Functions include but are not limited to program management, policy, IT management, systems development, operations, telecommunications, computer security, contracting, and secretarial support. Personnel who simply use IT assets incidental to the performance of their primary functions are not included.
Intra-governmental services	All IT services within agencies, and between executive branch agencies, judicial and legislative branches, and State and local governments.

Table E-2. Cost Elements for Systems (Page 2 of 2)

3. Estimate Future Requirements

Future customer requirements determine the system capabilities and architecture, and ultimately affect system costs and benefits. Two items to consider are:

- **Lifecycle Time**—Determine the system lifecycle, or when the system is terminated and replaced by a system with significant changes in processing, operational capabilities, resource requirements, or system outputs. Large, complex systems should have a lifecycle of at least five years, and no more than ten to 12 years.
- **Lifecycle Demands**—Identify the most appropriate demand measures and use the measures to determine previous year' demands, calculate the change in demand from year to year, average the demand change, and use the average to make predictions. In a complex situation, more sophisticated tools, such as time-series and regression analysis, may be needed to forecast the future.

4. Collect Cost Data

Data can be collected, from the following sources, to estimate the costs of each investment alternative:

- **Historical Organization Data**—If contracts were used to provide system support in the past, they can provide the estimated future cost of leasing and purchasing hardware and hourly rates for contractor personnel. Contracts for other system support services can provide comparable cost data for the development and operation of a new system.
- **Current System Costs**—Current system costs can be used to price similar alternatives.
- **Market Research**—Quotes from multiple sources, such as vendors, Gartner Group, IDC Government, and government-wide agency contracts (GWACS), can provide an average, realistic price.
- **Publications**—Trade journals usually conduct annual surveys that provide general cost data for IT personnel. Government cost sources include the General Services Administration (GSA) pricing schedule and the OMB Circular A-76, "Performance of Commercial Activities" supplemental listing of inflation and tax rates.
- **Analyst Judgment**—If data is not available to provide an adequate cost estimate, the CBA team members can use judgment and experience to estimate costs. To provide a check against the estimates, discuss estimated costs with other IT professionals.
- **Special Studies**—Special studies can be conducted to collect cost data for large IT investments. For example, the Federal Aviation Administration (FAA) used three different in-house studies to provide costs for software conversion, internal operations, and potential benefits. These data sources became the foundation for a CBA.

5. Choose at Least Three Alternatives

A CBA should present at least three alternatives, with one alternative being to continue with no change. Each viable technical approach should be included as an alternative. However, the number

of technical approaches may be limited if only one or two are compatible with the architecture or if some approaches are not feasible for reasons other than costs and benefits.

6. Document CBA Assumptions

It is important to document all assumptions and, if possible, justify them on the basis of prior experiences or actual data. This can be an opportunity to explain why some alternatives are not included. If an alternative is eliminated because it is not feasible, the assumption should be clearly explained and justified.

7. Estimate Costs

Many factors should be considered during the process of estimating costs for alternatives. Full lifecycle costs for each competing alternative should be included, and the following factors should be addressed:

- **Activities and Resources**—Identify and estimate the costs associated with the initiation, design, development, operation, and maintenance of the IT system.
- **Cost Categories**—Identify costs in a way that relates to the budget and accounting processes. The cost categories should follow current USDA object class codes.
- **Personnel Costs**—Personnel costs are based on the guidance in OMB Circular A-76, "Supplemental Handbook, PART II—Preparing the Cost Comparison Estimates." Government personnel costs include current salary by location and grade, fringe benefit factors, indirect or overhead costs, and General and Administrative costs.
- **Depreciation**—The cost of each tangible capital asset should be spread over the asset's useful life (i.e., the number of years it will function as designed). OMB prefers that straight-line depreciation be used for capital assets.
- **Annual Costs**—All cost elements should be identified and estimated for each year of the system lifecycle. This is necessary for planning and budget considerations **Table E-3—**illustrates the cost estimates for an investment initiation activity.

Activities/Cost Categories	Problem Definition	Work Process Evaluation	Requirements Definition	Security Plan	Performance Measures	Cost-Benefit Analysis	Total
Hardware							
Software							
Services							
Support Services		10,000	4,000	1,000	6,000	3,000	24,000
Supplies		100	100	0	100	100	400
Personnel	5,000	10,000	6,000	500	5,000	8,000	34,500
Inter-Agency Services							
Total	5,000	20,100	10,100	1,500	11,100	11,100	58,900

Table E-3. Sample Cost Estimates for an Investment Initiation Activity

The costs for each year can be added to provide the estimated annual costs over the investment's life. For example, **Table E-4—Sample System Lifecycle Cost Estimates** provides the total estimated costs for a 10-year investment. In the first year, in-house staff and contractors define the problem, evaluate the work process, define processing requirements, prepare the CBA,

develop a request for proposals (RFP), and issue a contract for the system development. In the second year, a contractor designs and implements the system. The next eight years reflect operational and maintenance costs for equipment, software, in-house personnel, and contractor personnel. Years five and six also reflect in-house acquisition costs for establishing a new five-year contract for system maintenance and help desk support.

Year	Startup	Acquisition	Development	Operation	Maintenance	Total
1	100,000	100,000				200,000
2			800,000			800,000
3				200,000	80,000	280,000
4				200,000	60,000	260,000
5		50,000		200,000	50,000	300,000
6		50,000		200,000	50,000	300,000
7				200,000	40,000	240,000
8				200,000	30,000	230,000
9				200,000	30,000	230,000
10				200,000	30,000	230,000
Total	100,000	200,000	800,000	1,600,000	370,000	3,070,000

Table E-4. Sample System Lifecycle Cost Estimates

8. Estimate Benefits

The following six activities are completed to identify and estimate the value of benefits:

Define Benefits—Benefits are the services, capabilities, and qualities of each alternative, and can be viewed as the return from an investment. The following questions will help define benefits for IT systems and enable alternative comparisons:

- *Accuracy*—Will the system improve accuracy by reducing data entry errors?
- *Availability*—How long will it take to develop and implement the system?
- *Compatibility*—How compatible is the proposed alternative with existing procedures?
- *Efficiency*—Will one alternative provide faster or more accurate processing?
- *Maintainability*—Will one alternative have lower maintenance costs?
- *Modularity*—Will one alternative have more modular software components?
- *Reliability*—Does one alternative provide greater hardware or software reliability?
- *Security*—Does one alternative provide better security to prevent fraud, waste, or abuse?

Identify Benefits—Every proposed IT system should have identifiable benefits for both the organization and its customers. Organizational benefits could include flexibility, organizational strategy, risk management and control, organizational changes, and staffing impacts. Customer benefits could include improvements to the current IT services and the addition of new services. Customers should help identify and determine how to measure and evaluate the benefits.

Establish Measurement Criteria—Establishing measurement criteria for benefits is crucial because the Government Performance and Results Act (GPRA) and the Clinger-Cohen Act (CCA) emphasize tangible measures of success (benefits) related to the organization's overall mission and goals. See **Appendix G—Performance Measurement** for guidance on how to develop performance measures.

Classify Benefits—Benefits that are "capable of being appraised at an actual or approximate

value" are called tangible benefits. Benefits that cannot be assigned a dollar value are called intangible benefits.

Estimate Tangible Benefits—The dollar value of benefits can be estimated by determining the fair market value of the benefits. An important economic principle used in estimating public benefits is the market value concept. Market value is the price that a private sector organization would pay to purchase a product or service
Quantify Intangible Benefits—Intangible benefits can be quantified using a subjective, qualitative rating system. A qualitative rating system might evaluate potential benefits against the following:

- Provides Maximum Benefits (2 points)
- Provides Some Benefits (1 point)
- Provides No Benefits (0 points)
- Provides Some Negative Benefits (-1 point)
- Provides Maximum Negative Benefits (-2 points).

Once the rating system is selected, each benefit is evaluated for each alternative. This should be done by a group of three to five individuals familiar with the current IT system and the alternatives being evaluated. The numerical values assigned to the ratings then can be summed and averaged to obtain a score for each benefit. **Table E-5—** shows the scores for benefits A to D from four reviewers using a scale of 1 to 5.

Benefit	Reviewer 1 Score	Reviewer 2 Score	Reviewer 3 Score	Reviewer 4 Score	Reviewer Average Score
A	5	4	3	5	4.25
B	4	2	3	4	3.25
C	3	2	5	4	3.50
D	4	3	2	2	2.75

Table E-5. Sample Reviewer Scores for Intangible Benefits

An option that can be used in a qualitative assessment is to "weight" each benefit criteria with regard to importance. The more important the benefit, the higher the weight. The advantage of weighting is the more important benefits have a greater influence on the benefit analysis outcome. The weighting scale can vary between any two predetermined high and low weights. An example of calculating a weighted score is provided in **Table E-6—**and demonstrates using weighting factors makes Alternative 1 the clear winner.

9. Discount Costs and Benefits

After costs and benefits for each system lifecycle year have been identified, convert them to a common measurement unit by discounting future dollar values and transforming future benefits and costs to their "present value." Present values are calculated by multiplying the future value times the discount factors published in the OMB Circular A-94.

Benefit	Alternative 1 Raw Score	Alternative 2 Raw Score	Weighting Factor	Alternative 1 Weighted Score	Alternative 2 Weighted Score
A	4	2	10	40	20
B	3	2	9	27	18
C	4	3	8	32	24
D	2	3	6	12	18
E	3	4	5	15	20
Total	16	14		126	100

Table E-6. Sample Weighted Benefits Score

Table E-7—shows annual costs and benefits for a system lifecycle, along with the discount factor, the discounted costs and benefits (present values), and the discounted net present value [NPV]. The discounted costs and benefits are computed by multiplying costs and benefits by the discount factor. The net benefit without discounting is $380,000 ($3,200,000 minus $2,820,000) while the discounted NPV is less than $60,000 because the biggest costs are incurred in the first two years, while the benefits are not accrued until the third year. When evaluating costs and benefits, be cautious of returns that accrue late in the investment's lifecycle. Due to discounting, benefits that accrue in later years do not offset costs as much as earlier-year benefits. Also, these later-year benefits are less certain. Both the business and IT environments may experience significant changes before these later-year benefits are realized.

Year	Annual Cost (AC)	Annual Benefit (AB)	Discount Factor (DF)	Discounted Cost (DC) ACxDF	Discounted Benefit (DB) ABxDF	Discounted Net DB - DC
1	150,000		0.9667	145,005		(145,005)
2	600,000		0.9035	542,100		(542,100)
3	280,000	400,000	0.8444	236,432	337,760	101,328
4	260,000	400,000	0.7891	205,166	315,640	110,474
5	300,000	400,000	0.7375	221,250	295,000	73,750
6	300,000	400,000	0.6893	206,790	275,720	68,930
7	240,000	400,000	0.6442	154,608	257,680	103,072
8	230,000	400,000	0.6020	138,460	240,800	102,340
9	230,000	400,000	0.5626	129,398	225,040	95,642
10	230,000	400,000	0.5258	120,934	210,320	89,386
Total	2,820,000	3,200,000		2,100,143	2,157,960	57,817

Table E-7. Sample Discounted Lifecycle Costs and Benefits

10. Evaluate Alternatives

Many benefits cannot be quantified in dollar terms. As a result, evaluating alternatives cannot always be done using present values, but valid evaluations can be made using a combination of dollar values and quantified relative values (values that are numeric, but do not represent dollar values).

Evaluate All Dollar Values—Once all the costs and benefits for each competing alternative have been assigned dollar values and discounted, the NPV of the alternatives should be compared and ranked. When the alternative with the lowest discounted cost provides the highest discounted benefit, it is the clear winner, as shown in **Table E-8—.**

Alternative	Discounted Cost (DC)	Discounted Benefit (DB)	Discounted Net (DB - DC)	Benefit-Cost Ratio (DB/DC)
1	1,800,000	2,200,000	400,000	1.22
2	1,850,000	1,750,000	(-100,000)	0.95
3	2,000,000	2,000,000	0	1.00
4	2,200,000	2,100,000	(-100,000)	0.95

Table E-8. Sample Investment Comparison (Lowest Cost System Provides Highest Benefit)

Discounted Net—There will probably be very few cases where the alternative with the lowest discounted cost provides the highest discounted benefit. The next number to consider is the Discounted Net (Discounted Benefit minus Discounted Cost). If one alternative clearly has the highest Discounted Net, it is considered the best alternative; however, it is usually advisable to look at other factors.

Benefit-Cost Ratio—When the alternative with the highest discounted net is not a clear winner, the benefit-cost ratio or BCR (discounted benefit divided by discounted cost) may be used to differentiate between alternatives with very similar or equal Discounted Nets. In **Table E-9—** Alternative 4 would be the winner because it has a higher BCR than Alternative 5. Alternatives 4 and 5 are clearly superior to other alternatives because they have the highest discounted net.

Evaluate With Intangible Benefits—When all the benefits are intangible, evaluation will be based on quantifying relative benefits.

Alternative	Discounted Cost (DC)	Discounted Benefit (DB)	Discounted Net (DB-DC)	Benefit-Cost Ratio (DB/DC)
1	1,500,000	1,600,000	100,000	1.07
2	1,600,000	1,750,000	150,000	1.09
3	1,900,000	2,000,000	100,000	1.05
4	2,000,000	2,450,000	450,000	1.23
5	3,000,000	3,450,000	450,000	1.15

Table E-9. Sample Investment Comparison (Other Than Lowest Cost System Provides Highest Benefit)

11. Perform Sensitivity Analysis

Sensitivity analysis tests the sensitivity of input parameters and the reliability of the CBA result. Sensitivity analysis should assure reviewers the CBA provides a sound basis for decisions. The sensitivity analysis process requires the following:

Identify Input Parameters—The assumptions documented earlier in the CBA are used to identify the model inputs to test for sensitivity. Good inputs to test are those that have significant (large) cost factors and a wide range of maximum and minimum estimated values. Some common parameters include:

- System requirement definition costs
- System development costs
- System operation costs
- Transition costs, especially software conversion
- System lifecycle

- Peak system demands.

Repeat the Cost Analysis—For each parameter identified, determine the minimum and maximum values. Then, choose either the minimum or maximum value as the new parameter value (the number selected should be the one that most differs from the value used in the original analysis). Repeat the CBA with the new parameter value and document the results. Prepare a table like **Table E-10—**to summarize the different outcomes and enable the results to be quickly evaluated.

Parameter	Parameter Value	Best Alternative
Development Cost ($)	1,500,000 2,000,000 2,500,000	A A B
Transition Costs ($)	100,000 200,000	A A
System Lifecycle (Years)	5 10 15	A B C
Benefits ($)	1,500,000 2,250,000 3,000,000	A A B

TableE-10. Sample Sensitivity Analysis

Evaluate Results—Compare the original set of inputs and the resulting outcomes to the outcomes obtained by varying the input parameters. In the previous table, the original values are the first value listed for each parameter. Sensitivity is measured by how much change in a parameter is required to change the alternative selected in the original analysis. The sensitivity guidelines include the following:

- A parameter is not considered sensitive if it requires a decrease of 50 percent or an increase of 100 percent to cause a change in the selected alternative.
- A parameter is considered sensitive if a change between 10 and 50 percent causes a change in the selected alternative.
- A parameter is considered very sensitive if a change of 10 percent or less causes a change in the selected alternative.

In the previous example, the analysis would appear to be somewhat sensitive to the development costs, but not sensitive to the transition costs and benefits.

12. Compare Investments

Even if the CBA shows that benefits will outweigh costs, using Payback Period and Return on Investment (ROI) analysis help demonstrate an investment is a better utilization of funds than other proposed investments.

Table E-11—illustrates that the money invested in the system's development, installation, and operation is not offset by the benefits until the 10th year. In other words, the payback period for the system is 10 years, which is generally unacceptable, making it difficult for this investment to obtain funding.

Year	Annual Cost (AC)	Annual Benefit (AB)	Discount Factor (DF)	Discounted Cost (DC) ACxDF	Discounted Benefit (DB) ABxDF	Discounted Net DB - DC	Cumulative Discounted Net
1	150,000		0.9667	145,010	0	(145,010)	(145,010)
2	600,000		0.9035	542,095	0	(542,095)	(687,106)
3	280,000	400,000	0.8444	236,428	337,754	101,326	(585,779)
4	260,000	400,000	0.7891	205,178	315,658	110,480	(475,299)
5	300,000	400,000	0.7375	221,256	295,007	73,751	(401,547)
6	300,000	400,000	0.6893	206,781	275,708	68,927	(332,620)
7	240,000	400,000	0.6442	154,603	257,671	103,068	(229,552)
8	230,000	400,000	0.6020	138,468	240,814	102,346	(127,206)
9	230,000	400,000	0.5626	129,409	225,060	95,651	(31,556)
10	230,000	400,000	0.5258	120,943	210,336	89,393	57,837
Total	2,820,000	3,200,000		2,100,171	2,158,008	57,837	

Table E-11. Sample Payback Period

Return on Investment—ROI is often used when comparing proposed investments. Total Discounted Net (Total Discounted Benefits minus the Total Discounted Costs) is often referred to as the return or profit from an investment. ROI is calculated by dividing the Total Discounted Net by the Total Discounted Cost. In the figure above, ROI is the Total Discounted Net ($57,837) divided by Total Discounted Costs ($2,100,171) and equals 0.0275. Since ROI is often cited as a percentage, multiplying by 100 converts the decimal rate to 2.75.

The ROI is really just another way to express the BCR. In the example above, the BCR is the Total Discounted Benefit ($2,158,008) divided by the Total Discounted Costs ($2,100,171) and equals 1.0275. The 1.0275 can also be expressed as 102.75 percent. This means that the benefits are 2.75 percent greater than the costs. Compute the ROI by subtracting 1 from the BCR.

The ROI must also be adjusted for risk. To adjust ROI for risk, use the process described for calculating the risk factor described in Appendix F.2. The “risk factor” for all risks should be totaled and added to the investment cost. Adjusting the ROI for risk will aid in comparing alternatives with different potential risk levels and will help ensure that returns for investments with higher risk potential are fully understood. (See **Appendix F—Risk Assessment** for a more detailed discussion on risk analysis.)

APPENDIX F—RISK ASSESSMENT

F.1 PURPOSE

Risk is part of any capital investment. Identifying and controlling risks during the Select Phase can have a significant impact on the investment's overall success. However, risk is not the only consideration for investment evaluations. Investments with high technical risk may be selected if the investment is deemed a strategic or operational necessity. Other investments may be selected simply because they have low risk and require few resources. Conducting a risk assessment and controlling risk is a continuing process throughout the investment lifecycle.

F.2 PROCESS

The risk evaluation process is composed of three steps:

1. Identify risks
2. Analyze risks
3. Control risks.

Each of these steps is detailed in the following sections.

1. Identify Risks

Risk identification consists of determining and documenting risks that will likely have an impact on the investment. The identification and associated analysis is a continuing process that should be done periodically throughout the investment lifecycle. Both internal and external risks should be identified. Internal risks are those that can be directly controlled within the project. There are several mechanisms available to assist in identifying risk areas that include historical information, work breakdown structure (WBS), project plans, risk checklist, and interviews. The following risk taxonomy or checklist is provided to assist in the risk identification. The Project Manager analyzes the following areas to identify investment risks.

Financial Risk—Risks that could result in needing unexpected funding, such as scope creep, sponsorship changes, cost overruns, legal dispute outlays, costs of lost information/data, hardware/software failure and replacement, costs to correct design errors or omissions, and potential cost of relying on a single vendor.

Technical Risk—Risks caused by an inability to accurately predict the investment's lifecycle. This can result from a failure to attain expected benefits from the investment, inaccurate investment cost or duration estimates, failure to achieve adequate system performance levels, failure to adequately integrate a new system with existing hardware and software, or failure to integrate organizational procedures or processes. Technical risk can be determined by the following factors:

- Investment Size:
  - Number of project team members
  - Project duration
  - Number of organizational departments involved in the investment
  - Size of programming effort (e.g., hours).
- Investment Structure:
  - Complexity of effort (e.g., number of interfaces with other systems, etc.)
  - Security vulnerabilities
  - New system or renovation of existing system(s)
  - Organizational, procedural, or personnel changes resulting from the system
  - User perceptions and willingness to participate
  - Management commitment
  - Level of user involvement.
- Project team's familiarity with:
  - Proposed business or application area
  - Target development environment, tools, and operating system
  - Development of similar systems.
- User group's familiarity with:
  - System development process
  - Proposed application or business area
  - Similar investments
  - New technology.

Operational Risk—The degree to which a proposed investment solves business problems or takes advantage of business opportunities. The business case may be enhanced if the investment can be linked to the overall strategic plan. The investment should functionally integrate with Department-level planning (i.e., enterprise architecture, Telecommunications and eGovernment). Information should be included on how the investment will affect organizational structures and procedures. (Investments with broader impacts on existing organizational structures or procedures are more risky than investments with lesser or more narrow impacts.)

Schedule Risk—The degree to which the expected completion dates for all major investment activities meet organizational deadlines and constraints for effecting change. Concerns may include governmental regulation deadlines, project management experience, schedule timeframe, resource availability and competency, and contractor capabilities.

Legal and Contractual Risks—The investment ramifications that could result from developing an information system. Risks increase when outside organizations are involved. Risks may include, but are not limited to:

- Contract protests
- Copyright infringements
- Non-disclosure
- Labor laws
- Foreign trade regulations (limiting encryption techniques)
- Financial reporting standards
- Software ownership in joint ventures
- License agreements.

Organizational Risk—Risks associated with key stakeholders and their view of the investment. Redistribution of power is the single greatest element that will increase organizational risk. Increasing stakeholder buy-in lowers organizational resistance to change.

2. Analyze Risks

Each risk is analyzed based on an assessment of likelihood and impact. Numerous activities are used to analyze risks and obtain a complete risk assessment to aid in developing risk management and control strategies. The following provides a summary of activities to assist in risk analysis:

- Group similar and related risks into categories. This will assist in identifying related risks as well as identifying potential dependencies between risks.

- Determine risk drivers or variables that affect the probability and impact of identified risks.
- Determine the root cause or source of risk.
- Use risk analysis techniques and tools such as simulation or decision trees to assess trade-offs, interdependencies, and timing of identified risks.
- Estimate risk factor or risk exposure. Multiply probability of occurrence or likelihood with the consequence or impact (in financial terms) if the risk occurred.
- Determine risk severity. Risk severity is determined by assessing the risk factor with the relative risk timeframe for action. This provides a means to assist in prioritizing risks to better focus control strategies.
- Rank and prioritize risks.

In addition to prioritized risks, a primary output of the risk analysis is an overall "risk factor" that can be applied to each risk. To calculate the risk factor, determine the impact a particular risk (in financial terms) will have on the investment if it is realized, and the likelihood (probability in percentage terms) of this risk occurring. Then multiply these two numbers together. Calculate the risk factor for each identified investment risk and sum the risk factors to determine an overall risk rating for the investment. The overall risk rating should reflect the risk-adjusted ROI for the investment (see **Appendix E: Cost-Benefit Analysis** for a discussion on ROI and risk adjustment.)

To aid comparisons across investments, it is useful to also calculate a risk score. This is computed by dividing the investment's overall risk rating by the number of identified risks. This encourages Project Managers to include all identified risks and provides a more accurate picture of the overall investment risk. For example, several low-impact, low-likelihood risks may be less risky than a single high-impact, high-likelihood risk.

The Risk Assessment Plan, submitted as part of the Select and Control Phases should, at a minimum, have the columns shown in **Table F-1**.

Risk Priority	Risk Description	Probability of Risk Occurring (in %)	Cost if Risk Occurred	Risk Factor

Table F-1. Example of Risk Assessment Table

3. Control Risks

The Project Manager establishes and executes a risk management plan to mitigate risks. The development of a risk management plan assists in addressing each risk and whether to accept, avoid, transfer, or reduce the impact of the risk. This includes determining risk controls based upon available resources and identifying responsible parties. Plans should include the identification of the appropriate risk control strategy, objectives, alternatives, mitigation approach, responsible parties, resources required, activities, actions taken to date, and results achieved. The risk management plan is an evolving strategy to assist the Project Manager and ensure a higher probability of success for the investment. The plan should be updated continually as risks change throughout the lifecycle. Risks, actions taken, and results should be tracked and included as part of periodic reviews.

Risks can rarely be completely eliminated, however they can be controlled. If the following controls or risk mitigation strategies are in place, the likelihood of risk decreases and the investment is more attractive:

Financial Controls

- Perform Cost-Benefit and economic analyses
- Implement a rigorous investment management program
- Utilize earned value, share in savings, use contracting approaches, etc. to help control costs
- Purchase liability insurance
- Establish clear benefits to be realized
- Use competitive bidding for each investment design increment.

Technical Controls

- Reengineer the process first
- Use development lifecycle methodology/ structure
- Use project planning/management software
- Use appropriately trained personnel
- Divide the investment into increments
- Isolate custom design portions of the investment
- Assign a Project Manager (preferably with Project Management Institute or similar organization certification) to be accountable for the investment
- Conduct an IV&V
- Conduct pilot test(s).

Operational Controls

- Use a strategic information management framework
- Establish clear requirements and objectives
- Use a change management program to minimize organizational disruption
- Adequately train organization and provide follow on support
- Establish performance metrics and monitor metrics using a reporting system
- Establish a communications plan.

Schedule Controls

- Use contractual incentives for quality or timeliness
- Use contractual penalties for missed deadlines
- Use contractual incentives for meeting or beating deadlines
- Use project management software

- Use an experienced/certified Project Manager and/or provide the necessary training to the Project Manager
- Set realistic expectations and manage those expectations
- Use outsourcing to augment scarce internal resources.

Legal and Contractual Controls

- Create a software license management program
- Review all applicable laws
- Apprise contracting personnel of potential legal concerns and contract disputes
- Maintain communication with contractors to minimize contract disputes
- Provide multiple termination opportunities within a contract.

Organizational Controls

- Obtain “buy-in” from top management early in planning stages
- Work closely with end-users to establish system requirements
- Maintain good communication with all stakeholders.

APPENDIX G—PERFORMANCE MEASUREMENT

G.1 PURPOSE

Performance measurement is the process whereby an organization establishes the parameters within which programs, investments, and acquisitions are reaching the desired results in support of mission goals. Performance measures are set during the Select Phase and assessed during subsequent phases. The focus of performance measurement is on outcomes, or how well the IT investment enables the program or agency to accomplish its primary mission. Consequently, performance measurement should look beyond measures of input (resource consumption), activities (milestones), and output (production numbers), which are more directly related to operational performance. This focus, however, does not imply that input, activity, and output measures are not useful. Indeed, internal measures are used to track resources and activities and make necessary adjustments since investments are only successful if hardware, software, and capabilities are delivered on time and meet specifications.

Performance is evaluated using two criteria—effectiveness and efficiency. Effectiveness demonstrates that an organization is doing the correct things, while efficiency demonstrates that an organization is doing things optimally. New acquisitions and upgrades should include a business case indicating the investment will result in effectiveness or efficiency improvements. For example, a new computer network might result in enhanced efficiency because work is processed faster, digital images are transferred among remote sites, or messages are transmitted more securely. Some questions that facilitate performance measure development include:

- What product will be produced, shared, or exchanged?
- Who will use the results?
- What decisions or actions will result from delivery of products from this system?

Answers to these questions will help Project Managers develop effective performance measures with the following characteristics:

- Strategically relevant
  - Directed to factors that matter and make a difference
  - Promote continuous and perpetual improvement
  - Focus on the customer
  - Agreed to by stakeholders.
- Short, clear, and understandable
  - Measurable/quantifiable
  - Meaningful.
- Realistic, appropriate to the organizational level, and capable of being measured.
- Valid
  - Link to activity and provide a clear relationship between cause and effect
  - Focus on managing resources and inputs, not simply costs
  - Discarded when utility is lost or when new, more relevant measures are discovered.

G.2 PROCESS

Outcome-based performance measures are developed through a series of steps. It is important to understand that developing measures is only one part of the more comprehensive process. After measures are developed, baseline information is gathered if it does not already exist, and performance information is collected, analyzed, interpreted, and used throughout the investment's life. These steps require a commitment of management attention and resources.

The following five steps are recommended to establish performance measures:

1. Analyze how the investment supports the mission goals and objectives and reduces performance gaps
2. Develop IT performance objectives and measures that characterize success
3. Develop collection plan and collect data
4. Evaluate, interpret, and report results
5. Review process to ensure it is relevant and useful.

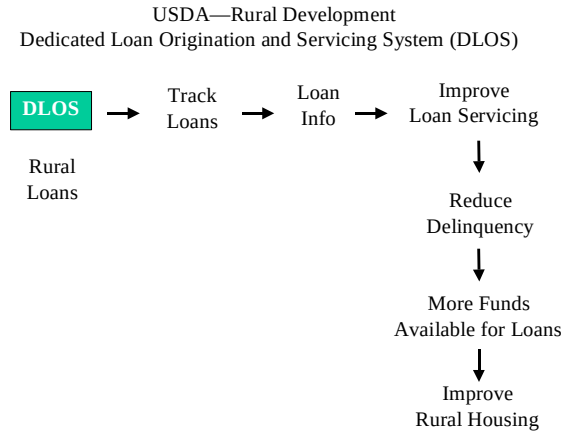
Steps one to three are completed during the Pre-Select and Select Phases. Steps four and five are completed during the Control Phase, with follow-up during the Evaluate and Steady-State Phases. Each of these process steps is defined in the following sections.

1. Analyze How the Investment Supports the Mission and Reduces Performance Gaps

Effective outcome-based performance measures are derived from the relationship between the new investment and how users will apply investment outputs. Specifically, the users' mission and critical success factors (those activities and outputs that must be accomplished if users are to achieve their mission) must be clearly understood. The critical element of this step is linking proposed and in-process IT investments and activities to the user mission and critical success factors.

This concept is often described as a method of strategically aligning programs and support functions with the agency's mission and strategic priorities. The first step in effectively developing outcome-based IT performance measures is to identify the organization's mission, the critical tasks necessary to achieve the mission, and the strategies that will be implemented to complete those tasks. One structured method of accomplishing this step is to develop a Logic Model linking the mission to IT performance measures. An example of a Logic Model is provided in **Figure G-1—Example of Logic Model**.

Figure G-1. Example of Logic Model[3]



3 DLOS model from the Rural Development's Rural Housing Service.

Answers to the following questions will aid logic model development:

- Identify the system or the left most box. What will the system do? What are major functions or features that the system will provide (i.e., what functionality or information)? Is this system a stand-alone system or is it used or integrated with another large system? What is the purpose of that system? How is it used?
- What aspects of the system, service, and information quality are needed for the system to perform optimally or acceptably?
- Identify who will use the system. What is the principal business task they perform? How will using the system help them with that task?
- How does completion of that task contribute to a business function?
- How does completion of the business function contribute to achievement of the program goals?
- How does completion of program goals contribute to organizational goals?
- How does completion of organizational goals contribute to Departmental goals?
- Determine whether there are related IT investments that impact the mission area and goal(s) selected. Understand the relationships between various IT investments that address the same or similar needs. This will help identify potential areas for consolidation.

Once the mission is clearly defined, a gap analysis is performed to understand how IT can improve mission performance. The analysis begins with the premise that IT will improve effectiveness, efficiency, or both. To accomplish this, requirements are defined and the following questions are answered:

- Why is this application needed?
- How will the added functionality help users accomplish the mission?
- How will the added functionality improve day-to-day operations and resource use?

The investment initiation and requirement documentation also describes gaps between the current and future mission and strategy in terms of how overall efficiency and effectiveness will be improved. Project managers assist users in developing a baseline measurement of the current IT use and in comparing the baseline to the business objective to identify gaps. This analysis defines the investment need as the basis for determining what success will look like (e.g., the investment is successful when the gap is reduced by “x” amount).

2. Develop IT Performance Measures that Characterize Success

Well-designed performance measures define success parameters for the IT initiative. The following questions should be asked for each performance measure and answered affirmatively before deploying the measure:

- Is it useful for monitoring progress and evaluating the degree of success?
- Is it focused on outcomes that stakeholders will clearly understand and appreciate?
- Is it practical? Does it help build a reliable baseline and cost-effectively collect performance data at periodic intervals?
- Can the performance measure be used to determine the level of investment risk and whether the investment will meet performance targets?

Answering these questions affirmatively results in an agreement that the IT investment, by supporting improvements identified earlier, will support organizational goals and objectives. Additionally, it will help limit the number of performance measures and focus management attention on the requirements that have the greatest priority or impact. After three to five major requirements have been identified, the following questions are asked:

- What are the performance indicators for each major requirement?
- How well will those outputs satisfy the major requirements?
- What additional steps must be taken to ensure outputs produce intended outcomes?
- How does this IT investment improve capabilities over the current method?

Once requirements to be measured are identified, determine when each requirement is met. Some

requirements may need to be changed if they are too difficult to measure. Or, if the requirement has indirect rather than direct outcomes, it may be necessary to use "surrogate" performance measures that mirror actual outcomes. For example, it is difficult to measure the direct benefit of computer-based training (CBT) systems. In this case, a surrogate measure might be the percentage of staff achieving certifications through the CBT with implications that certified staff are more desirable than non-certified staff because they have demonstrated initiative and are more proficient.

Of the possible performance indicators, select one or more to report performance against each requirement. One performance indicator may provide information about more than one requirement. The objective is to select the fewest number of performance indicators that will provide adequate and complete information about progress.

Selecting the fewest performance indicators necessary is important because data collection and analysis can be costly. The cost is acceptable if the benefit of the information received is greater than the cost of performance measurement, and if the data collection does not hinder accomplishment of primary missions. Costs are calculated by adding the dollars and staff time and effort required to collect and analyze data. When calculating costs, consider whether they are largely confined to initial or up-front costs, or will occur throughout the IT lifecycle. For example, the cost of developing and populating a database may have a large initial cost impact but diminish significantly for later maintenance. Answers to the following questions will help to determine the cost of tracking a specific performance indicator:

- What data are required to calculate the performance measure?
- Who collects the data and when?
- What is the verification and validation strategy for the data collection?
- What is the method to ensure the quality of the information reported?

In addition to determining costs, it is also necessary to determine the baseline performance, target performance, and expected time to reach the target. The baseline value is the start point for future change. If performance measures are currently in use, the data collected can provide the baseline. Otherwise the manager must determine the baseline by a reasonable analysis method including the following:

- Benchmarks from other agencies and private organizations
- Initial requirements
- Internal historical data from existing systems
- Imposed standards and requirements.

To determine the target value, obtain stakeholder agreement regarding the quantifiable benefits of the new system. These targets may be plotted as a function over time, especially for IT investments that are being installed or upgraded or as environmental factors change. However, incremental improvement is not necessarily success. The targeted improvement from the baseline must be achieved within the designated timeframe to be counted as a success.

3. Develop Collection Plan and Collect Data

To ensure performance data is collected in a consistent, efficient, and effective manner, it is useful to develop and publish a collection plan so all participants know their responsibilities and can see their contributions. The collection plan details the following items:

- Activities to be performed
- Resources to be consumed
- Target completion and report presentation dates
- Decision authorities
- Individuals responsible for data collection.

In addition, the collection plan answers the following questions for each performance measure:

- How is the measurement taken?
- What constraints apply?
- Who will measure the performance?
- When and how often are the measurements taken?
- Where are the results sent and stored, and who maintains results?

- What is the cost of data collection?

While costs should have been considered during the previous step, the actual cost will be more evident at this stage. Excessively costly performance measures may require project managers to find a different, less costly mix of performance measures for the IT investment. Or it may be necessary to creatively collect the measures to reduce collection cost. For example, a sampling may produce sufficiently accurate results at significantly less cost than counting every occurrence, and some results can be automatically generated by the system and accessed through a standard report.

To ensure data is being collected in a cost-effective and efficient manner, it is important to ensure the data collectors are involved in developing performance measures. The collectors will do a much better job if they believe the performance measures are valid and useful, and they will have insight regarding the best way to collect the data.

4. Evaluate, Interpret, and Report Results

Performance measures are useful in monitoring the investment against expected benefits and costs. To evaluate performance, data is compiled and reported according to the collection plan that was previously constructed. The data is then evaluated and the following questions are answered regarding the collected data and the investment's performance:

- Did the investment exceed or fall short of expectations? By how much and why?
- If the data indicates targets are successfully reached or exceeded, does that match other situational perceptions?
- What were the unexpected benefits or negative impacts to the mission?
- What adjustments can and should be made to the measures, data, or baseline?
- What actions or changes would improve performance?

This evaluation reveals any needed adjustments to the IT investment or performance measures. It also helps surface any lessons learned that could be fed back to the investment management process.

5. Review Process to Ensure It Is Relevant and Useful

Performance measures provide feedback to managers and help them make informed decisions on future actions. To ensure that performance measures are still relevant and useful, answer the following questions:

- Are the measures still valid?
  - Have higher-level mission or IT investment goals, objectives, and critical success factors changed?
  - Are threshold and target levels appropriate in light of recent performance and changes in technology and requirements?
  - Can success be defined by these performance measures?
  - Can improvements in mission or operations efficiency be defined by the measures?
  - Have more relevant measures been discovered?
- Are the measures addressing the right things?
  - Are improvements in performance of mission, goals, and objectives addressed?
  - Are all objectives covered by at least one measure?
  - Do the measures address value-added contributions made by overall investment in IT and/or individual programs or applications?
  - Do the measures capture non-IT benefits and customer requirements?
  - Are costs, benefits, savings, risks, or ROI addressed?
  - Do the measures emphasize the critical aspects of the business?

- Are the measures the right ones to use?
  - Are measures targeted to a clear outcome (results rather than inputs or outputs)?
  - Are measures linked to a specific and critical organizational process?
  - Are measures understood at all levels that must evaluate and use them?
  - Do the measures support effective management decisions and communicate achievements to internal and external stakeholders?
  - Are measures consistent with individual motivations?
  - Are measures accurate, reliable, valid, and verifiable?
  - Are measures built on available data at reasonable costs and in an appropriate and timely manner for the purpose?
  - Are measures able to show interim progress?
- Are measures used in the right way?
  - Are measures used in strategic planning (e.g., to identify baselines, gaps, goals, and strategic priorities) or to guide prioritization of program initiatives?
  - Are measures used in resource allocation decisions and task, cost, and personnel management?
  - Are measures used to communicate results to stakeholders?

APPENDIX H—PROJECT MANAGEMENT

H.1 PURPOSE

Project Management is a crucial element for IT investment success. It involves executing the necessary skills and management practices to ensure successful investment development and implementation. This integrated skill set addresses such areas as project planning, scope management, cost, schedule, performance, risk, and organizational management. The Project Manager is ultimately responsible for the investment's success and ensuring the investment delivers the functionality and capabilities expected by stakeholders (i.e., users, customers, and senior leaders). Perhaps the greatest project management challenge is identifying risks and then executing management techniques that mitigate the risks to ensure timely and successful completion.

H.2 COMPONENTS

Project Managers should complete the following project management components to help ensure the investment's successful completion:

Project Planning—Project planning is a critical element of every successful investment. It provides a foundation on which to base anticipated efforts. Additionally, it helps identify investment components and illustrates these components in a project plan. Project planning includes:

- Scope definition
- Activity identification
- Activity duration estimation
- Activity sequencing
- Cost estimation
- Schedule development
- Project staffing/resourcing
- Project plan development.

Investments typically involve multiple components that may be complex or interface with other proposed/existing systems or data. Integrating these components can be challenging. To support improved integration and management, it is useful to develop a Work Breakdown Structure (WBS). A WBS provides a management framework by separating the investment lifecycle into distinct, manageable components related to various activities and interfaces. Each component is defined with appropriate sub-components and activities, such that one individual or team can implement each component. This enables the Project Manager to more effectively estimate the cost and schedule for completing individual components, supports sequencing activities and identification of interdependencies, and provides a basis to identify milestones and develop resource and schedule estimates. **Table H-1—**provides an example of a WBS.

Scope Management—The scope frames what is expected of the investment's ultimate capability and functionality. As such, it directly impacts functional and system requirements development. The Project Manager should obtain the Project Sponsor's concurrence on the investment's scope, and then effectively manage that scope and mitigate "scope creep" by maintaining requirements traceability throughout the project lifecycle and implementing configuration management procedures. It is important for the Project Sponsor to determine whether existing requirements have been redefined, new requirements have been identified, or existing requirements eliminated based upon events. The project scope should be based on the business requirements identified during the Pre-Select Phase and traced throughout the project lifecycle. All system features, functions, and capabilities should be linked to original customer requirements throughout the entire planning, acquisition, design and implementation phases to ensure accurate system or network design.

Risk—Risk is inherent in every investment. To aid in effectively identifying, analyzing, and managing risk, Project Managers should develop a risk management plan early in the planning stages, ideally during the Select Phase. Project Managers should employ subject matter experts (SMEs) among the various functional areas of the investment to identify risk and provide mitigation strategy. Key risk areas may include technology, cost, schedule, and performance/quality. The risk management plan is continually updated throughout the investment's lifecycle and is part of annual and periodic reviews. **Appendix F—Risk Assessment** provides additional guidance on risk assessment and management.)

Cost and Schedule Management—Effective investment management entails establishing cost and schedule baselines. Actual information is continuously collected, analyzed, and compared to original projections and the current baseline. Variances are identified, and appropriate actions are taken to inform senior management and mitigate the impacts of increased costs and schedule slippages. The WBS, milestones, activities, and project plan assist the development and tracking of cost and schedule. Earned value techniques provide a means to more completely evaluate costs and schedule, and assist in early risk identification (see **Appendix I—Earned Value Analysis**).

Plan Project	
100	Define Project
10	Determine Project Objectives
20	Define Project Scope
30	List Project Products
40	Determine Project Constraints
50	Select Project Approach
60	Determine Project Standards
70	Assess Project Risks
200	Make Project Plan
10	Define Work Breakdown Structure
20	Determine Activity Dependencies
30	Define Project Milestones
40	Determine Project Organization
50	Estimate Effort
60	Allocate Resources
70	Schedule Activities
80	Develop Budget
90	Assess Project Risks
300	Obtain Project Approval
10	Assemble Project Plan
20	Present Project Plan
30	Agree to Project Plan
MPMP1	Milestone PMP1

Table H-1. Example of a Project Planning WBS

Performance—An investment's ultimate objective is to meet or exceed stakeholder performance expectations by ensuring the investment satisfies the mission need and business requirements. In the Pre-Select and Select Phases, performance planning includes defining performance measures and identifying activities required to ensure performance objectives will be met (see **Appendix G—Performance Measurement**). This may include benchmarking to establish a baseline and to further refine the investment's performance objectives. The Control Phase includes a continual monitoring of the performance baseline to potentially include quality reviews, tests, or pilot tests. In the Evaluate Phase, a PIR helps compare actual investment performance with expectations (see **Appendix J—Post-Implementation Reviews**). During the Steady-State Phase, performance measures are analyzed to determine whether investments are continuing to meet mission needs and performance expectations.

Organizational Management—Organizational management skills needed to manage an investment include project staffing, communications, and organizational understanding. Project Managers should be able to identify the needed skill sets and assign appropriate personnel to accomplish a given set of activities. Project Managers should also have the requisite interpersonal and leadership skills to communicate with both the project team and stakeholders. This includes possessing a vision for the investment and how to best meet stakeholder expectations, as well as ensuring the project team is able to focus on assigned tasks/activities. Additionally, Project Managers should be able to communicate and build consensus with key stakeholders, since this ultimately impacts the investment's success or failure.

APPENDIX I—EARNED VALUE ANALYSIS

I.1 PURPOSE

Earned value analysis is a program management technique that uses an investment's past performance and work as indicators of the investment's future. This enables the Project Manager to evaluate and gain insight into an investment's actual schedule and financial progress relative to the project plan. Earned value analysis identifies expenditure and scheduling projections for established critical path milestones, or significant points in the investment's development where the initiation of each milestone is dependent on the completion of a prior milestone. The Project Manager tracks actual progress and expenditures at the completion of each critical path milestone against planned figures to obtain variances. These variances can then be used to identify schedule and cost overruns so they can be resolved as quickly as possible.

The earned value methodology requires an investment to be fully defined at the outset. The information that is required to complete an earned value analysis includes:

- List of all critical path milestones
- Budgeted percentage of work performed for each critical path milestone
- Planned critical path milestone start and completion dates
- Planned expenditures for each critical path milestone
- Total investment budget
- Budgeted dollars for work performed for each critical path milestone
- Planned investment start and end dates.

The approach can provide accurate and reliable assessments from as early as 15 percent into the investment's lifecycle. It provides early indications of cost and schedule variances in order to take appropriate risk mitigation steps. Typically, investments that are over budget when 15 percent of the investment is finished will result in cost overruns. Once a cost overrun is identified, it can generally be reduced by only 10 percent, which indicates the need to support early awareness of potential cost and schedule risks. Early investment assessment and identification of cost and schedule variances is critical for the overall success of the investment, and supports improved cost and schedule control.

I.2 PROCESS

Before completing earned value analysis, the Project Manager needs to complete the following project management tasks (see **Appendix H—Project Management**):

- Develop a WBS
- Define investment activities
- Allocate costs to each WBS element
- Schedule each activity
- Chart and evaluate the investment's status.

The Project Manager will then have the basis for periodically assessing the investment's performance and completing the following four steps in the earned value analysis process:

1. Update the Schedule

The scheduled activities are reported as started, completed, or with a remaining duration as appropriate. For unfinished activities, the percent complete is reported. For work that results in discrete/concrete deliverable products (e.g., reports, studies, briefings, etc.), it generally is easy to determine the percent complete. For efforts that are not so easily measured, special "earning rules" may be employed. A common "earning rule" is to report percent complete according to completed milestones within an activity.

2. Record Actual Costs

After updating the schedule, actual costs from the investment's accounting system are recorded. In situations where the accounting system does not provide the level of detail required to obtain actual accounting costs, the Project Manager may need to estimate what percentage of actual costs should be assigned to the investment.

3. Calculate Earned Value Measures

After recording actual costs for the reporting period, earned value measures are calculated and

reports generated. This can be done, in part, by creating an earned value chart as shown in **Figure I-1—Sample Earned Value Analysis Chart** (This can be accomplished using a standard project management or spreadsheet software's charting functionality.)

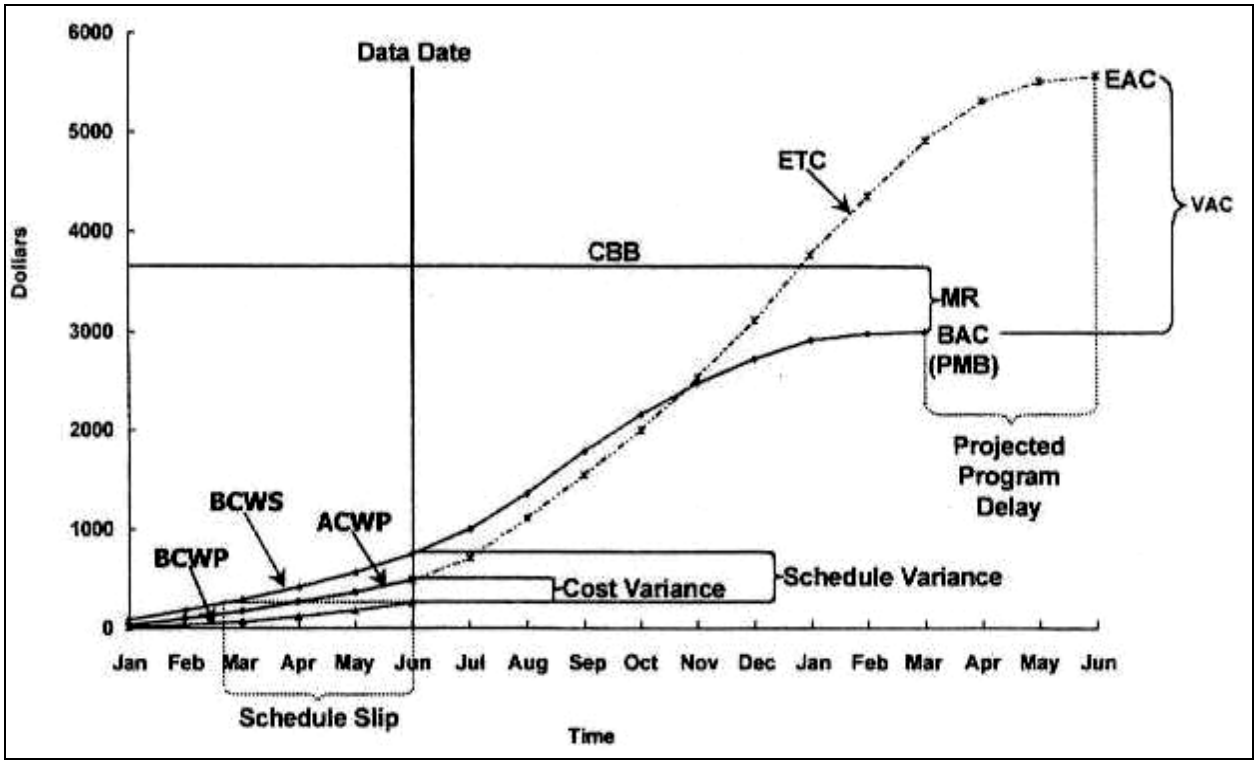


Figure I-1. Sample Earned Value Analysis Chart

The sample chart includes the following earned value measures:

Actual Cost of Work Performed (ACWP)—The costs actually incurred and recorded in accomplishing the work performed within a given time period.

Budget at Completion (BAC)—The sum of all budgets established for the contract.

Budgeted Cost for Work Performed (BCWP)—The sum of the budgets for completed work packages and completed portions of open work packages, plus the applicable portion of the budgets for level of effort and apportioned effort.

Budgeted Cost of Work Scheduled (BCWS)—The sum of all WBS element budgets that are planned or scheduled for completion.

Contract Budget Base (CBB)—The total cost of all budgeted activities necessary to complete a task.

Cost Performance Index (CPI)—Earned value divided by the actual cost (BCWP divided by ACWP).

Cost Variance (CV)—Earned value minus the actual cost (BCWP minus ACWP).

Estimate at Completion (EAC)—The actual costs incurred, plus the estimated costs for completing the remaining work.

Estimate to Complete (ETC)—The cost necessary to complete all tasks from the ACWP end date through the investment's conclusion.

Management Reserve (MR)—The amount of the total allocated budget withheld for management control purposes rather than designated for the

accomplishment of a specific task or set of tasks; not part of the performance measurement.

Performance Measurement Baseline (PMB)—The time-phased budget plan against which investment performance is measured.

Schedule Variance (SV)—Earned value minus the planned budget for the completed work (BCWP minus BCWS).

Variance at Completion (VAC)—The difference between the total budget assigned to a contract, WBS element, organizational entity, or cost account and the estimate at completion; represents the amount of expected overrun or under run.

4. Analyze the Data and Report Results

The critical path milestones used to complete the earned value analysis are directly derived from the project plan. These are the milestones that require completion before a successive milestone can begin. The data is collected and monitored for each milestone throughout the project to achieve maximum effectiveness.

APPENDIX J—POST-IMPLEMENTATION REVIEWS

J.1 PURPOSE

Post-Implementation Reviews (PIRs) support the Evaluation Phase of the process (see **Chapter 5—Evaluate Phase**). PIRs help determine whether investments have achieved expected benefits, such as lowered cost, reduced cycle time, increased quality, or increased speed of service delivery.

The PIR has a dual focus:

- It provides an assessment of the implemented investment, including an evaluation of the development process.
- It indicates the extent to which the USDA's decision-making processes are sustaining or improving the success rate of IT investments.

The PIR usually occurs either after a system has been in operation for about six months or immediately following investment termination.

A team of agency and/or staff office personnel should conduct the PIR. However, in order to ensure the review is conducted independently and objectively, the PIR team should not include members from the investment under review. The PIR team should review the following investment elements:

- Mission alignment
- IT architecture and telecommunications infrastructure (including security and internal controls)
- Performance measures
- Project management
- Customer acceptance
- Business process support
- High performance workforce
- Cost versus anticipated savings.

As a minimum, the PIR team will evaluate stakeholder and customer/user satisfaction with the end product, mission/program impact, and technical capability, as well as provide decision-makers with lessons learned so they can improve investment decision-making processes.

The review will provide a baseline to decide whether to continue the system without adjustment, to modify the system to improve performance or, if necessary, to consider alternatives to the implemented system. Even with the best system development process, it is quite possible that a new system will have problems or even major flaws that must be rectified to obtain full investment benefits. The PIR should provide decision-makers with useful information on how best to modify a system, or to work around the flaws in a system, to improve performance and bring the system further in alignment with the identified business needs.

J.2 PROCESS

As detailed below, there are seven major steps to conducting a PIR:

1. Initiate PIR

The review team initiates a PIR by preparing and sending a memorandum to the Project Sponsor stating the review has begun. The memorandum should include a schedule for the planned review and indicate any areas that may receive special review emphasis.

2. Analyze Documentation

The review team attains any existing investment documentation and analyzes the information to understand the investment scope, generate interview and survey questions, prepare for system overview briefings, and plan the PIR. The review team also reviews any existing reports and memos from the Pre-Select, Select, and Control Phases to uncover any findings or outstanding issues.

3. Interview Key Players

The review team interviews all key IT and business process players. The interviews should help the team develop an understanding of the system's goals, objectives, benefits, and costs as described in the business case submitted during the Select Phase. Additionally, the interviews will help the team determine how efficiently and effectively the system's objectives, goals, performance measures, and benefits are being

achieved, as well as identify system deficiencies and enhancement needs.

4. Measure Performance

The review team assesses the investment performance measures established during the Select Phase. These performance measures are compared to actual data generated during the operations/production stage. In the absence of certain statistics, the review team may perform onsite observations to measure specific criteria.

5. Perform User Surveys

The review team conducts qualitative surveys with users to determine user satisfaction with the system. Executing the survey includes designing questionnaires, distributing survey questionnaires to remote users' locations, receiving responses, analyzing results, and generating a survey results memorandum. The survey measures the system's efficiency and effectiveness in achieving its stated goals and benefits and in satisfying user needs.

6. Perform Analysis

The review team analyzes all documentation, survey results, and performance measurements to determine if the system efficiently and effectively achieved its objectives.

7. Issue Report

After comments are received from the Project Sponsor, the review team prepares the Final Report and submits it for the OCIO, EWG, and EITIRB review. Report findings and recommendations must be clear and concise to avoid any misunderstandings.

APPENDIX K—STRATEGIC INVESTMENT CRITERIA AND BONUS POINT EVALUATION TOOLS

The following pages provide the criteria used by an EWG and the EITIRB during the annual investment review cycle. Each page details the specific materials that are reviewed, evaluation factors, and rating award basis for the project components required. The following chart indicates which factors are rated in the five stages:

Investment Criteria Applicable in Each Phase					
Criteria	Pre-Select	Select	Control	Evaluate	Steady-State
Mission	X	X			X
Risk		X	X		
ROI		X			
Cost			X	X	X
Schedule			X		
Performance			X	X	X
Post-Implementation Review				X	
Security		X	X	X	X
Enterprise Architecture	X	X	X	X	X
eGovernment	X	X	X	X	X
Telecommunications	X	X	X	X	X
Secretarial/Administration Priority	X	X	X		

Figure K-1. Investment Criteria Applicable in Each Phase

EVALUATION OF MISSION

Objective: Maximize the relationship between the investment and the mission.

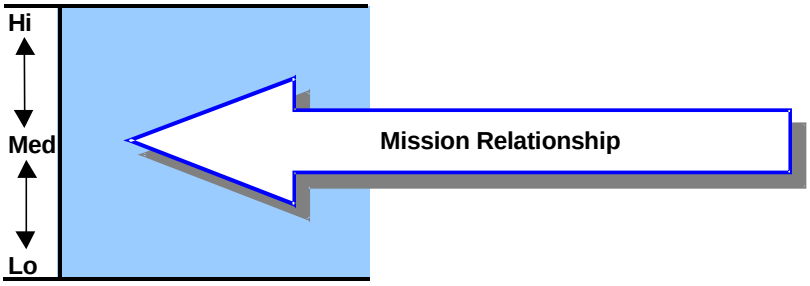


Figure K-2. Mission Relationship

Review the Following Materials Related to Mission and Performance Measures

- Agency Mission Needs Statement
- Statement of Project/System Purpose and Business Case
- Strategic Plan Goals/Strategic Plan Performance Measures and Indicators
- Results of I-TIPS Scoring

Mission Evaluation Factors

- How does the investment support or influence mission effectiveness?
- Do the performance measures reflect the effectiveness of the investment to achieve mission goals?

Rating Award Basis

5	Award this rating if there is a direct and influential relationship between the investment and the mission, and if the performance measures reflect the ability to directly affect and influence the achievement of mission goals.
4	Award this rating if there is an indirect or support relationship between the investment and the mission, and if the performance measures reflect an indirect ability to positively affect and influence mission goals.
3	Award this rating if there is a direct and influential relationship between the investment and the mission, but the performance measures are not developed well enough to determine how the investment would contribute to the achievement of mission goals.
2	Award this rating if there is an indirect or support relationship between the investment and the mission, but the performance measures are not developed well enough to determine how the investment would contribute to the achievement of mission goals.
1	Award this rating if the relationship between the investment and the mission is not clear, or if there are no developed performance measures.

Figure K-3. Rating Award Basis

Objective: Maximize Return and Minimize Risk

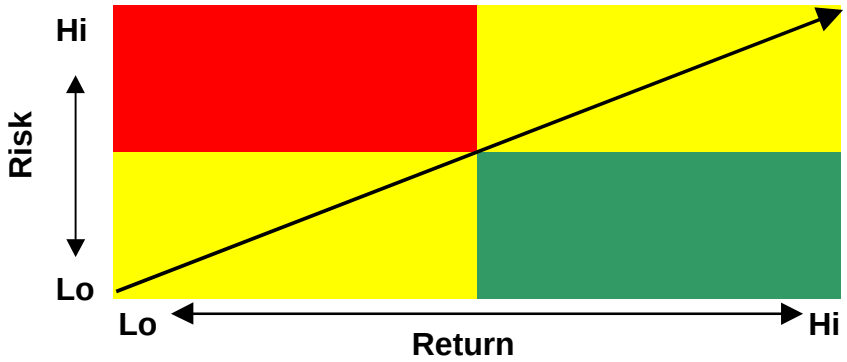


Figure K-4. Risk Objective

Examples of Different Types of Risk

- Project Costs, Size, or Resource Requirements
- Organization/Project Management
- Strategic/Business Impact
- Security
- Management
- Economic/Financial
- Technical
- Contract/Acquisition
- Implementation
- Change Management
- Human Element

Risk Evaluation Factors

- Is there a comprehensive Risk Management Plan in place?
- Are the appropriate risks identified, quantified, evaluated, and mitigated?

Rating Award Basis

5	Award this rating if there is a comprehensive Risk Management Plan in place, and all the appropriate risks are identified, quantified, evaluated, and mitigated.
4	Award this rating if there is a Risk Management Plan in place, but not all of the risks are identified, and the omissions are minor, and the risk mitigation strategies address the critical areas.
3	Award this rating if there is a Risk Management Plan in place, but not all of the risks are identified, and some of the mitigation strategies are suspect.
2	Award this rating if only token attention has been paid to risk, or if the Risk Management Plan is poorly developed.
1	Award this rating if there is no Risk Management Plan in place.

Figure K-5. Rating Award Basis

EVALUATION OF RETURN ON INVESTMENT (ROI)

Objective: Maximize the Return, Minimize the Investment Cost

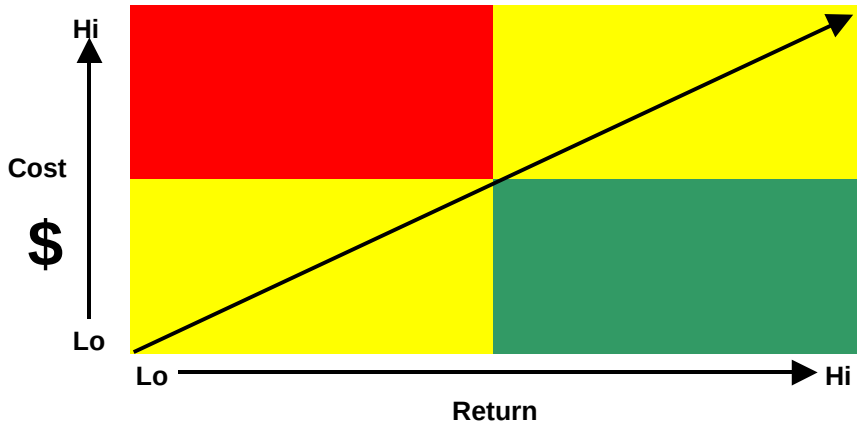


Figure K-6. ROI Objective

Examples of Return-on-Investment Measures

- Benefit/Cost Analysis
- Return on Investment (ROI) Calculations
- Non-quantitative Benefits (intangibles)
- Discounted Simple Return-On-Investment
- Net Present Value (NPV)
- Internal Rate of Return
- Discounted Payback Period

Return on Investment Evaluation Factors

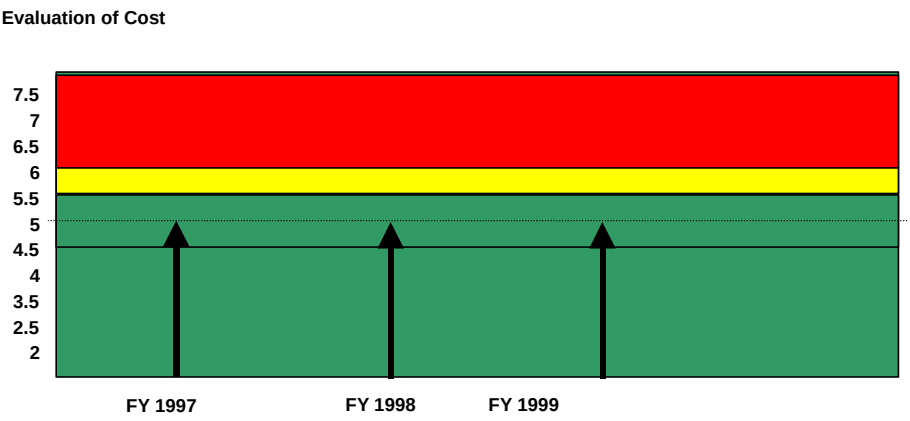
- Has the agency addressed and computed all the quantitative and non-quantitative measures to determine its overall return-on-investment?
- Do the measures used indicate that the investment will provide a justifiable return-on-investment relative to the investment level?

Rating Award Basis

5	Award this rating if all the ROI measures were addressed and computed, and if they indicate a potential high.
4	Award this rating if most of the ROI measures were addressed, and if they indicate a potential good return on investment.
3	Award this rating if some ROI measures were used, and if they indicate a potential reasonable return on investment.
2	Award this rating if few or no ROI measures were used, or if they indicate a potential poor return on investment.
1	Award this rating if no ROI measures were prepared.

Figure K-7. Rating Award Basis

EVALUATION OF COST



In the example to the left, assume a baseline funding level of $5.0 million for FY 1997, 1998, and 1999. With good cost control discipline, these costs could be controlled within a variance of +/-10 percent of this level, or between $4.5 and $5.5 million. A 20 percent variance would be between $4.0 and $6.0 million.

Figure K-8. Cost Evaluation

Cost-Control Considerations

- Cost baseline budget estimates or projections.
- Revised cost estimates
- Actual expenditure history and variance.
- Management actions based on actual versus projected cost experience.

Cost-Evaluation Factors

- How well are budgeted and actual costs accounted for, controlled, and managed?
- Are cost variances computed? Are they used to monitor how well the investment is proceeding relative to its cost estimates? Are they used as a management tool?

Rating Award Basis

5	Award this rating if costs are appropriately accounted for, controlled, and managed, and if the original cost estimate has been met.
4	Award this rating if costs are appropriately accounted for, controlled, and managed, and if the cost variance is within 10 percent cost variance of the original estimates.
3	Award this rating if costs are appropriately accounted for, controlled, and managed, and if the cost variance is within 20 percent of the original estimates.
2	Award this rating if costs are not appropriately accounted for, controlled, and managed, or if the cost variance is beyond 25 percent of the original estimate.
1	Award this rating if costs are not appropriately accounted for, controlled, and managed, or if cost variance are not calculated, or if costs are beyond 50 percent of the original estimates.

Figure K-9. Rating Award Basis

EVALUATION OF SCHEDULE

Objective: Deploy and deliver the initiative on time.

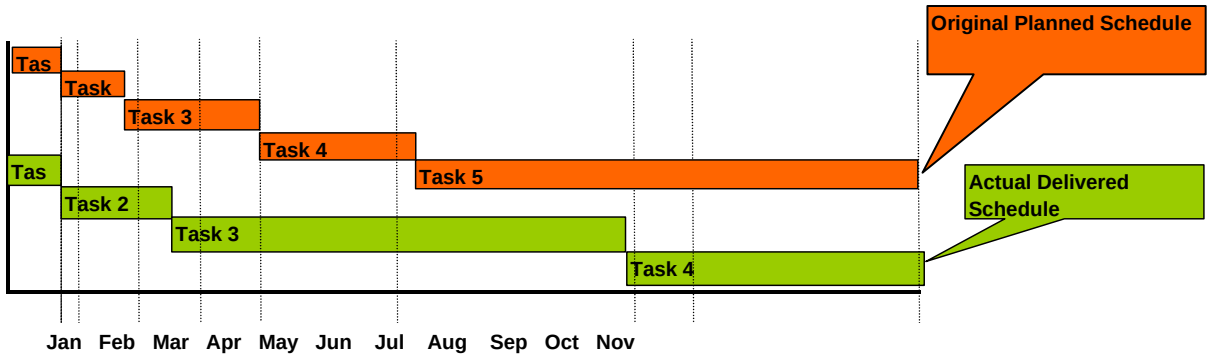


Figure K-10. Schedule Objective

Review the Following Materials

- Baseline project plans, timelines, milestone, or Gantt charts
- Actual historical experience relative to the schedule for deployment implementation and for operation
- Strategic and/or tactical plans
- Record of management actions taken

Schedule Evaluation Factors

- How well has the deployment of the initiative adhered to its original project schedule?
- Are schedule slippages being properly managed?

Rating Award Basis

5	Award this rating if the original schedule has been met.
4	Award this rating if the original schedule has been closely adhered to and any schedule slippages are within 10 percent of original baseline.
3	Award this rating if the project is within 20 percent of the original schedule and any schedule slippages have been properly managed.
2	Award this rating if the project is delayed more than 20 percent, but less than 50 percent of the original schedule, or if schedule slippages have not been properly managed.
1	Award this rating if the project is delayed beyond 50 percent of the original schedule or if schedule slippages have not been properly managed.

Figure K-11. Rating Award Basis

Objective: Meet or exceed the performance goals for the project.

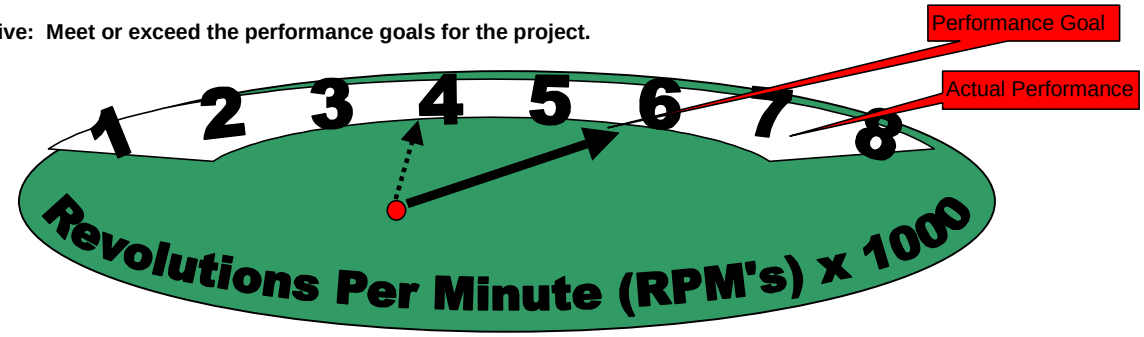


Figure K-12. Performance Objective

Performance Considerations

- Original baseline performance design goals
- Performance measures, indicators, or other metrics
- Reports on progress toward meeting original baseline design goals or performance measures or indicators

Performance Evaluation Factors

- How well has the agency done in identifying original baseline goals?
- How well has the agency done in identifying performance measures and indicators?
- How well has the agency done in reporting progress in attaining its baseline goals or attaining its targets for performance measures and indicators?
- How meaningful are the identified baseline performance goals and the performance measures and indicators in measuring the "value" of the investment to the supported program?

Rating Award Basis

5	Award this rating if the agency has done a commendable job at identifying both original baseline performance goals and performance measures and indicators, and the reports indicate full attainment of the original performance goals and their related performance measures and indicators.
4	Award this rating if the agency has done a commendable job at identifying both baseline performance goals and performance measures and indicators, and reports achieving within 10 percent of the original design goals/measures/indicators.
3	Award this rating if the agency has done a fair job at identifying baseline performance goals and performance measures and indicators, and percent reports achieving within 20 percent of the original design goals/measures/indicators.
2	Award this rating if the agency has done a fair job at identifying baseline performance goals, but the performance measures and indicators are lacking in specificity, and progress toward these goals/measures/indicators is not well tracked.
1	Award this rating if the agency has done a poor job at identifying either baseline performance goals or performance measures and indicators, or if unsatisfactory progress has been made toward achieving those goals and measures, or if they are not appropriately tracked.

Figure K-13. Rating Award Basis

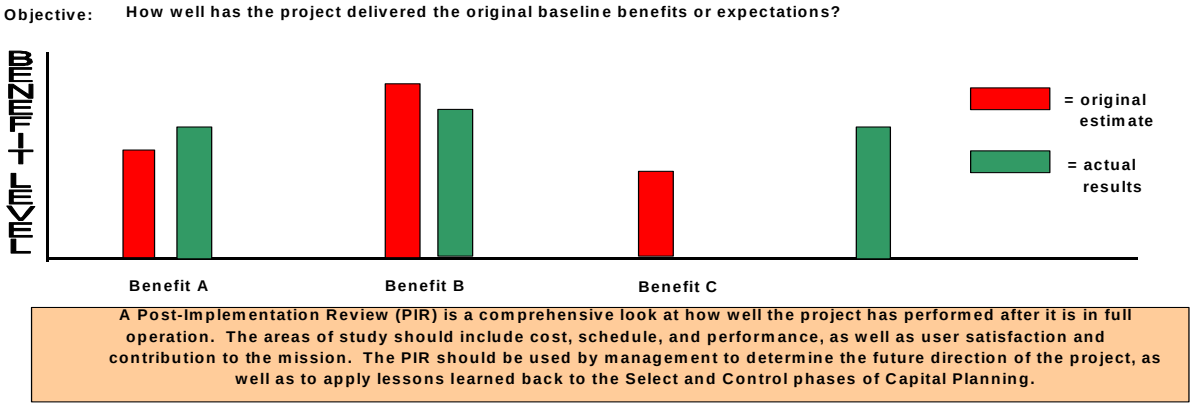


Figure K-14. Post-Implementation Review Objectives

Post-Implementation Review Considerations

- Post-Implementation-Review (PIR) documents
- Management actions based on PIR activities

Post-Implementation Review Evaluation Factors

- How has the agency done at conducting post-implementation reviews and documenting the progress toward achieving the original goals, benefits, and expectations?
- How well has management done at using the results of those reviews as the basis for taking the appropriate management action on the investment and the investment process?

Rating Award Basis

5	Award this rating if the agency has done a commendable job at conducting PIRs and if those reviews report attainment of the goals, benefits, and expectations originally envisioned for the project, those reviews have been used by management to assess the project and the process, and the agency has taken appropriate actions.
4	Award this rating if the agency has done a commendable job at conducting PIRs and if those reviews report attainment of the majority of the goals, benefits, and expectations originally envisioned for the project, and those reviews have been used by management to assess the project and take appropriate actions on the investment and the investment process.
3	Award this rating if the agency has done a fair job at conducting PIRs, and if the reviews results were used to determine appropriate changes to the investment.
2	Award this rating if the agency has made some effort to conduct PIRs, but the results do not clearly indicate progress toward attainment of goals, benefits, and expectations, or they were not used to manage the investment.
1	Award this rating if the agency has not conducted PIRs.

Figure K-15. Rating Award Basis

EVALUATION OF SECURITY

Objective: To protect the availability, confidentiality and integrity of system assets by maximizing security safeguards and performance, while controlling security costs.

Figure K-16. Security Objective

Elements of Security Protection

Select Phase:	Security Analysis Risk Assessment/Mitigation
Control Phase:	Security Cost Performance Goals
Evaluation and Steady-State Phases:	Post-Implementation Security Reviews

Figure K-17. Elements of Security Protection

Security Evaluation Factors

Select Phase:	Has a comprehensive security analysis been conducted? Are security risks identified and mitigation strategies proposed?
Control Phase:	Have estimated security costs been compared to actual costs? Are the estimated and actual costs in line? Have security goals and measures been established and met?
Evaluation and Steady-State Phases:	Is the system security functioning as anticipated? Are additional security countermeasures needed to protect assets?

Figure K-18. Security Evaluation Factors

Rating Award Basis

Select Phase

5	Comprehensive security analysis done, appropriate risks identified, mitigation strategies sound, security cost accurate, and security complements departmental architecture.
4	Comprehensive security analysis done, appropriate risks identified, mitigation strategies sound, security cost accurate, and security complements departmental architecture.
3	Comprehensive security analysis done with minor omissions, most but not all risks identified, some mitigation strategies suspect, security costs accurate, security complements departmental architecture.
2	Security analysis has been done with major omissions, risk assessment/mitigation strategies inadequate, cost data is incomplete, and security does not complement departmental architecture.
1	Security analysis has not been done, risks and mitigation strategies are not identified, cost data not accurate, security does not complement departmental architecture.

Figure K-19. Rating Award Basis—Select Phase

Rating Award Basis

Control Phase

5	Security costs are appropriately accounted for, controlled, and managed; original cost estimate is accurate; detailed performance goals/measures established.
4	Security costs are appropriately accounted for, controlled, and managed; cost variance is within 10 percent of original estimates; detailed performance goals/measures established.
3	Security costs are appropriately accounted for, controlled, and managed; cost variance is within 20 percent of original estimates; reasonable performance goals/measures established.
2	Security costs are not appropriately accounted for, controlled, or managed and cost variance is beyond 25 percent of original estimates; reasonable performance goals/measures have been established.
1	Security costs are not appropriately accounted for, controlled, or managed, and cost variance is beyond 50 percent of original estimates; reasonable performance goals/measures have not been established.

Figure K-20. Rating Award Basis—Control Phase

Rating Award Basis

Evaluation and Steady-State Phases

5	Agency has done a commendable job in conducting post-implementation security reviews; results confirm attainment of the goals, benefits, and expectations for the project.
4	Agency has done a commendable job in conducting post-implementation security reviews; results were used to determine appropriate changes to investment process and to take remedial actions on project.
3	Agency has done an average job in conducting post-implementation security reviews; results were used to assess the desired goals/benefits/expectations of project, changes in the investment process, and remedial actions taken on the project.

2	Agency has made some effort to conduct post-implementation security reviews; results have not had sufficient impact on the project or investment process.
1	Agency has not performed any post -implementation security reviews, or results were not documented and have not had sufficient impact on the project or investment process.

Figure K-21. Rating Award Basis—Evaluation and Steady-State Phases

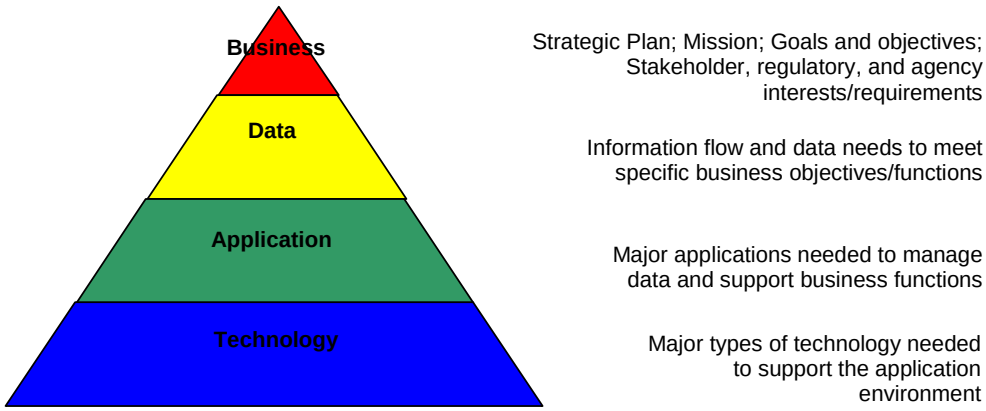


Figure K-22. Evaluation and Steady-State Phases

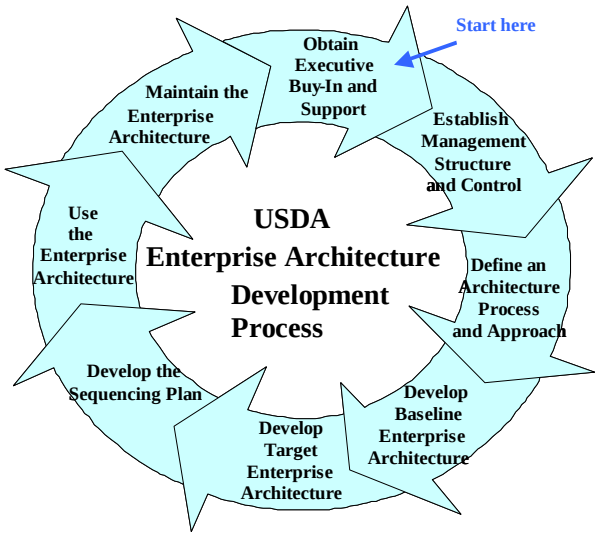


Figure K-23. USDA EA Development Process

Review the following materials:

- *USDA Enterprise Architecture Plan* (http://www.ocio.usda.gov/irm/e_arch/index.html)
- CIO Council's *Practical Guide to Federal Enterprise Architecture* (http://www.itpolicy.gsa.gov/mke/archplus/ea_guide.doc)
- List of enterprise-wide IT acquisition contracts (http://www.hqnet.usda.gov/ocio/it_leadership/e_arch/ent_acq_projs.doc)
- The sponsoring agency's enterprise architecture and associated documents (if available).

EA Evaluation Factors

- Does the agency have:
  - an agency-level ("component") enterprise architecture (EA)? If so, is the investment integrated with the agency's EA?
  - an EA plan and/or EA policies?
  - a chief architect and/or an EA governing board?
  - a defined overall EA approach or framework?
  - an automated EA tool in use?
- If an EA has been developed, is there a credible migration plan (for data, applications, and legacy system phase-out) from the existing ("as-is") to the proposed ("to-be") environment?
- Could, or has, the investment taken advantage of the enterprise-wide IT acquisition contracts?
- Does the investment have eGovernment, information security, standardized procurement, or wide area telecommunication elements? If so, is the investment integrated with USDA's eGov, info security, standardized procurement, or telecommunication plans and standards?
- Does the investment have interagency elements? Has the investment been integrated with the EA(s) of interfacing agencies or mission areas?
- Are detailed management plans in place describing how this investment will be supported, maintained, and refreshed to ensure its currency and continued effectiveness, including a training and awareness plan for users and technical staff?
- Are asset management processes in place to inventory and manage this new asset (investment) from a property management perspective, to provide configuration management support, and to monitor system performance?

Rating Award Basis (for all phases)

5	Award this score if the preponderance of evidence indicates that: ◆ The sponsoring agency has all the EA foundation elements mentioned below in place and has both fully defined "as-is" (baseline) and "to-be" architectures in place. These architectures include business, data, application and technology elements, and a sequencing plan has been developed. ◆ This investment aligns with the agency's EA. ◆ The investment's managers have determined there are opportunities for cooperation with interfacing agencies or mission areas and have taken advantage of all applicable opportunities. ◆ The investment's managers have determined there are alignment requirements with Departmental eGov, telecommunications, standardized procurement, and/or IT security initiatives and are fully aligned with these requirements. ◆ The investment's managers have determined there are opportunities to take advantage of enterprise-wide IT acquisition contracts and have completely done so.

Figure K-24. Rating Award Basis—All Phases (Page 1 of 3)

4	Award this score if the preponderance of evidence indicates that: ❖ The sponsoring agency has all the EA foundation elements mentioned below in place and has fully defined either an "as-is" (baseline) or "to-be" EA that include business, data, application, and technology elements. ❖ This investment aligns with the agency's EA. ❖ The investment's managers have determined there are opportunities for cooperation with interfacing agencies or mission areas and have made significant progress in doing so. ❖ The investment's managers have determined there are alignment requirements with Departmental eGov, telecommunications, standardized procurement, and/or IT security initiatives and have made significant progress in addressing these requirements. ❖ The investment's managers have determined there are opportunities to take advantage of enterprise-wide IT acquisition contracts and have made significant progress in doing so.
3	Award this score if the preponderance of evidence indicates that: ❖ The sponsoring agency has all the EA foundation elements in place in that: ▲ it has a governance mechanism in place (e.g., Chief Architect or EA board), ▲ an EA policy has been developed or is under development, ▲ it has an EA framework or approach, ▲ it is using an automated tool, and ▲ it has created an EA development plan. However, neither an "as-is" (baseline) nor "to-be" EA including business, data, application, and technology elements has yet been fully defined. ❖ The investment's managers have determined there are opportunities for cooperation with interfacing agencies or mission areas and have made some progress in doing so. ❖ The investment's managers have determined there are alignment requirements with Departmental eGov, telecommunications, standardized procurement, and/or IT security initiatives and have made some progress in addressing these requirements. ❖ The investment's managers have determined there are opportunities to take advantage of enterprise-wide IT acquisition contracts and have made some progress in doing so.
2	Award this score if the preponderance of evidence indicates that: ❖ The sponsoring agency has some EA foundation elements in place (i.e., a Chief Architect has been designated or an EA policy has been developed). Additionally, pieces of a baseline ("as-is") EA that includes business, data, application, and technology elements have been partially defined. ❖ The investment's managers have determined there are opportunities for cooperation with interfacing agencies or mission areas, but have made no progress in doing so. ❖ The investment's managers have determined that there are alignment requirements with Departmental eGov, telecommunications, standardized procurement, and/or IT security initiatives, but have made no progress in addressing these requirements. ❖ The investment's managers have determined there are opportunities to take advantage of enterprise-wide IT acquisition contracts, but have made no progress in doing so.

Figure K-24. Rating Award Basis—All Phases (Page 2 of 3)

1	Award this score if the preponderance of evidence indicates that: ❖ The sponsoring agency has not developed any portions of its component EA. ❖ The investment's managers have made no effort to determine whether there are opportunities for cooperation with interfacing agencies or mission areas. ❖ The investment's managers have made no effort to determine potential alignment with Departmental eGov, telecommunications, standardized procurement, or IT security initiatives. ❖ The investment's managers have made no effort to review ongoing enterprise-wide IT acquisition contracts.

Figure K-24. Rating Award Basis—All Phases (Page 3 of 3)

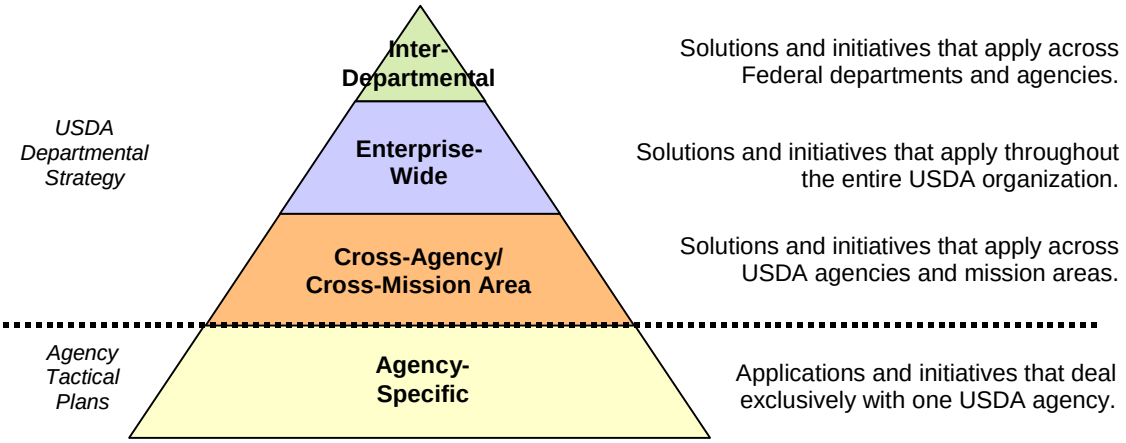


Figure K-25. Evaluation of EGovernment

Review the following materials for eGovernment:

- Strategic plan
- Tactical plan
- Business case

eGovernment Considerations

- Agency-led initiatives should support and enable the Department's eGovernment strategic goals and objectives.
- Initiative should reduce cost and/or increase efficiency and effectiveness.
- Does the investment provide for increased customer-centered government?
- Does the investment consider collaboration efforts (i.e., support one or multiple agencies, leverage exiting or proposed investments, etc.)?
- Does the investment consider the architecture and security requirements?
- Consider the agency's Government Paperwork Elimination Act of 1998 (GPEA) transactions.
- Major systems investment should be designed to address program delivery using the electronic approaches and solutions afforded by the information age.
- Metrics should be developed to measure use of and satisfaction with the electronic delivery channel.
- Systems must be viewed with the objective of unifying, (i.e., eliminating redundancy), and simplifying systems development and information and data collection efforts.
- Information collections must be identified for systems that impact the public.
- Identify which records are being used and produced by the system.

eGovernment Evaluation Factors

- Pre-Select/Select
  - How much consideration has the agency given to eGovernment?
  - Does this investment follow the eGovernment strategic plan?
  - What documentation/evidence has been provided?
  - How much focus is on customer requirements?
  - Should it be eGov?
- Control

- Are Change of Requirements/Design meeting Government objectives?
- Has additional Governmental need for the investment been identified?
- Has technological capability increased?
- Have customer service requirements been identified?
- Goals/objectives?
- Detailed plans?
- Is new initiative coming out that could replace and cover eGov?
- If the system is eGov, are customers using and satisfied with the system?

- Evaluate/Steady-State
  - Could it be eGov?

Rating Award Basis

Pre-Select/Select

5	Award this rating if eGov strategic goals and objectives have been met, the agency tactical plan is complete, a comprehensive analysis has been done, and supporting documentation/evidence is complete.
4	Award this rating if eGov strategic goals and objectives have been met, the agency tactical plan is nearly complete with any outstanding issues documented, a comprehensive analysis has been done, and supporting documentation/evidence is complete.
3	Award this rating if eGov strategic goals and objectives have been reasonably met, the agency tactical plan is under development, an analysis is in process, and some of the documentation is complete.
2	Award this rating if eGov strategic goals and objectives have been considered, the agency tactical plan is under development, an analysis has been started, and limited documentation is available.
1	Award this rating if eGov strategic goals and objectives have not been considered, the agency tactical plan has not been started, an analysis is in process, and some of the documentation is available.

Figure K-26. Rating Award Basis—Pre-Select/Select

Control

5	Award this rating if eGov initiative exceeded customer service requirements, thoroughly assessed all interagency eGov initiatives, and fully aligned with the agency's Enterprise Architecture, Strategic and Tactical Plans.
4	Award this rating if eGov initiative met customer service requirements, assessed all interagency eGov initiatives, and fully aligned with the agency's Enterprise Architecture, Strategic and Tactical Plans.
3	Award this rating if eGov initiative met customer service requirements, assessed some interagency eGov initiatives, and aligned with the agency's Enterprise Architecture Strategic and Tactical Plans.
2	Award this rating if eGov initiative marginally met customer service requirements, considered some interagency eGov initiatives, and loosely aligned with the agency's Enterprise Architecture Strategic and Tactical Plans.
1	Award this rating if eGov initiative failed to meet customer service expectations, failed to consider interagency eGov initiatives, and was not aligned with the agency's Enterprise Architecture, Strategic and Tactical Plans.

Figure K-27. Rating Award Basis—Control

Evaluate/Steady State

5	Award this rating if eGov initiative exceeded customer service expectations, proactively addressed all technology refresh options, and fully aligned with the agency's Enterprise Architecture, Strategic and Tactical Plans.
4	Award this rating if eGov initiative met customer service expectations, proactively addressed all technology refresh options, and fully aligned with the agency's Enterprise Architecture, Strategic and Tactical Plans.
3	Award this rating if eGov initiative met customer service expectations, addressed some technology refresh options, and aligned with the agency's Enterprise Architecture Strategic and Tactical Plans.
2	Award this rating if eGov initiative marginally met customer service expectations, reactively addressed some technology refresh options, and loosely aligned with the agency's Enterprise Architecture Strategic and Tactical Plans.
1	Award this rating if eGov initiative failed to meet customer service expectations, failed to address technology refresh options, and was not aligned with the agency's Enterprise Architecture, Strategic and Tactical Plans.

Figure K-28. Rating Award Basis—Evaluate/Steady State

EVALUATION OF TELECOMMUNICATIONS TECHNOLOGIES AND SERVICES

Objective: To serve as a basis for the evaluation of telecommunications planning, design, acquisition, installation/integration, operations, and maintenance tasks for information technology, electronic government and telecommunications capital projects. Recommendations on how to perform the specific tasks presented in each phase can be found in the CPIC Guide, main document, and in the Telecommunications Reference Manual.

Elements of Telecommunications Integration and Support

Pre-Select Phase:	◆ Gap Analysis ◆ Rough-order-of-magnitude (ROM) Lifecycle Cost Estimate (acquisition, design and development, installation, operations and maintenance)
Select Phase:	◆ Telecommunications Infrastructure Analysis ◆ Cost Estimate ◆ Agency Telecommunications Plan
Control Phase:	◆ Review Cost Estimate ◆ System/Service Performance Goals/Measures
Evaluation and Steady-State Phases:	◆ Post-Implementation Reviews of Telecommunications Infrastructure

Figure K-29. Elements of Telecommunications Integration and Support

Telecommunications Evaluation Factors

Pre-Select Phase:	◆ What is the scope of anticipated telecommunications requirements for the project? ◆ What changes to the current telecommunications capability do you anticipate in order to meet operational requirements? ◆ What obstacles might prevent the organization from meeting existing or anticipated business or technical requirements for telecommunications support? ◆ What is the current budget for telecommunications? What is the anticipated budget for telecommunications? ◆ Based on a preliminary assessment of costs for anticipated telecommunications requirements, are ROM Lifecycle costs feasible when considering the return on investment (ROI)?
Select Phase:	◆ Has a comprehensive telecommunications analysis been conducted? ◆ Resource sharing explored? Has a supportable cost estimate and agency telecommunications plan been prepared for the system/service?

Control Phase:	◆ Have estimated original cost estimates been compared to actual costs? ◆ Have goals and measures been established for this system/service?
Evaluation and Steady-State Phases:	◆ Is the system telecommunications infrastructure functioning as anticipated? ◆ What are the lessons learned for replacement/upgrade systems?

Figure K-30. Telecommunications Evaluation Factors

Rating Award Basis

Pre-Select Phase

5	Documentation is thorough and complete. Sound assumptions are made.
4	Documentation is complete. Reasonable assumptions are made.
3	Documentation is complete. Assumptions are questionable.
2	Documentation is incomplete. Assumptions are questionable.
1	Documentation is incomplete. Assumptions are unrealistic.

Figure K-31. Rating Award Basis—Pre-Select Phase

Select Phase

5	Comprehensive telecommunications analysis done, cost estimates reasonable, resource sharing explored, and an Agency Telecommunication Plan prepared.
4	Comprehensive telecommunications analysis done, supported cost estimate provided, resource sharing explored, and an Agency Telecommunications Plan prepared.
3	Comprehensive telecommunications analysis done with minor omissions, cost estimate provided, resource sharing explored, and an Agency Telecommunications Plan prepared.
2	Comprehensive telecommunications analysis done with major omissions, cost estimate incomplete, resource sharing not explored, but an Agency Telecommunications Plan prepared.
1	Comprehensive telecommunications analysis not done, cost estimate not included, resource sharing not explored, and an Agency Telecommunications Plan not prepared.

Figure K-32. Rating Award Basis—Select Phase

Control Phase

5	Telecommunications costs are appropriately accounted for, controlled, and managed; original cost estimate is accurate; system/service performance goals/measures established.
4	Telecommunications costs are appropriately accounted for, controlled, and managed; original cost variance is within 10 percent of original estimate; and system/service performance goals/measures established.
3	Telecommunications costs are appropriately accounted for, controlled, and managed; cost variance is within 20 percent of original estimates; system/service performance goals/measures established.

2	Telecommunications costs are not appropriately accounted for, controlled, and managed; cost variance is within 25 percent of original estimates; system/service performance goals/measures established.
1	Telecommunications costs are not appropriately accounted for, controlled, and managed; cost variance is within 25 percent of original estimates; system/service performance goals/measures not established.

Figure K-33. Rating Award Basis—Control Phase

Evaluation and Steady-State Phases

5	Agency has done a commendable job in conducting post-implementation reviews of the telecommunications infrastructure; results confirm attainment of the goals/measures for the project.
4	Agency has done a commendable job in conducting post-implementation reviews of the telecommunications infrastructure; results were used to determine appropriate changes to the investment process and take remedial actions on this project.
3	Agency has done an average job in conducting post-implementation reviews of the telecommunications infrastructure with minor omissions; results were used to assess desired benefits for this project, make changes in the investment process, and take remedial actions to maximize benefits.
2	Agency has made some effort to conduct post-implementation reviews of the telecommunications infrastructure with major omissions; results have not had sufficient impact on the project or investment process.
1	Agency has not performed any post-implementation reviews of the telecommunications infrastructure, or results were not documented and have not had sufficient impact on the project or investment process.

Figure K-34. Rating Award Basis— Evaluation and Steady-State Phases

EVALUATION OF SECRETARIAL/ADMINISTRATION PRIORITIES

Objective: Give extra consideration to those projects that directly support the priority initiatives of the Secretary or the Administration.

Figure K-35. Evaluation of Secretarial/Administration Priorities

Secretarial/Administration Priority Considerations

- Policy statements by the Secretary and Under and Assistant Secretaries
- Department/Administration budget priorities

Rating Award Basis

★	Award this bonus point if the investment supports a Secretarial or Administration priority, or is an acknowledged budget priority.
	Make no award if the investment does not support a Secretarial or Administration priority, or is not an acknowledged budget priority.

Figure K-36. Rating Award Basis

APPENDIX L—EGOVERNMENT

L.1 PURPOSE

eGovernment is the exchange of value, through an electronic medium, and includes interactions and relationships between: Government and citizens; Government and public and private entities; and Government and employees and the enterprise. The focus is to increase the value of these relationships. Specifically, USDA's goals are to:

- Improve citizens' knowledge of and access to USDA to enhance service delivery, (i.e., to be customer-centered);
- Enhance collaboration with public and private sector organizations to develop and deliver USDA's mission; and
- Improve internal efficiency by promoting enterprise-wide solutions.

eGovernment is enabled by a wide range of electronic, multimedia and digital solutions, such as
the Internet, personal digital assistants, call centers, handheld wireless devices, machine-to-machine devices (i.e., Smart Tags) and kiosks.

L.2 USDA'S EGOVERNMENT ENVIRONMENT

In support of the President's Management Agenda and USDA's own desire to transform and enhance the delivery of USDA's programs, services, and information, USDA has developed a strategic framework for meeting the challenges and opportunities of service delivery in an eGovernment environment.

USDA's eGovernment vision of making information, services, and programs available any place, any time means that eGovernment at USDA is viewed holistically and encompasses an enterprise approach to delivering information, services, and programs. It also addresses the Office of Management and Budget's (OMB) requirements to fully integrate the business, information management and IT planning processes. At the highest level, USDA IT investments will demonstrate the following:

- Collaborative and Blended Ventures vs. Single Agency Approaches
  - Requiring new problem-solving perspectives;
  - Leveraging existing agency expertise for interdepartmental and cross-mission area benefit;
  - Foregoing single agency initiatives that are not integrated with quicksilver or USDA's eGovernment strategies
  - Leverages current fiscal years 2002 and 2003 funding and proposed fiscal year 2004 funding:
    - Supports interdepartmental initiatives under Quicksilver (fiscal years 2002 and 2003)
    - Supports USDA Smart Choices integrated with USDA's Strategic Opportunities in fiscal years 2002 and 2003
    - Expands the number of agencies involved
    - Expands the functionality provided
    - Pools funds to support enterprise approaches and acquisitions beginning in fiscal year 2002.
- Customer-Centered Government
  - Improves customer service;
  - Connects the Federal Government with its citizens
  - Assesses customer demand and readiness and projects expected growth for eGovernment service delivery channel
  - Provides for multiple delivery channels.
- Internal Pressures and Demands
  - Enables employees and the enterprise to do more with less
  - Focuses on results-oriented solutions.

1. Looking Forward

USDA's existing and proposed information technology (IT) investments will be evaluated to ensure that the Internet-based and other electronic information, services, and program delivery channels have been sufficiently considered. Investments must align with USDA business goals and objectives and USDA's eGovernment mission, vision, goals, and objectives. The following types of investments should be identified.

President's Management Agenda

Expanding Electronic Government is one of the five key elements in the President's Management Agenda. The key goals of this element are to improve IT planning through the budget process and champion citizen-centered electronic government that will result in a major improvement in the Federal Government's value to the citizen. A government-wide eGovernment task force (Quicksilver) was convened by the OMB, and the President's Management Council in July 2001. USDA is a significant participant in 16 of the 25 initiatives and is working to align overlapping Departmental projects with the Administration's eGovernment initiatives.

USDA's eGovernment Smart Choices

Mission area and agency representatives have created an eGovernment Strategic Plan for USDA. A copy of the Plan can be found at www.egov.usda.gov. This plan outlines USDA's eGovernment mission, vision, goals, objectives, and **smart choices, both strategic and enabling**, for transforming USDA information, service and program delivery. The Departmental strategy includes interdepartmental, enterprise-wide and cross-agency/cross-mission area initiatives. These initiatives are high-priority projects that will enhance the delivery of USDA's services and information through greater collaboration and the leveraging of resources.

Agency-Specific Tactical eGovernment Plans

Each agency has developed an Agency-specific eGovernment Tactical Plan. An investment proposal for each project listed in the tactical plan should be submitted.

2. Major, Significant, and Other IT Investments

Through the Capital Planning and Investment Control Process (CPIC) investments are designated as major, significant, or other IT investments.

Major IT investments meet at least one of the following criteria:

- Total lifecycle costs greater than $50 million
- Significant multiple-agency impact
- Mandated by legislation or executive order, or identified by the Secretary as critical
- Require a common infrastructure investment
- Department strategic or mandatory-use system
- Significantly differs from, or impacts on, the Department infrastructure, architecture, or standards guidelines.

These investments are considered to be strategic for the Department and, thus, have a greater documentation burden, including being individually reported to OMB on an Exhibit 300B. They are also included in the EITIRB executive portfolio.

- **Significant** IT investments are those investments deemed significant by the agency but do not rise to the definition of "major" (e.g., used by a single agency, agency-wide in scope, relative high lifecycle cost, etc.).
- **Other** IT investments are those investments that are not deemed major or significant. They are generally investments of lower dollar value that are aggregated with other small IT investments to complete the costs included in the agency IT portfolio.
- NOTE: In addition to the new investments proposed for budget year 2004, agencies should identify funding provided during the fiscal years 2002 and 2003 budget processes, to develop systems and purchase IT components in support of the eGovernment Services Delivery Channel. Both existing and proposed funding streams should be documented.

3. New and Existing Investments

New and existing investments will be evaluated against a comprehensive set of criteria. Each investment must address the following questions:

CPIC/I-TIPS:

- In which investment phase does this investment fall: Pre-Select, Select, Control, Evaluate, or Steady-State?
- If this is an existing investment, indicate the category, based on the CPIC criteria: Major, Significant, or Other.

PMA/Quicksilver

- Does the investment support the President's Management Agenda—Expanding Electronic Government?
- Does the investment support one or more Quicksilver initiatives? Identify the initiative name(s)?

USDA Business Goals, eGov Goals/Smart Choices

- Does the project make use of IT and its practical applications in re-engineering traditional government processes consistent with the goals and objectives of the Secretary's USDA Food and Agriculture Policy—Taking Stock for the New Century and USDA Strategic eGovernment Plan?
- Does the investment support a USDA Smart Choice initiative? Identify the Smart Choice(s); USDA eGovernment Strategic Plan?
- Does the investment support:
  - Government to Citizen
  - Government to public and private entities
  - Government to employees and the enterprise?
- What level of changed service delivery is provided by the IT investment? Does it provide information only, does it allow the customer to interact or transact business, or does it transform the business?

Collaboration:

- Does this project support one agency, multiple agencies, or the entire USDA enterprise?
- Does the proposed investment leverage existing or proposed IT investments?
- Does the proposed investment unify and simplify program delivery and eliminate redundancy in system development and information and data collection efforts?
- Does the proposed investment use an eGovernment Service Delivery Channel? If so, does the proposal describe how other delivery channels will still be supported and describe the scheduled phase out of these services, if applicable? If this investment is not using an eGovernment/Internet-based delivery channel for any of its end-to-end processing, provide the justification/rationale for not doing so.
- Describe the end-to-end process(es), identify areas for improvement and show how "e" enabling them provides value to external customers and/or internal improvements in efficiency and effectiveness.
- Does the proposed investment enable sharing of information more quickly and conveniently between USDA employees and agencies and/or federal and state, local and tribal governments?

Planning & Assessment

- Does the proposed investment provide for increased customer-centered government? Identify customer group(s) impacted.
- Has business process reengineering/ improvement been conducted?
- Has the readiness of these customer group(s) been determined? What is the current baseline of electronic services users? What is the projected user base 6, 12, and 18 months after implementation?
- Does the proposed investment address legislative priorities, GAO material weaknesses, OMB guidelines and/or IG findings?
- Does the proposed investment identify, examine and employ, where appropriate, industry best practices?
- Does the proposed investment reduce the reporting burden on citizens, public and private entities and/or employees? For information collection from the public, does the proposed investment identify the information collection package control number and associated forms numbers and title and the level of the service provided, (i.e., print, fill, save, submit, transmit)?
- Does the proposed investment expand the reach and participation of USDA programs (i.e., increase the numbers of beneficiaries)? Does the proposed investment generate revenue, if applicable?
- Does the proposed investment describe the information and records to be created and the associated records management requirements from creation to disposition, such as records scheduling, migration, etc.?

- Does the proposed investment identify performance measurements associated with the eGovernment delivery channel?

Change Management Component:

- Does the proposal include a change management component?
- Does the proposed investment address the awareness and training requirements to effect change?
- Has the proposal considered governance, communications, training and other change management needs?

Citizen-Focus

- Has the project identified specific performance measures and indicators that are geared to citizens' needs?
- Will the proposed investment deploy existing or create easy-to-find point(s) of access to USDA services? Will the proposed investment use facilities such as FirstGov or USA Services?
- Will a marketing/communications plan promote the products/services to the public? Other government agencies? Business Partners? Internally?

Budget/Finance

- Does the investment reduce/eliminate redundant expenditures (intra and inter-Departmental)?
- Can multiple agencies collaborate or pool resources?

Architecture/Infrastructure/Security

- Does the proposed investment describe the technology components required to support this investment, (e.g., web farm, web server, e-signature, etc.)?
- Does the proposed investment advance IT priorities in the areas of enterprise architecture, telecommunication, and information management?
- Have security-related components been addressed and coordinated?

UNITED STATES DEPARTMENT OF AGRICULTURE

APPENDIX M—OMB EXHIBIT 300

PART 1

Date of Exhibit

Part I: Capital Asset Plan and Business Case (All Assets)								
Agency								
Bureau								
Account Title								
Account Identification Code								
Program Activity								
Name of Project								
Project Initiation Date								
Project Planned Completion Date								
This Project is:	Initial Concept	Planning	Full Acquisition	Steady State	Mixed Life Cycle			
Project/useful segment is funded:						Incrementally		Fully	
Was this project approved by Office of Management and Budget (OMB) for previous year budget cycle?						Yes		No	
Did the Executive/Investment Review Committee approve funding for this project this year?						Yes		No	
Did the CFO review the cost goal?						Yes		No	
Did the Procurement Executive review the acquisition strategy?						Yes		No	
Is this investment included in your agency's annual performance plan or multiple agency annual performance plans?						Yes		No	
Does the project support homeland security goals and objectives, (i.e., (1) improve border and transportation security, (2) combat bioterrorism, (3) enhance first responder programs, and (4) improve information sharing to decrease response times for actions and improve the quality of decision-making)?						Yes		No	
Is this project information technology? (See Section 53 for definition.)						Yes		No	
For information technology projects only:									
a. Is this Project a Financial Management System? (see section 53.2 for definition)						Yes		No	
If so, does this project address a FFMIA compliance area?						Yes		No	
If yes, which compliance area?									
b. Does this project implement electronic transactions or record-keeping that is covered by the Government Paperwork Elimination Act (GPEA)?						Yes		No	
If so, is it included in your GPEA plan (and does not yet provide an electronic option)?						Yes		No	
Does the project already provide an electronic option?						Yes		No	
c. Was a privacy impact assessment performed for this project?						Yes		No	

Figure M-1 Part I: Capital Asset Plan and Business Case (Page 1 of 2)

Part I: Capital Asset Plan and Business Case (All Assets)				
d. Was this project reviewed as part of the FY2002 Government Information Security Reform Act review process?	Yes		No	
d.1 If yes, were any weaknesses found? d.2. Have the weaknesses been incorporated into the agency's corrective action plans?	Yes Yes		No No	
e. Has this project been identified as a national critical operation or asset by a Project Matrix review or other agency determination?	Yes		No	
e.1 If no, is this an agency mission-critical or essential service, system, operation, or asset (such as those documented in the agency's COOP Plan), other than those identified as above as national critical infrastructures?	Yes		No	

Figure M-1 Part I: Capital Asset Plan and Business Case (Page 2 of 2)

I.A. SUMMARY OF SPENDING FOR PROJECT STAGES (In Millions)									
EXISTING 300	PY-1 And Earlier	PY 2001	CY 2002	BY 2003	BY+1 2004	BY+2 2005	BY+3 2006	BY+4& Beyond	Total
Planning:									
Budget authority									
Outlays									
Full acquisition :									
Budget authority									
Outlays									
Total, sum of stages:									
Budget authority									
Outlays									
Maintenance:									
Budget authority									
Outlays									
Total, all stages:									
Budget authority									
Outlays									

Figure M-2. I.A. Summary of Spending for Project Stages

I.B. JUSTIFICATION (ALL ASSETS)

I.B.1) How does this investment support your agency's mission and strategic goals and objectives? If it is a cross-agency investment, how does it support the strategic goals from the President's Management Agenda?

I.B.2) Are there any alternative sources in the public or private sectors that could perform this function? If so, explain why your agency did not select one of these alternatives.

I.B.3) Who are the customers for this project?

I.B.4) Who are the stakeholders of this project?

I.B.5) If this is a multi-agency initiative, identify the agencies and organizations affected by this initiative.

I.B.6) How will this investment reduce costs or improve efficiencies?

I.C. Performance Goals and Measures (All Assets)

	Strategic Goal(s) Supported	Existing Baseline	Planned Performance Improvement Goal	Actual Performance Improvement Results	Planned Performance Metric	Actual Performance Metric Results
FY02						
FY02						
FY03						
FY03						
FY04						
FY04						

Figure M-3. I.C. Performance Goals and Measures (All Assets)

I.D. Program Management (All Assets)

1. Is there a program manager assigned to the project? If so, what is his/her name?	Yes		No	
2. Is there a contracting officer assigned to the project?	Yes		No	
3. Sponsor/owner:	Yes		No	

Figure M-4. I.D. Program Management (All Assets)

I.E. Alternatives Analysis and Risk Management [All Assets]

I.E.1) Describe the alternatives you considered for supporting your ongoing project. Describe the results of the feasibility/performance/benefits analysis.

I.E.2) Summarize the results of your lifecycle cost analysis performed for each investment and the underlying assumptions.

I.E.3) Which alternative was chosen and why?

I.E.3.(A) Are there any quantitative benefits that will be achieved through this investment (e.g., systems savings, cost avoidance, stakeholder benefits, etc.)?

I.E.3.(B) For alternative selected, provide financial summary, including net present value by year and payback period calculations:

I.E.3.(C) Net Present Value by Year

Alternatives	Description
Alternative 1 –	
Alternative 2 –	
Alternative 3 –	
Alternative 4 –	

Figure M-5. Description of Alternatives

Cost Elements	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Element 1				
Element 2				
Element 3				
Element 4				
Element 5				
Total				

Figure M-6. Lifecycle Cost Analysis Summary

YEAR =	FY	FY	FY	FY	FY	FY	FY	FY	FY

Figure M-7. Net Present Value by Year

I.E.4) What is the date of your cost benefit analysis?

I.E.5) Describe the results of your risk assessment for this project and discuss your plans to eliminate, mitigate, or manage identified risks (e.g., financial, acquisition, technical).

FIGURE 8. RISK INVENTORY AND ASSESSMENT

Risk Assessments performed at the initial concept stage and then monitored and controlled throughout the lifecycle of the project should include risk information from all stakeholders.

OMB establishes a minimum mandatory set of risk factors for IT projects. These are: (1) organizational and change management, (2) business, (3) data/information, (4) technology, (5) strategic, (6) Security, (7) privacy, and (8) Project Resources. (Agencies may include others for IT, and may define the core set for other assets.)

Date Identified	Area of Risk	Description	Probability of Occurrence	Strategy for Mitigation	Current status as of the date of this exhibit

Figure M-8. Risk Inventory and Assessment

I.E.6) What is the date of your risk management plan?

I.F. Acquisition Strategy

I.F.1) Will you use a single contract or several contracts to accomplish this project? If multiple contracts are planned, explain how they are related to each other and how each supports the project performance goals.

I.F.2) What type(s) of contract(s) will you use (e.g., cost reimbursement, fixed-price, etc.)?

I.F.3) Will you use financial incentives to motivate contractor performance (e.g., incentive fee, award fee, etc.)?

I.F.4) Will you use competition to select suppliers?

I.F.5) Will you use commercially available or COTS products, or custom-designed products?

I.F.6) What is the date of your acquisition plan?

I.F.7) Will you ensure Section 508 compliance?

I.G. PROJECT AND FUNDING PLAN

I.G.1. Description of performance-based management system (PBMS)

Which performance-based management system will you use to monitor and manage contract or project progress? Using information consistent with a work breakdown structure (WBS) approach, provide the following in all parts of this section.

I.G.2. Original baseline (OMB-approved at project outset)

I.G.2.(A)

What are the cost and schedule goals for this segment of phase of the project (e.g., what are the major project milestones or events; when will each occur; and what is the estimated cost to accomplish each one)? If this is a multi-agency project identify the funding agency for each milestone or event.

	Cost and Schedule Goals				
	Schedule		Duration		
Description	Start Date	End Date	Days	Planned Cost	Funding Agency
FY 2001				(000)	

Figure M-9. Cost and Schedule Goals 2001

I.G.3. Proposed Baseline Changes (applicable only if OMB approved the changes)

Using the format of your selected PBMS, provide the following:

What are the cost and schedule goals for the project (e.g., what are the major project milestones or events; when will each occur; and what is the estimated cost to accomplish each one)? If this is a multi-agency project, identify the funding agency for each milestone or event.

	Cost and Schedule Goals				
	Schedule		Duration		
Description	Start Date	End Date	Days	Planned Cost	Funding Agency
FY 2002				(000)	
FY 2003					

Figure M-10. Cost and Schedule Goals 2002 and 2003

I.G.4 Actual Performance and Variance from OMB-approved Baseline (original or current)

Actual cost and schedule performance

I.G.4(A) Explain what work you planned (scheduled) to accomplish and how much you budgeted to complete the work.

I.G.4(B) What work did you actually accomplish and how much did you actually spend? *Refer to the list of accomplishments in the Project Description.*

	Planned					Actual			
Description	Schedule		Duration	Planned Cost	Funding Agency	Schedule		Percent Complete	Actual Cost
	Start Date	End Date	Days	(000)		Start Date	End Date		

Figure M-11. Actual Cost and Schedule Performance

I.G.4(C) Cost and schedule variance. If either the actual work accomplished or costs incurred vary from your baseline goals by 10 percent or more, explain:

I.G.4(D) What is the variance between planned and actual costs or planned and actual schedule, expressed as a percentage of the baseline goal.

I.G.4(E) Provide the reason for the variance.

I.G.4(F) Provide performance variance. Explain whether, based on work accomplished to date, you still expect to achieve your performance goals. If not, explain the reasons for the variance.

I.G.4(G) Corrective actions:

I.G.4(H) If actual work accomplished or costs incurred to date vary from the planned baseline goals by 10 percent or more, explain:

I.G.4(H)(1) What do you plan to do, if anything, to correct project performance?

I.G.4(H)(2) What effect will your action have on overall project cost, schedule, and performance benefits?

PART II: ADDITIONAL BUSINESS CASE CRITERIA FOR INFORMATION TECHNOLOGY

II.A. Project Description

II.A.1) What assumptions are made about this project and why?

II.A.2) What are the major process simplification/reengineering/design projects required as part of this initiative?

II.A.3) What are the major organization restructuring, training, and change management projects that are required?

II.A.4) What are the lines of business involved in this project?

II.A.5) What are the implications for the agency business architecture?

II.A.6) What types of data will be used in this project?

II.A.7) Synthesis of findings derived from research, interviews, and other documentation?

II.B. Enterprise Architecture

II.B.1) Is this project identified in your agency's enterprise architecture (EA)? If not, why?

II.B.2) Explain how this project conforms to your Departmental (entire agency) enterprise architecture.

II.B.3) Discuss this initiative/project in relationship to the business and data layers of the EA.

II.B.4) Does the data needed for this project already exist at the Federal, State, or local level? If *so, what are your plans to gain access to that data?*

II.B.5) Are there legal reasons why this data cannot be transferred? If so, what are they and did you address them in the barriers and risk sections above?

II.B.6) Discuss this initiative/project in relationship to the application and technology layers of the EA. Include a discussion of hardware, applications, infrastructure, etc.

II.B.7) Are all the hardware, applications, and infrastructure requirements for this project included in the EA Technical Reference Model? If not, please explain.

II.C. Security and Privacy

NOTE: Each category below must be addressed at the project (system/application) level, not at a program or agency level. Referring to security plans or other documents is not adequate.

II.C.1) How is security provided and funded for this project (e.g., by program office or by the CIO through the general support system/network)?

II.C.1(A) What is the total dollar amount allocated to security over the lifecycle of this project by the program office or security provider?

II.C.1(B) For security provided outside the program office, how does the agency ensure security and its funding are adequate and sustained over the lifecycle of the project?

II.C.2) Has the project (including the system or application) been assigned a level of risk, e.g., high, medium, or low?

II.C.2(A) What aspect of security determines the level of risk, (i.e., the need for confidentiality of information, availability of information or the system, or reliability of the information or system?)

II.C.2(B) If no level of risk has been determined, how have program and agency officials determined the necessary security controls?

II.C.3) Does the project (system/application) meet the following security requirements of the Government Information Security Reform Act (GISRA), OMB policy, and National Institute of Standards and Technology (NIST) guidance?

II.C.3(A). Does the project (system/application) have an up-to-date security plan that meets the requirements of OMB policy and NIST guidance? What is the date of the plan? If there is no plan or no up-to-date plan, when will a plan be completed or updated?

II.C.3(B) Has the project undergone an approved certification and accreditation process? Specify the C&A methodology used (e.g., NIST guidance) and the date of the last review?

NOTE: For A. and B. above, policy requires both a plan and C&A prior to management authorizing system operations. If either A. or B. is lacking, upon what empirical data has management assessed the acceptable level of risk to operations?

II.C.3(C) Have the management, operational, and technical security controls been tested for effectiveness? When were most recent tests performed? Are deficiencies reflected in the agency's report under the Government Information Security Reform Act (GISRA) Plan of Action and Milestones (POA&M)?

II.C.3(D) Have all system users been appropriately trained in the past year, including the rules of behavior and consequences for violating the rules?

II.C.3(E) How has incident-handling capability been incorporated into the system, including intrusion-detection monitoring and audit log reviews? Are incidents reported to the General Services and Administration's (GSA's) Federal Computer Incident Response Capability (FedCIRC)?

II.C.3(F) Is the system operated by contractors either onsite or at a contractor facility? If yes, does any such contract include specific security requirements required by law and policy? How are contractor security procedures monitored, verified, and validated by the agency?

II.C.4) How does the agency ensure the effective use of security controls and authentication tools to protect privacy for those systems that promote or permit public access?
II.C.5) How does the agency ensure that the handling of personal information is consistent with relevant government-wide and agency policies.

II.C.6) If a Privacy Impact Assessment was conducted, please provide a copy to OMB.

II.D. Government Paperwork Elimination Act

II.D.1) If this project supports electronic transactions or record-keeping that is covered by GPEA, briefly describe the transaction or record-keeping functions and how this investment relates to your agency's GPEA plan.

II.D.2) What is the date of your GPEA plan?

II.D.3) Identify any OMB Paperwork Reduction Act (PRA) control numbers from information collections that are tied to this investment.

APPENDIX N—CYBER SECURITY INFRASTRUCTURE GUIDE

DEVELOPED BY

RICK PERRY

LEAD PROJECT OFFICER

EXECUTIVE OVERVIEW

The Clinger-Cohen Act of 1996, the most significant IT reform of the last decade, requires that Federal agencies institute a disciplined approach to managing and controlling Information Technology (IT) investments. The Act directs agencies to establish a comprehensive approach to planning, budgeting, procuring and managing IT, while encouraging the use of performance- and results-based management of these investments. The Clinger-Cohen Act (CCA) also provides a framework that includes a three-pronged process – a systematic capital planning and investment process, an enterprise architecture, and management of the IT workforce to ensure the skills needed to manage this framework and the processes are available.

Roughly 8 percent of the Federal Budget is now invested in IT. The Federal Government's Fiscal Year 2001 IT Portfolio of investments totaled $39.7 billion. The USDA IT portfolio consists of approximately 800 active initiatives accounting for an estimated $1.3 billion. This represents 3.3 percent of the total Federal investment. Since 1997, the Office of the Chief Information Officer (OCIO) has been working diligently to implement the Capital Planning and Investment Control (CPIC) process within USDA for all major IT investments. Each year since that time, the CPIC process has been refined and expanded to cover more critical areas, such as information security and telecommunication infrastructure. The review process has also become more comprehensive and now includes rating and ranking activities by the Deputies Capital Planning Working Group and the Corporate Administrative/Financial Systems Executive Committee prior to presentation to the Executive Information Technology Investment Review Board (EITIRB) for action.

This guide is intended to be a reference document to be used in developing a comprehensive planning process for the cyber security of information systems within each agency/mission area. The document is structured in a question-and-answer format designed to be informative for all audiences. The guide begins with a few brief regulatory reasons this type of planning must be performed in USDA, followed by formal security planning stages for major investments. Guidance is provided as to how to develop user requirements and regarding anticipated cyber security costs for investments. Strategic investment criteria are identified for the Cyber Security Infrastructure, including rating and ranking factors.

The tools for capturing these costs in the USDA Information Technology Investment Portfolio System (I-TIPS) include three detailed backup sheets. In addition to the Major Security Initiative Backup Sheet, two detailed backup sheets have been included to use in the planning of overall costs for the Cyber Security Program Operations and Physical Security Operations. Together all three sheets provide source documents to extract overall cyber security infrastructure cost for agencies and enable the rollup of cyber security costs for the Department. The final sections contain a Glossary of Terms and a Reference List of source documents used in development of this guide. Like all new activities, this process will be iterative in nature and grow more valuable over time and revision. The expansion of CPIC into the Cyber Security Infrastructure has provided agencies an opportunity to reengineer their current business processes to include this critical planning and investment control function.

CPIC requires cultural changes and a real commitment from the executive levels within USDA. The importance of a strong investment management/capital planning process has been demonstrated time and again by the counterexamples of investments in which millions and billions of dollars have been wasted. The benefits for USDA and its agency/mission areas include: a more comprehensive executive review of cyber security infrastructure requirements/costs, budgets allocated to best achieve IT objectives, and visible evidence of cyber security planning that can be used in responding to regulatory audits and inquiries.

BACKGROUND

The Office of Management and Budget (OMB) recently updated Circular A-130, "Management of Federal Information Resources," to reflect the disciplines of capital planning and information system security in order to reinforce the critical nature of CPIC. In addition, the Director of the OMB issued guidance on implementing the Government Information Security Reform Act, M-01-08, dated January 16, 2001, and the General

Accounting Office (GAO) released its IT Investment Management guide, with the goal of guiding its staff in reviewing and assessing agencies' capital planning processes. The task for executives and their staff, then, is to effectively implement capital planning for the benefit of organizations and programs.

CPIC requires both major cultural changes and executive buy-in. Grounded in these two requirements is the need to think, plan, and act strategically. "At USDA, the goal is to build on each success and modify our processes as we learn what is effective for the department. Most recently, our program executives recognized the need for strong security and cyber security to meet a growing business need for 'e-government'…". Technology should emphasize business value and solutions rather than technical sophistication. Although technology may drive the changes in the business processes, it is important that these changes are prioritized because of the benefits they bring to the process, not simply because they are technically attractive. Deploying technology for its own sake is not an effective use of resources. To use technology effectively, IT organizations must partner with business lines to ensure that business objectives and requirements drive the architecture and technology investments.

Each successive year after 1997, OCIO has made incremental changes to more fully capture IT cost data. The time has come for the Department to specifically define how our cyber security infrastructure capital planning and investment control will be accomplished. Each agency Chief Information Officer (CIO) and Information System Security Program Manager (ISSPM) is being asked to join in a partnership to determine how this process will be defined over the coming months. We encourage each partner to exercise the opportunity to participate by providing constructive feedback designed to ensure that we implement the best process possible. Implementation of an IT CPIC process is required by law and is essential for making better investment and program decisions.

POINT OF CONTACT

This guide is supported and maintained by the USDA Office of the Chief Information Officer's (OCIO) Associate CIO for Cyber Security. For further information about this guide, please contact Rick Perry at (202) 690-3230 or RL.Perry@USDA.GOV.

WHAT IS A SECURITY INFRASTRUCTURE AND THE OVERALL OBJECTIVE OF GOOD SECURITY?

A security infrastructure is a model for integrating security services, mechanisms, objects, and management functions, across multiple hardware and software platforms and networks. The infrastructure supports the strategy for providing end-to-end protection of applications and information within the Department.

The overall objective of security is defined in the principles below that apply to all capital planning phases:

- Use of new technologies to sustain, not erode, the privacy protections provided in statutes
- Protection of Federal computer resources commensurate with the risk of harm resulting from misuse of unauthorized access to such systems
- Security risks and incidents managed in a way that complements and does not unnecessarily impede agency business operations
- An overall strategy to manage security is essential and should be based on a cycle of risk management that identifies significant risks, clearly establishes responsibility for reducing them, and ensures that risk management remains effective over time.

HOW DO I DEVELOP SECURITY INFRASTRUCTURE USER REQUIREMENTS AND ANTICIPATED COSTS?

The first step is to conduct a security analysis. To ensure success, an IT investment must include accurate, reliable, and up-to-date data on project costs, benefits, and risks. The security analysis should be performed by the agency ISSPM and other security specialists to ensure that estimated costs are based on experience and market research. The ISSPM works in tandem with the agency Portfolio Manager to ensure detailed backup sheets are entered into the I-TIPS Resource Library. All data entered should be representative of the anticipated costs for a program or initiative. The information developed in the security analysis will be kept in the I-TIPS

Resource Library. This library is an electronic repository for all documents supporting investment, projects, or programs. Hard copies of material contained in the library can be printed for investment, projects, or programs under review. However, the intent is to have this library house all pertinent material developed in connection with the telecommunication infrastructure.

Select Phase:

Security Analysis. OMB Circular A-130 states, in part, that agencies should ensure that the selected system or process maximizes the usefulness of information, minimizes the burden on the public, and preserves the appropriate integrity, availability, and confidentiality of the information throughout the lifecycle. Further, the agency will establish oversight mechanisms, consistent with Appendix III of this circular, to periodically evaluate and ensure the continuing security and availability of systems and their data. This analysis includes, but is not limited to:

- **User Requirements Definition.** The agency ISSPM will fully define the security requirements (needs) of the customer. How important is the information protection to their mission? How many users will be accessing the system/application (internal, external, trusted partners, clients, public)? What are peak time periods of user activity? When does the customer need security to be operational?
- **Responsibility for Security.** The agency ISSPM is responsible for assuring that security of each major system/application is assigned to a management official knowledgeable in the nature of the information. This individual should also understand the process supported by the system/application, and the management, personnel, operational, and technical controls used to protect it. The ISSPM will ensure that security products and techniques are appropriately used in the system /application. The designated official will be contacted when a security incident occurs concerning the application.
- **Sensitivity of Information.** The agency ISSPM will take action to determine the sensitivity of the information. Sensitive information is defined as any information, the loss, or unauthorized access to or modification of which could adversely affect the national interest or conduct of federal/agency programs, or the privacy to which individuals are entitled under 5 U.S.C. Section 552a(the privacy Act), but that has not been specifically authorized under criteria established by an Executive Order or an Act of Congress to be kept secret in the interest of national defense or foreign policy.

  NOTE: Systems that are not national security systems but contain sensitive information are to be protected in accordance with the requirements of the Computer Security Act of 1987 (P.L. 100235).]

- **Risk Assessment/Mitigation Strategies.** Risk management addresses risks that arise from an organization's use of IT. Risk assessment, the process of analyzing and interpreting risk, is comprised of three basic steps: (1) determining the assessment's scope and methodology, (2) collecting and analyzing data, and (3) interpreting the risk analysis results. The agency ISSPM is responsible for developing the appropriate risk assessment and mitigation strategies for all major investments. This includes procedures for conducting a risk assessment, what approach is used or recommended, what type of documentation is maintained, and whether the assessments are based on specific components such as technical, operational, and cyber security within a data center or based on the entire organization. Risk mitigation involves the selection and the implementation of security controls used to reduce risk to a level acceptable to management. The risk assessment should discuss the selection of safeguards and risk acceptance, as well as cost considerations within your security program.
- **System Security Plan.** The agency ISSPM needs to plan for the adequate security of each major investment, taking into account the security of all systems in which the new application/system will operate. The plan shall be consistent with guidance issued by the National Institute of Standards and Technology (NIST). A summary of the security plans shall be incorporated into the strategic Information Recourse Management (IRM) plan required by the Paperwork Reduction Act (PRA) and the Annual Agency Information Security Plan.

- **System Rules.** The agency ISSPM and the System Administrator will establish a set of rules concerning use of and behavior within the application/system. The rules shall be as stringent as necessary to provide adequate security for the application/system and information in it. Such rules shall clearly delineate responsibilities and expected behavior of all individuals with access to the application/system. In addition, the rules shall be clear about the consequences of behavior inconsistent with the rules.
- **Specialized Training.** Before allowing individuals access to the system, the agency ISSPM will ensure that all individuals receive specialized training focused on their responsibilities and the system rules. This may be in addition to the training required for access to a system. Such training may vary from a notification at the time of access (e.g., for members of the public using an information retrieval system) to formal training (e.g., for an employee that works with a high-risk system).
- **Personnel Security.** The agency ISSPM in coordination with the System Administrator will incorporate controls such as separation of duties, least privilege, and individual accountability into the system and system rules as appropriate. In cases where such controls cannot adequately protect the system or information in it, they will ensure that individuals are screened commensurate with the risk and magnitude of the harm they could cause. Such screening shall be done prior to the individuals' being authorized to access the system and periodically thereafter.
- **Contingency Planning.** The agency ISSPM will establish a contingency plan in coordination with the system owner and IT Manager and periodically test the capability to perform the agency function supported by the system in accordance with appropriate guidance issued by NIST 800-18.

Technical Controls. The agency ISSPM will ensure that appropriate security controls are specified, designed into, tested, and accepted in the system in accordance with appropriate guidance issued by NIST 800-18.

Information Sharing. The agency ISSPM will ensure that information shared from the system is protected appropriately, comparable to the protection provided when information is within the application.

Public Access Controls. Where an agency's system promotes or permits public access, additional security controls shall be added by the ISSPM and System Administrator to protect the integrity of the system and the confidence the public has in the system. Such controls shall include segregating information made directly accessible to the public from official agency records.

Review of System Controls. The agency ISSPM will have a process for (1) requesting, establishing, issuing, and closing user accounts, (2) tracking users and their respective access authorizations, and (3) managing these functions. Mechanisms besides auditing and analysis of audit trails should be used to detect unauthorized and illegal acts.

Authorize Processing. The agency ISSPM will ensure that a management official authorizes in writing use of the system/application by confirming that its security plan as implemented adequately secures the system. Results of the most recent review or audit of controls shall be a factor in management authorizations. The system/application must be authorized prior to operating and re-authorized at least every three years thereafter. Management authorization implies accepting the risk of each system/application.

Security Architecture. The ISSPM will ensure that the investment security architecture, which all participants trust, will include the logical and physical security controls to appropriately mitigate risks and address the five core information security requirements. These are authentication/identification, access control, data privacy, data integrity, and data nonrepudiation. The architecture design must be based on a structured risk assessment to ensure implementation costs are commensurate with identified risks and vulnerabilities. In part, it consists of policy formulation to clearly establish operational security guidelines and define exactly what connections are allowed to pass on the network. The architecture is also composed of coordination of agency firewall implementations to facilitate interoperable encryption of data-flows, secure dial-in communication services from

remote locations, and properly manage Internet and Intranet Services.

Cost-Benefit Analysis (CBA). The ISSPM will conduct a cost-benefit analysis, identify and quantify benefits and costs, and prepare estimates for the security to support the investment. Benefits should describe how the investment security enhances the agency's ability to meets its mission needs, and they should outline functionality or cost savings. Benefits are defined as a profit, advantage, or gain attained by using the security. Cost refers to both the incurred expenses of an investment and its capitalized costs, and can be categorized as direct or indirect. Cost that are unidentified in the planning phase frequently account for a large number of IT project cost overruns. This cost-benefit analysis can be part of the overall investment CBA. Include assumptions and constraints that were used to develop these figures. Ensure that costs have been validated, either independently or using a self-assessment process.

Special Requirements of the Project (Waiver, Technology Search)

Do the security requirements needed to support the investment require a waiver from cyber security policies or Departmental Regulation 3140? If so, send a cyber security policy waiver request to OCIO's Associate CIO for Cyber Security.

Is an IT acquisition moratorium waiver needed? The criteria outlined in the OCIO memorandum dated March 14, 2000, "Information Technology Acquisition Moratorium," require waiver approval for:

- IT acquisitions exceeding $250,000 (except renewals of existing maintenance agreements)
- All software or hardware for major systems within the functional areas of the Department's Corporate Administrative and Financial Systems Portfolio.

Although a waiver request is normally separate from an IT investment package, approved investments still require waivers for acquisitions. The March 14, 2000, memorandum, relative to the moratorium waiver guidance, is still current and must be followed for IT purchases.

A waiver should be requested early in the pre-acquisition process, preferably concurrent with the investment package, to allow sufficient review by the necessary offices within OCIO. The waiver package should clearly identify reason(s) for the request, include comprehensive cost comparisons, and contain a strong justification for waiver approval. It should be sent to the USDA CIO. IT acquisition should commence only after written approval has been obtained from OCIO.

Technical Overview with Graphic Depiction.

The ISSPM will ensure that a technical overview of the entire security infrastructure for the system/application is included with the investment package. This depiction should detail the security hardware and software environment at all levels and their location. This can be included with the overall graphical depiction of the system/application. Explain in narrative how the security infrastructure will be deployed, the use of commercial-off-the-shelf (COTS) software, and planned technology refreshments. Discuss the security migration plan for the infrastructure from the existing to the proposed technology and major transition details that affect the provisioning.

Control Phase:

Security Cost Review. OMB Circular A-130 states, in part, that agencies should conduct cost-benefit analysis for each information system to support management decision-making to ensure realization of expected benefits. When preparing cost-benefit analyses to support investment in IT, agencies should seek to quantify the improvements in agency performance results through measurement of program outputs. Proposed "major investment systems" require detailed and rigorous analysis. While it is not necessary to create a new cost-benefit analysis at each stage of the information system lifecycle, it is useful to refresh this analysis with up-to-date information to ensure the continued viability of an information system prior to and during implementation. Appendix III, OMB Circular A-130 further specifies four controls: assigning responsibility for security, security planning, periodic review of security controls, and management authorization. Any cost-benefit analysis for IT systems should include detailed security cost projections prepared in the Select Phase. The security cost review in the Control Phase should compare the actual system security

costs with those projected in the Select phase, the percentage of variance should be noted, and information included to support why the cost were different than those in the original projections. A security cost review should include the following:

- **Review of Risk Assessment/Mitigation Strategy.** A review of the risk mitigation strategies should be conducted by the ISSPM to ensure that they have been included in the design specifications of the system.
- **Comprehensive Information Systems/Program Security Goals/Measures.** DM3140-1 requires that the ISSPM or their designate participate in the testing of security systems after installation. To adequately test security, goals/measures must be developed and established during the Control Phase. Establish baseline performance measures for the security infrastructure that will be used to determine overall effectiveness and efficiency. These factors should be consistent with the levels of desired security formulated during the Select Phase to ensure that system security benefits are realized by the system when it is operational during the post-implementation review.

Evaluation Phase:

Detailed Post Implementation Security Review of System. OMB Circular A-130 states, in part, that agencies should conduct post-implementation reviews of information systems and information management processes to validate estimated benefits and document effective management practices for broader use. Further, agencies should document lessons learned from the Post-Implementation Review (PIR) and redesign oversight mechanisms and performance levels to incorporate acquired knowledge.

Post Implementation Security Review. NIST Special Publication 800-18, "Guide for Developing Security Plans for Information Technology Systems," specifies that during the Implementation Phase, the system's security features will be tested. The ISSPM will ensure that the security for the system/application is tested, installed, and authorized for processing. A security design review and systems test should be performed prior to placing the system into operation to assure the system meets security requirements. In addition, if new security controls are added to the application or support system, additional acceptance tests of those new controls must be performed. Since the installation of new major systems generally occurs well after the initial design phase, the post-implementation review becomes more significant. Care should be exercised when conducting this review to document the results and determine whether the system still meets the original security design. All system design specifications for security should have been delivered and furnished to the new system administrator. Another review of the risk mitigation strategies should be performed to ensure the strategies have been built into the system and are operational. If necessary, addition countermeasures should be identified and implemented to ensure that the system will adequately protect the integrity, confidentiality, and availability of the data.

AGAINST WHAT STRATEGIC INVESTMENT CRITERIA WILL MY CYBER SECURITY INFRASTRUCTURE ANALYSIS BE EVALUATED?

The EITIRB is responsible for the approval and management of USDA IT investments. Each investment is rigorously reviewed against approved strategic investment criteria. The strategic investment criteria for the evaluation of the Cyber Security Infrastructure have been outlined in the section below. Specifically, the factors applicable to each investment phase have been determined for the Select, Control, and Evaluate phases. This process is used to ensure that the investment is sound and remains on target throughout its lifecycle. OCIO has developed the following item to be used in the CPIC cyber security infrastructure review and oversight process for new or existing items in the USDA's Portfolio. The criteria have been expressed in three CPIC phases as they will be followed during the investment scrutiny process. The draft criteria below will be used to evaluate existing investments in the USDA Portfolio and all new investments received each fiscal year.

SECURITY PROTECTION

Objective: To protect the availability, confidentially, and integrity of system assets by maximizing security safeguards and performance, while controlling security costs.

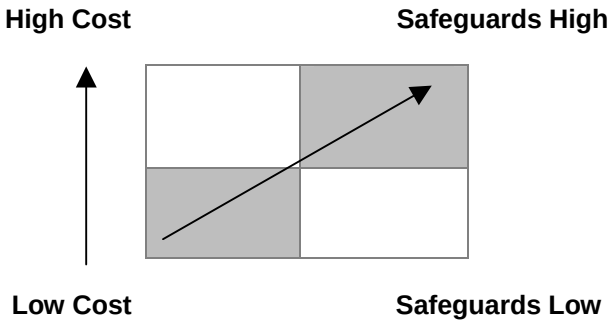


Figure N-1

ELEMENTS OF A SECURITY PROTECTION

Select Phase	Security Analysis Risk Assessment/Mitigations
Control Phase	Security Cost Performance Goals
Evaluation Phase	Security Post-implementation Review

Figure N-2. Elements of a Security Protection

SECURITY EVALUATION FACTORS

Select Phase	Has a comprehensive security analysis been conducted? Are security risks identified and mitigation strategies proposed?
Control Phase	Have estimated security costs been compared to actual costs? Have security goals and measures been established?
Evaluation Phase	Is the system security functioning as anticipated? Are additional security countermeasures needed to protect assets?

Figure N-3. Security Evaluation Factors

Select Phase	5 Comprehensive security analysis done, appropriate risks identified, mitigation strategies sound, security costs accurate, and security complements departmental architecture. 4 Comprehensive security analysis done, major risks identified, mitigation strategies address critical areas, security costs accurate, and security complements departmental architecture. 3 Comprehensive security analysis done with minor omissions, most but not all risks identified, some mitigation strategies suspect, security costs accurately projected, security complements departmental security architecture. 2 Security analysis has been done with major omissions, risk assessment/mitigation strategies inadequate, cost data is incomplete, and security does not complement departmental architecture. 1 Security analysis has not been done, risks and mitigation strategies are not identified, cost data not accurate, security does not complement departmental architecture
Control Phase	5 Security costs are appropriately accounted for, controlled, managed; original cost estimate accurate; detailed performance goals/measures established. 4 Security costs are appropriately accounted for, controlled, managed; cost variance is within 10 percent of original estimates; detailed performance goals/measures established. 3 Security costs are appropriately accounted for, controlled, managed; cost variance is within 20percent of original estimates; reasonable performance goals/measures established. 2 Security costs are not appropriately accounted for, controlled, or managed and cost variance is beyond 25 percent of original estimates; reasonable performance goals/measures have been established. 1 Security costs are not appropriately accounted for, controlled or managed and cost variance is beyond 50 percent of the original estimates; reasonable performance goals/measures not established.

Figure N-4. Rating Award Basis (Page 1 of 2)

Evaluation Phase	5	Agency has done commendable job in conducting the post-implementation security reviews; reviews report attainment of the goals, benefits, and expectations that were originally envisioned for the project.
	4	Agency has done a commendable job in conducting the post-implementation security reviews; review results were used to determine appropriate changes to the investment process and take any remedial actions on project.
	3	Agency has done a fair job in conducting the post-implementation security reviews; review results were used to assess the desired goals, benefits, and expectations originally envisioned for the project.
	2	Agency has made some effort to conduct post-implementation security reviews; results have not had sufficient impact on the project or investment.
	1	Agency has not performed any post implementation security reviews, or reviews are not documented.

Figure N-4. Rating Award Basis (Page 2 of 2)

HOW IS COST DATA CAPTURED IN INFORMATION TECHNOLOGY INVESTMENT PORTFOLIO SYSTEM (I-TIPS)? WHERE WILL THE INFORMATION RESIDE?

The Detailed Backup Sheets (**Figures N-6**, **N-7**, and **N-8**) have been developed to reflect the Cyber Security Program Operations, Major IT System/Initiatives, and Physical Security costs for Cyber Security infrastructure. These sheets will reside in the I-TIPS Reference Library and will be used to roll up costs in each of the three proposed categories. Detailed backup sheets are to be completed for the Cyber Security Program Operations and Physical Security even though they are not used in the major IT investment process. This information is captured to provide a more complete picture of the total cyber security cost by agency. Each of the three types of spreadsheets will be part of the overall Cyber Security Portfolio for each agency in the I-TIPS Public Resource Library. The detailed backup sheets will reside in the I-TIPS Resource Library, which is designed to be an electronic repository of agency information supporting the investments, projects, or programs. The information that resides in the Resource Library is informal in organization, and permits the data captured in the library to be developed in categories that are not currently included in the regular capital planning process. In the case of travel and training, Program Managers can view this information separately in lieu of the costs being rolled up into their personnel costs. Portfolio Managers will need to manually enter these costs into their overall personnel costs in I-TIPS to meet the official CPIC requirements. These spreadsheets have been created in Excel and can be downloaded from the library and updated following the normal I-TIPS guidelines.

The detailed backup spreadsheets will serve as a “memory jogger” for the agency and will allow program heads or other review levels the opportunity to see how costs were formulated at the working level. Further, they provide a permanent record of cyber security planning at the Cyber Security Program Operations, Major Cyber Security Initiative, and Physical Security working levels for audit purposes. Permanent records can be kept of cost data by printing the sheets after entry and retaining them in a file or by saving the sheet as an Excel file for historical purposes.

Planned costs developed in **Figures N-6** and **N-7**, Cyber Security Program Operations Resources Base/Budget Requirements and Major Security Initiatives Resources Base/Budget Requirements, are not subject to review during the Select, Control and Evaluate process. However, these figures will be used in evaluating each agency’s Annual Cyber Security Program Plan and to satisfy regulatory reporting requirements to the General Accounting Office and the OMB. The information developed in

Figure N-7—Major Security Initiatives Resources Base/Budget Requirements will be used to evaluate the agency cyber security infrastructure review by OCIO during major IT investment call periods. It is perfectly acceptable to use the cost reported in accounting records as a beginning point for developing next year's projections. However, each agency should factor into these costs all anticipated customer and major projects cyber security infrastructure requirements.

I-TIPS Detailed Backup Sheets (General Information)

The new cyber security infrastructure sheets for detailed costs are provided in three formats: Cyber Security Program Operations, Major Cyber Security System/Initiative, and Physical Security. The breakdown of the Cyber Security Program Operations, Major Cyber Security System/Initiative and Physical Security sheets were based on identification of major security components commonly needed to provide infrastructure protection. These costs are to be categorized by function they support rather than the equipment type. Firewalls may be purchased to support the agency cyber security requirement or may support a particular investment. Costs for normal support or program operations are reflected under **Figure N-6.** Costs for a particular investment are shown under **Figure N-7.**

The general format for all three figures has been outlined below:

- Agency name should be provided in the space to the left.
- Year should be reflected for the planned cost.
- Steady State are costs of maintenance and operations at current capability and performance level. These are the normal operational and maintenance costs involved in operating a program.
- Development/Modernization/Enhancement (D/M/E) are costs for new systems, changes or modifications to existing systems that improve capability or performance, changes of agency leadership mandated by Congress, personnel costs for project management, and direct support.
- Planned Costs are the total costs by category and subcategory for each item according to the operation or initiative they support. If the agency does not have significant costs in a subcategory, planned costs can be put in the "Other Security Equipment" subcategory as a general total. However, the intent of CPIC is to show that USDA is planning and managing upcoming business. Updating subcategories of costs reflects the planning effort more clearly, so agencies are encouraged to break down costs into as many subcategories as feasible.
- Cost Categories are the object class codes used for initial cost development. Since the development of Telecom Infrastructure costs is a new requirement under the CPIC Process, we are only looking at the first two digits of the Object Class code in terms of our breakdown. After agencies become more comfortable with the process, we will look at ways to further refine the cost data. In the meantime, agencies can certainly modify their own detailed backup sheets internally to provide the additional granularity, if desired. However, they should only use the Universal Object Class Codes that have been established by OMB for this purpose. Each cost category is shown on the following pages.

Cost Categories Chart

I-TIPS DME or SS Category	Object Class	Object Class Definition
Equipment	31.0	Those equipment-related costs under Object Class 31—purchases of equipment, including software
Software	31.0	Those software related costs under Object Class 31—purchases of equipment, including software
Services	23.1, 23.2, 23.3, 25.2	Rental payments to General Services Administration (GSA); rental payments to other federal agencies; security, communications, utilities, and miscellaneous charges; and other contractual services not elsewhere reported
Support Services	25.2, 25.7*	Other contractual services (commercial); operation and maintenance of equipment (commercial)
Supplies	25.2, 25.3, 26.0	Supplies and materials
Personnel	11.1 through 12.2	Personnel compensation and personnel benefits
Other	DO NOT USE, RESERVED FOR DOD USE ONLY	DO NOT USE, RESERVED FOR DOD USE ONLY
Intra-Governmental Payments	23.3, 25.3, 41.0	Payments for all IT services within agencies, between executive branch agencies (e.g., FTS2001), and state and local governments; including grants, subsidies, and contributions
Intra-Governmental Collections		Collections for all IT services within agencies, between executive branch agencies (e.g., FTS2001), and state and local governments, including grants, subsidies, and contributions

Figure N-5. Cost Categories Chart (Page 1 of 2)

I-TIPS DME or SS Category	Object Class	Object Class Definition
Training	25.1, 25.2	Training-related costs for personnel in support of program or initiative
Travel	21.0	Travel-related costs for personnel in support of program or initiative; including travel related to training courses or project management

* NOTE: In all cases, obligations or estimated expenditures under object class 25.7, operations and maintenance of equipment should be reported as an SS cost.

Figure N-5. Cost Categories Chart (Page 2 of 2)

31 Equipment: Include all planned costs by year for IT equipment by subcategory (Security, Video, Data hardware and Other). Additional items may be added, if necessary, within the Other subcategory or may be reflected in the Other Security Equipment cost as a total figure. Equipment costs for the Cyber Security Program include those costs associated with maintaining current capability and performance level. Equipment costs for Major Cyber Security Initiatives and Physical Security include those expenses associated with project management and direct support for the project, as well as the costs associated with maintaining current capability and performance level.

31 Software: Include all expenses for IT software, custom and COTS, regardless of cost. Rows may be added to break this software down by type, if desired. Software costs for the Cyber Security Program include those costs associated with maintaining current capability and performance level. Software costs for Major Cyber Security Initiatives and Physical Security include those costs associated with project management and direct support for the project, as well as the costs associated with maintaining current capability and performance level.

23 Services: Include costs for all GSA contracts for cyber security service by major type of service. Also in this category include all cyber security service provided by other federal activities to USDA by agency. Type of service provided can also be noted after the planned cost, if desired. Services costs for the Cyber Security Program include those costs associated with maintaining current capability and performance level. Services costs for Major Cyber Security Initiatives and Physical Security include those costs associated with project management and direct support for the project, as well as the costs associated with maintaining current capability and performance level.

25 Support Services: Include planned costs for cyber security services provided by private sources. For planning purposes this can be shown by type of service anticipated under the item. Support Service costs for the Cyber Security Program include those costs associated with maintaining current capability and performance level. Support Services costs for Major Cyber Security Initiatives and Physical Security include those costs associated with project management and direct support for the project, as well as the costs associated with maintaining current capability and performance level.

26 Supplies: Include planned costs for items ordinarily consumed or expended within one year. Supply costs for the Cyber Security Program include those costs associated with maintaining current capability and performance level. Supply costs for Major Cyber Security Initiatives and Physical Security include those expenses associated with project management and direct support for the project, as well as the costs associated with maintaining current capability and performance level.

10 Personnel: Include planned costs for compensation directly related to duties performed for the Government by Federal civilian and Non-Federal personnel. These costs may be further delineated by job title/series, if desired. Personnel costs for the Cyber Security Program include those expenses associated with maintaining current capability and performance level. Personnel costs for Major Cyber Security Initiatives and Physical Security include those costs associated with project management and direct support for the project, as well as the costs associated with maintaining current capability and performance level.

Intra-Government Payments: Include planned costs for Cyber Security service provided by other agencies within or outside USDA for which you must pay a fee. Intra-Government Payments costs for the Cyber Security Program include those costs associated with maintaining current capability and performance level. Intra-Government Payment costs for Major Cyber Security Initiatives and Physical Security include those expenses associated with project management and direct support for the project, as well as the costs associated with maintaining current capability and performance level.

Intra-Government Collections: Include planned fees for Cyber Security services provided to other agencies within or outside USDA. Intra-Government Collections for the Cyber Security Program include those associated with maintaining current capability and performance level. Intra-Government Collections costs for Major Cyber Security Initiatives and Physical Security include those costs associated with project management and direct support for the project, as well as the costs associated with maintaining current capability and performance level.

21 Travel & Transportation of Persons: Include planned costs for the travel and transportation of persons while in authorized travel status. Travel for the Cyber Security Program includes those costs associated with maintaining current capability and performance level. Travel expenses for Major Cyber Security Initiatives and Physical Security include those costs associated with project management and direct support for the project, as well as the costs associated with maintaining current capability and performance level.

25 Training: Include the planned costs for Personnel Training. Training costs for the Cyber Security Program include those costs associated with maintaining current capability and performance level. Training costs for Major Cyber Security Initiatives and Physical Security include those expenses associated with project management and direct support for the project, as well as the costs associated with maintaining current capability and performance level.

Figure N-6—Cyber Security Program Operations Resources Base/Budget Requirements is the Detailed Backup Spreadsheet used to capture annual costs for the normal operations and maintenance of the total Cyber Security Program. The costs should be entered in I-TIPS during the yearly IT budget cycle. Anticipated costs should be planned or projected based on the prior year's accounting records, purchase orders, invoices from contractors, or other reliable agency cost data. However, the final forecasts should be based in large part on the upcoming user security requirements or additional project support required for the coming year.

This sheet is designed to reflect the costs involved in the daily operation of your agency's cyber security infrastructure. Planned costs for cyber security equipment and services that are not specifically tied to a specific cyber security major investment or physical security should be included in **Figure N-6—Cyber Security Program Operations Resources Base/Budget Requirements below**:

DETAILED BACKUP SHEET

Date _____
Agency _____
Year: _____

31 Equipment			
Item	**Steady State**	**D/M/E**	**Planned Cost**
Firewall Hardware			
VPNs			
Public Key Infrastructure			
Intrusion Detection System (IDS) Hardware			
Sniffers			
User Authentication Systems			
Content Smart Switches			
Layer I			
Layer II			
Layer III			
Layer IV			
Data Backup Equipment			
Hot Site System			
Redundancy Hardware			
Other Security Equipment			
SUBTOTAL			
31 Software			
Item	**Steady State**	**D/M/E**	**Planned Cost**
Firewall			
Intrusion Detection System (IDS)			
SUBTOTAL			
23 Services—GSA Contracts for Cyber Security Service			
Item	**Steady State**	**D/M/E**	**Planned Cost**
Risk Management Assessments			
IDS Support			
Security Plan Preparation			
Disaster Recovery Plan Preparation			
Firewall Support			
Public Key Infrastructure (PKI) Support			
Vulnerability Testing			
SUBTOTAL			

Figure N-6. Cyber Security Program Operations Resources Base/Budget Requirements (Page 1 of 3)

Other Federal Contracts for Cyber Security Service			
Item	**Steady State**	**D/M/E**	**Planned Cost**
Risk Management Assessments			
IDS Support			
Security Plan Preparation			
Disaster Recovery Plan Preparation			
Firewall Support			
PKI Support			
SUBTOTAL			
25 Support Services—Non-Federal Contracts for Cyber Security Service			
Item	**Steady State**	**D/M/E**	**Planned Cost**
Risk Management Assessments			
IDS Support			
Security Plan Preparation			
Disaster Recovery Plan Preparation			
Firewall Support			
PKI Support			
SUBTOTAL			
26 Supplies			
Item	**Steady State**	**D/M/E**	**Planned Cost**
SUBTOTAL			
10 Personnel			
Item	**Steady State**	**D/M/E**	**Planned Cost**
SUBTOTAL			
Intra-Government Payments			
Item	**Steady State**	**D/M/E**	**Planned Cost**
SUBTOTAL			
Intra-Government Collections			
Item	**Steady State**	**D/M/E**	**Planned Cost**
SUBTOTAL			

Figure N-6. Cyber Security Program Operations Resources Base/Budget Requirements (Page 2 of 3)

21 Travel and Transportation of Persons			
Item	**Steady State**	**D/M/E**	**Planned Cost**
SUBTOTAL			
25 Training			
Item	**Steady State**	**D/M/E**	**Planned Cost**
Security Awareness			
User Authentication			
Intrusion Detection System			
Firewall and VPN			
Introduction Information Security			
Active Content Inspection System			
Vulnerability Testing			
SUBTOTAL			
GRAND TOTAL			

Figure N-6. Cyber Security Program Operations Resources Base/Budget Requirements (Page 3 of 3)

The costs in **Figure N-6**—**Cyber Security Program Operations Resources Base/Budget Requirements** are updated as emergency or unanticipated costs occur, or biannually to ensure they accurately reflect normal program operation.

Figure N-7—Major Security Initiatives Resources Base/Budget Requirements is the detailed backup spreadsheet used to capture the planned costs developed to support major IT investments. The criteria for a "major investment" are defined under the "How Does CPIC Work" section of this guide. All cyber security requirements (equipment and services) identified to support a specific investment should be included on this spreadsheet. If other I-TIPS data has been developed to support other types of costs not related to IT, a reference should be made to the main investment portfolio location. In any case, the total security costs should be entered in the major portfolio for the investment. If this investment is made in partnership with another agency or agencies, a note should be included with the agency name to highlight the spreadsheet reflects pro-rated costs for the agency on that investment.

If the agency determines that the investment does not require additional cyber security support, a note reflecting this analysis should be included under **Figure N-7**. In all cases, a security analysis should be performed for every major investment, and appropriate documentation should be prepared using **Figure N-7**.

DETAILED BACKUP SHEET

Date _____
Agency _____
Year: _____

31 Equipment			
Item	**Steady State**	**D/M/E**	**Planned Cost**
Firewall Hardware			
VPNs			
Public Key Infrastructure			
Intrusion Detection System (IDS) Hardware			
Vulnerability Testing			
Sniffers			
User Authentication Systems			
Content Smart Switches			
Layer I			
Layer II			
Layer III			
Layer IV			
Data Backup Equipment			
Hot Site System			
Redundancy Hardware			
Other Security Equipment			
SUBTOTAL			
31 Software			
Item	**Steady State**	**D/M/E**	**Planned Cost**
Firewall			
IDS			
SUBTOTAL			
23 Services—Federal Contracts for Cyber Security Service			
Item	**Steady State**	**D/M/E**	**Planned Cost**
Risk Management Assessments			
IDS Support			
Security Plan Preparation			
Disaster Recovery Plan Preparation			
Firewall Support			
PKI Support			
Vulnerability Testing			
SUBTOTAL			

Figure N-7. Major Security Initiatives Resources Base/Budget Requirements (Page 1 of 3)

Other Federal Contracts for Cyber Security Service			
Item	**Steady State**	**D/M/E**	**Planned Cost**
Risk Management Assessments			
IDS Support			
Security Plan Preparation			
Disaster Recovery Plan Preparation			
Firewall Support			
Public Key Infrastructure (PKI) Support			
SUBTOTAL			
25 Support Services—Non-Federal Contracts for Cyber Security Service			
	Steady State	**D/M/E**	
Risk Management Assessments			
IDS Support			
Security Plan Preparation			
Disaster Recovery Plan Preparation			
Firewall Support			
PKI Support			
SUBTOTAL			
26 Supplies			
Item		**D/M/E**	**Planned Cost**
SUBTOTAL			
10 Personnel			
Item		**D/M/E**	**Planned Cost**
SUBTOTAL			
Intra-Government Payments			
Item	**Steady State**	**D/M/E**	
SUBTOTAL			
Intra-Government Collections			
Item	**Steady State**	**D/M/E**	**Planned Cost**
SUBTOTAL			
21 Travel and Transportation of Persons			
Item	**Steady State**	**D/M/E**	**Planned Cost**
SUBTOTAL			

Figure N-7. Major Security Initiatives Resources Base/Budget Requirements (Page 2 of 3)

25 Training			
Item	**Steady State**	**D/M/E**	**Planned Cost**
Security Awareness			
User Authentication			
IDS			
Firewall and Virtual Private Network (VPN)			
Introduction Information Security			
Vulnerability Testing			
SUBTOTAL			
GRAND TOTAL			

Figure N-7. Major Security Initiatives Resources Base/Budget Requirements (Page 3 of 3)

Figure N-7—Major Security Initiatives Resources Base/Budget Requirements, planned cost should be entered into the I-TIPS Resource Library along with other major investment supporting documentation during the preparation of the investment proposal by the agency. Updates should be made to costs based on the overall guidance provided on the CPIC process. Generally, this is whenever costs change during the investment life cycle.

Figure N-8—Physical Security Operations Resources Base/Budget Requirements is the detailed backup spreadsheet used to capture the planned costs developed to support physical security. All physical security (equipment and services) identified above normal program cost should be included on this spreadsheet.

DETAILED BACKUP SHEET

Date _____
Agency _____
Year _____

31 Equipment			
Item	**Steady State**	**D/M/E**	**Planned Cost**
Security Alarms			
Key Card/ID System			
Electronic Surveillance System			
Perimeter Fences			
Window Guards			
Vaults/Safes			
Metal Detectors			

Figure N-8. Physical Security Operations Resources Base/Budget Requirements (Page 1 of 3)

31 Equipment			
Item		**D/M/E**	**Planned Cost**
X-Ray Machines			
Hand-held Magnetometers			
SUBTOTAL			
31 Software			
Item	**Steady State**	**D/M/E**	**Planned Cost**
SUBTOTAL			
23 Services—GSA Contracts for Cyber Security Service			
Item	**Steady State**		**Planned Cost**
SUBTOTAL			
Other Federal Contracts for Cyber Security Service			
Item		**D/M/E**	**Planned Cost**
SUBTOTAL			
25 Support Services—Non-Federal Contracts for Cyber Security Service			
	Steady State	**D/M/E**	**Planned Cost**
SUBTOTAL			
26 Supplies			
Item	**Steady State**	**D/M/E**	**Planned Cost**
SUBTOTAL			
10 Personnel			
Item	**Steady State**		**Planned Cost**
SUBTOTAL			
Intra-Government Payments			
Item	**Steady State**	**D/M/E**	**Planned Cost**
SUBTOTAL			
Intra-Government Collections			
Item	**Steady State**	**D/M/E**	**Planned Cost**
SUBTOTAL			
21 Travel and Transportation of Persons			
Item	**Steady State**	**D/M/E**	**Planned Cost**
SUBTOTAL			

Figure N-8. Physical Security Operations Resources Base/Budget Requirements (Page 2 of 3)

25 Training			
Item	**Steady State**	**D/M/E**	**Planned Cost**
Physical Security Academy (GSA, Glynco)			
SUBTOTAL			
GRAND TOTAL			

Figure N-8. Physical Security Operations Resources Base/Budget Requirements (Page 3 of 3)

The costs in **Figure N-8—Physical Security Operations Resources Base/Budget Requirements** are updated as emergency or unanticipated costs occur, or biannually, to ensure they are accurate.

GLOSSARY OF TERMS

Access Control—Process of limiting access to the resources of an automated information system only to authorized uses, programs, processes, or other systems.

Alternatives analysis—An analysis to compare and evaluate the costs and benefits of various alternatives for meeting a requirement for the purpose of selecting the alternative that is most advantageous to the enterprise.

Authentication—Security measure designed to establish the validity of a transmission, message, or originator, or a means of verifying an individual's eligibility to receive specific categories of information or perform some action.

Bandwidth—In network communications, the amount of data that can be sent across a wire in a given time. Each communication that passes along the wire decreases the amount of available bandwidth.

Best practices—Processes, practices, or systems, used by public and private organizations that perform exceptionally well and are widely recognized as improving an organization's performance and efficiency in specific areas. Successfully identifying and applying best practices can reduce business expenses and improve an organization's efficiency.

Business process—A collection of related, structured activities—a chain of events—that produce a specific service or product for a particular customer or customers.

Business processes analysis—An evaluation of the business processes supported by, or associated with, an information system, cyber security project, or information technology initiative to determine which processes should be improved, which should be reengineered, and which should not be changed. Such an analysis may involve using performance measures to benchmark existing processes against similar processes in other organizations or against performance goals.

Concept of operations—As it relates to cyber security services, a concept of operations document defines the roles, responsibilities, and procedures for day-to-day operation and maintenance of networks and other telecommunications services.

Configuration management—One of five categories of network management defined by the International Standards Organization. As it relates to cyber security services, configuration management is the process of adding, deleting, and modifying connections, addresses, and topologies within a system/network.

Cost accounting system or process—A continuous and systematic accounting process, designed to accumulate and assign costs to a variety of objects routinely or as desired by the management. Costs may be accumulated either through the use of cost accounting systems or through the use of cost finding techniques.

Cost-benefit analysis—A technique used to compare the various costs associated with an investment or project with the benefits it proposes to return. It should address and account for both tangible and intangible factors.

Data integrity—Assurance that data has not been altered or destroyed in an unauthorized manner.

Effectiveness—An assessment of the qualitative level of achievement of program goals and the intended results, as defined in strategic or other plans or documentation or in legislation.

Efficiency—A measure of the relative amount of resources used in performing a given unit of work. Sometimes characterized as doing things right. Can involve unit costing, work measurement (standard time for a task), labor productivity (ratio of outputs to labor inputs), or cycle time.

Extranet—An extranet is an Internet-like network that an enterprise runs to conduct business with its employees, its customers, and/or its suppliers. Extranets typically include web sites that provide information to internal employees and also have secure areas to provide information to customers and external partners like suppliers, manufacturers, and distributors.

Identification—Initially, people wishing to use a computer system are required to identify themselves. This is usually done by the user typing in a user name or identification number.

Identification of data sensitivity—Any information, the loss or unauthorized access to or modification of which could adversely affect the national interest or conduct of federal/agency programs, or the privacy to which individuals are entitled under 5 U.S.C., Section 552a (the Privacy Act), but that has not been specifically authorized under criteria established by an Executive Order or Act of Congress to be kept secret in the interest of national defense or foreign policy. [NOTE: Systems that are not national security systems, but contain sensitive information are to be protected in accordance with the requirements of the Computer Security Act of 1987 (Public Law 100235).]

Implementation/integration plan—(Also called a Systems Integration Plan) A document discussing the steps for progressively linking and testing of system or network components to merge their functional and technical characteristics into a comprehensive, interoperable system or network.

Internet Protocol (service)—Part of the Transmission Control Protocol/Internet Protocol (TCP/IP) family of protocols describing software that track the Internet address of nodes, routes outgoing messages, and recognizes incoming messages. Internet Protocol is used in gateways to connect networks at Open Systems Interconnection (OSI) network Level 3 and above. TCP/IP is a networking protocol that provides communication across interconnected networks, between computers with diverse hardware architectures, and various operating systems. Internet Protocol is the messenger protocol of TCP/IP. The Internet Protocol basically addresses and sends packets. The Internet Protocol address identifies your system on the TCP/IP network. Internet Protocol addresses are 32-bit addresses that are globally unique on a network. They are generally represented in dotted decimal notation, which separates the four bytes of the address with periods.

Local area network—A short distance data communications network, typically within a building or campus, that links computers and peripheral devices such as printers, CD-ROMS, and modems using some form of standard control. A local area network (LAN) allows users to be given access to databases and programs running on client servers and allow users to work jointly and send messages.

Metropolitan area network—A data network covering an area larger than a LAN but less than a wide area network (WAN). A metropolitan area network (MAN) typically interconnects two or more LANs. MANs may operate at a higher speed than LANs, may cross administrative boundaries, and may use multiple access methods.

Non-repudiation—Method by which the sender of data is provided with proof of delivery and the recipient is assured of the sender's identity, so that neither can later deny having processed the data.

Organization-wide network—An enterprise wide or corporate network or a network of networks. Such a network connects most or all of an organization's voice, data, and video resources and may use various methods, including the phone system, LANs, private data networks, leased telecommunications lines, and public data networks. Organization wide networks come in many shapes and sizes and may span great distances. Connections between networks are made with bridges and routers.

Outsourcing—The process by which a company arranges for a contractor or other external entity to manage a specific department or provide a specific function or service for the organization—an organization may contract one of its internal functions out to an outside company. Those functions might include managing the company's networks and or maintaining them. An enterprise might be motivated to do this because they lack the internal resources (typically people with needed knowledge, skills, and experience) or believe they can obtain more economical, effective, or efficient cyber security services by using a contractor or other external entity.

Performance goals—A desired endpoint or purpose of an operation or activity.

Performance management—One of the five categories of network management defined by the International Standards Organization. As it relates to cyber security services, a set of procedures and practices for measuring and recording resource utilization.

Performance measures/performance measurement—The process of developing measurable indicators that can be systematically tracked to assess progress made in achieving predetermined performance goals and to benchmark an organization's performance against that of other organizations.

Post-implementation review—A review of an investment or project that compares the actual cost, schedule, performance, and other results achieved, after an investment or project has been completed and is fully operational, against the conditions that existed prior to the implementation of the investment or project, as indicated by baseline cost, schedule, and performance data, and against the planned cost, schedule, and performance goals established for the investment or project. A post-implementation review can provide valuable "lessons learned" to be applied to future investments or projects.

Privacy attestation—Signed statement by a certifying official attesting to the fact that the system sustains and does not erode privacy protections.

Private network—A network (MAN, WAN, or set of interconnected MANs, WANS, or LANs) used by an organization or other end user such as a department, agency, bureau, division, etc. A private network might use dedicated circuits and private lines leased from public carriers bypassing the switches or may use microwave technology.

Router—An intelligent Internet work connectivity device that uses logical and physical addressing to connect two or more logically separate networks. Routers use algorithms to determine the best path by which to send a packet.

Security analysis—A formal analysis conducted by the agency Information Systems Security Program Manager (ISSPM) or designee for the purpose of determining the importance of the information, assessing risks, formulating mitigation strategies, and other measures needed to safeguard the system/application.

Software—The detailed instructions to operate a computer or other type of equipment or hardware. The term was created to differentiate instructions (i.e., the program) from the hardware.

Telecommunications architecture—The governing plan showing the capabilities of functional elements of an organization's telecommunications resources and their interaction, including configuration, integration, standardization, lifecycle management, and definition of protocol specifications, among these elements.

User requirements study—The technical requirements for hardware, software, facilities, personnel, procedures, technical data, personnel training, verification matrices, spares, repair parts, and consumables needed to test, deploy, operate, and maintain a system, network, investment, or project. Also called Requirements Analysis.

Virtual private network (VPN)—A public circuit-switched service offered by long-distance phone companies that employs of the public switched-telephone network. VPNs are a means of augmenting a shared network on a secure basis through encryption or tunneling. Such a shared network could be an Internet Protocol (IP) network or the Internet, or an intranet, or a frame relay network. Tunneling involves encapsulation of encrypted data inside IP packets or frame relay.

Wide area network (WAN)—A network typically extending a local area network (LAN) or metropolitan area network (MAN) over telephone common carrier lines to link to other LANs or MANS. A WAN typically uses common-carrier leased lines, for example, from an analog phone line to a T-1 line. The jump between a LAN or MAN and a WAN can be made through a device called a bridge or a router.

Wireless—Wireless communication is anything that supports communication between mobile, portable, or fixed facilities through use of the electromagnetic spectrum. Examples are: AM and FM broadcasting, UHF and VHF television, satellite, microwave, land-mobile radio (used for public safety, commercial and private use), citizen's band, trunked radio, paging, cellular telephone, wireless LANs, wireless telephone PBXs and Personal Communications Services (PCS).

REFERENCE LIST

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Office of Management and Budget, "Guidance on Implementing the Government Security Reform Act" (Memorandum M-01-08).

DEVELOPED BY

THE TELECOMMUNICATIONS ADVISORY COUNCIL

POLICY WORKING GROUP

INTRODUCTION

This manual provides reference materials on the planning, management, and control of telecommunications products and services, and describes how they should be integrated into U.S. Department of Agriculture (USDA) projects.

Although the emphasis of this document is on high-dollar, high-risk, and highly visible projects, recommendations presented throughout this manual can be applied to *all* acquisitions of telecommunications products and services.

It is the goal of the Department to continuously improve telecommunications materials to support customers. This Telecommunications Reference Manual will serve as a living document and will be periodically updated when in coordination with major calls for (Capital Planning and Investment Control) CPIC updates. Updates will include improved methods, approaches, and processes, and include material on the most current products and services. This document reflects the input of multiple agencies and staff offices within the USDA.

PROJECTS VERSUS PROGRAMS AND ASSOCIATE LIFECYCLES

According to one publication, "A project is a [temporary] sequence of unique, complex, and connected activities having one goal or purpose and that must be completed by a specific time, within budget, and according to specification."[4]

Another publication differentiates between a development project, and the subsequent operations that follow.

"A project is a temporary endeavor undertaken to achieve a particular aim. Every project has a definite beginning and a definite end. While projects are similar to operations in that both are performed by people, both are generally constrained by limited resources, and both are planned, executed and controlled, projects differ from operations in that operations are ongoing and repetitive while projects are temporary and unique."[5]

[4] Jeffrey L. Whitten, Lonnie D. Bentley, Kevin C. Dittman. (2000). Project Management. *Systems Analysis and Design Methods*. McGraw-Hill Higher Education. New York, New York. page 124

[5] What Is A Project? *Project Management Institute*, Four Campus Boulevard, Newtown Square, Pennsylvania, 2000, Retrievedo n March 18, 2002, from http://www.pmi.org/projectmanagement/index.htm

A program typically contains a portfolio of projects that are coordinated to achieve a specific set of business objectives. Operations that follow project completion are often managed in conjunction with a long-term program.

Today Capital Planning and Investment Control (CPIC) processes help USDA project managers guide projects through a five-year system development lifecycle (SDLC) using a best practice approach. A five-year information technology (IT) project plan typically includes the initial acquisition, design and installation costs for telecommunications products and services. As a component of the total startup costs for a major IT system, telecommunications initial investment costs may seem negligible. However, once the project is complete and the system becomes fully operational, recurring costs for telecommunications often represent the largest percentage of total costs during the life of the program that the project was initiated to support. This manual emphasizes the initial investment decisions project managers face when integrating telecommunications products and services into a project. However, project managers supporting projects scheduled along continuums for long-term programs should also plan for recurring telecommunications costs that last well beyond the five-year projections required by current CPIC processes.

The sunset horizon for long-term programs can be as long as 20 years. While missions change slowly, business processes necessary for fulfilling mission objectives often need to accommodate the difficult to predict needs of internal and external stakeholders and are subject to a variable economy, legislative impacts, safety concerns, technological change and environmental effects. Even after the initial implementation of a large project, long-term, post-implementation changes often require iterative cycles of planning, design, implementation, and operations management. As subsequent projects are scheduled for technology refreshment (i.e., replacing outdated products and services) during the out years of a program, projects recycle through CPIC phases in a spiral fashion. As the pace of technology development accelerates, requirements to refresh technology at regular intervals during the life of a program are becoming an increasingly important aspect of program lifecycle planning.

The difference between the length of SDLC project planning and implementation, and long-term program lifecycle planning and management can vary by fifteen years or more.

CAPITAL PLANNING AND INVESTMENT CONTROL OVERVIEW

CPIC is required for any IT investment that meets or exceeds one of six criteria as follows:[6]

1. Total lifecycle costs greater than $50 million
2. Significant multiple-agency impact
3. Mandated by legislation or executive order, or identified by the Secretary as critical
4. Requires a common infrastructure investment
5. Department strategic or mandatory-use system
6. Significantly differs from or impacts on the Department infrastructure, architecture, or standards guidelines.

In cases where a telecommunications investment meets one of the above criteria, it becomes a candidate for CPIC oversight. Whether telecommunications products and services are components of IT or eGov projects led by experts from those disciplines or telecommunications representatives lead the project, CPIC has consistent guidelines for naming key personnel on project teams and defining their roles. It is important to recognize the roles and the varying responsibilities associated with each, in order to understand where specific functions are performed. According to the *USDA Information Technology Capital Planning and Investment Control Guide*, designated personnel include:

1. **Agency Head**—Responsible for signing CPIC documentation before submission to OCIO.
2. **Agency Sponsor**—Responsible for providing executive sponsorship of the investment; should be a senior level executive within the applicable mission area or agency.
3. **Project Sponsor/Functional Manager**—Responsible for the strategic business processes under development or

[6] Thresholds for Major IT Investments, *USDA Information Technology Capital Planning and Investment Control Guide*, Office of the Chief Information Officer, May 2001, Section 1.5, pages 1-3 (DEL 01-0985)

enhancement and for ensuring their integrity; also serves as the primary user interface to the OCIO, EWG, and EITIRB.

4. **Project Manager**—Responsible for successful management and completion of one or more IT investments.
6. **IT Manager**—Responsible for serving as the primary point of contact for technology issues.
7. **Contracting Specialist**—Responsible for serving as the primary acquisition support for the investment and interface between the investment and the Office of Procurement and Property Management (OPPM).
8. **Capital Planning Analyst**—Responsible for serving as the primary interface for capital planning between the investment and OCIO.
9. **Budget Analyst**—Responsible for serving as the primary interface between the investment and the Office of Budget and Program Analysis (OBPA).[7]

CPIC documentation begins in the Pre-Select Phase, when an agency or staff office first identifies the need to acquire technologies. **Figure O-1—Capital Planning and Investment Control Model Depicting Evolutionary Phases** portrays the sequence of CPIC processes for planning and managing projects.

[7] *USDA Information Technology Capital Planning and Investment Control Guide*, Office of the Chief Information Officer, May 2001, Section 1.5, Thresholds for Major IT Investments, pages 1-3 (DEL 01-0985)

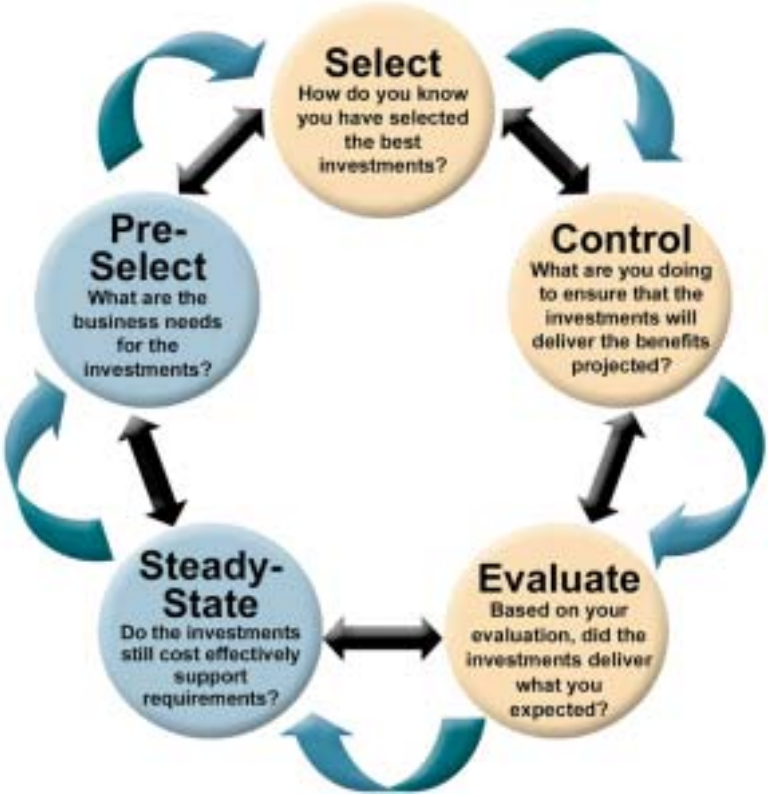

Figure O-1. Capital Planning and Investment Control Model Depicting Evolutionary Phases (USDA CPIC Guide)

EVALUATION CRITERIA

Each year during the five-year system development lifecycle, CPIC projects undergo annual investment reviews by members of an Executive Working Group (EWG), or members of the Executive Information Technology Investment Review Board (EITIRB). Appendix K, of the *Capital Planning and Investment Control Guide* provides the criteria that are used for evaluating a project's progress within each phase of the CPIC model, including those used to evaluate the telecommunications components of a project. A section within **Appendix K** called the **Evaluation of Telecommunications Technologies and Services** provides the telecommunications criteria for Fiscal Year 2002 in Exhibit 1.

CPIC Evaluation Criteria for Telecommunications Technologies

Evaluation of Telecommunications Technologies and Services

The following section is intended to serve as a basis for the evaluation of telecommunications planning, design, acquisition, installation/ integration, operations and maintenance tasks for IT, electronic government, and telecommunications capital projects. Recommendations on how to perform the specific tasks presented in each phase can be found in the *CPIC Guide*, main document, and in the Telecommunications Reference Manual.

Elements of Telecommunications Integration and Support

Pre-Select Phase	Gap analysis Rough-order-of-magnitude (ROM) lifecycle cost estimate (acquisition, design and development, installation, operations and maintenance)
Select Phase	Telecommunications infrastructure analysis Cost estimate Agency telecommunications plan
Control Phase	Review cost estimate System/service performance goals/measure
Evaluation and Steady State Phases	Post implementation review of telecommunications infrastructure

Figure O-2. Elements of Telecommunications Integration and Support

Telecommunications Evaluation Factors

Pre-Select Phase	What is the scope of anticipated telecommunications requirements for the project? What changes to the current telecommunications capability do you anticipate in order to meet operational requirements? What obstacles might prevent the organization from meeting existing or anticipated business or technical requirements for telecommunications support? What is the current budget for telecommunications? Anticipated budget for telecommunications? Based on a preliminary assessment of costs for anticipated telecommunications requirements, are ROM lifecycle costs feasible when considering the return on investment?

Figure O-3. Telecommunications Evaluation Factors (Page 1 of 2)

Select Phase	Has a comprehensive telecommunications analysis been conducted? Has resource sharing explored? Has a supportable cost estimate and agency telecommunications plan been prepared for the system/service?
Control Phase	Have estimated original cost estimates been compared to actual costs?
Evaluation and Steady State Phases	Have goals and measures been established for this system/service? Is the system telecommunications infrastructure functioning as anticipated? What are the lessons learned for replacement/upgrade systems?

Figure O-3. Telecommunications Evaluation Factors (Page 2 of 2)

Rating Award Basis

Pre-Select Phase

5	Documentation is thorough and complete. Sound assumptions are made.
4	Documentation is complete. Reasonable assumptions are made.
3	Documentation is complete. Assumptions are questionable.
2	Documentation is incomplete. Assumptions are questionable.
1	Documentation is incomplete. Assumptions are unrealistic.

Figure O-4. Rating Award Basis—Pre-Select Phase

Rating Award Basis

Select Phase

5	Comprehensive telecommunications analysis done, cost estimates reasonable, resource sharing explored, and an Agency Telecommunication Plan prepared.
4	Comprehensive telecommunications analysis done, supported cost estimate provided, resource sharing explored, and an Agency Telecommunications Plan prepared.
3	Comprehensive telecommunications analysis done with minor omissions, cost estimate provided, resource sharing explored, and an Agency Telecommunications Plan prepared.
2	Comprehensive telecommunications analysis done with major omissions, cost estimate incomplete, resource sharing not explored, and an Agency Telecommunications Plan prepared.
1	Comprehensive telecommunications analysis not done, cost estimate not included, resource sharing not explored, and an Agency Telecommunications Plan not prepared.

Figure O-5. Rating Award Basis—Select Phase

Rating Award Basis

Control Phase

5	Telecommunications costs are appropriately accounted for, controlled, and managed; original cost estimate is accurate; system/service performance goals/measures established.
4	Telecommunications costs are appropriately accounted for, controlled, and managed; original cost variance is within 10 percent of original estimate; and system/service performance goals/measures established.
3	Telecommunications costs are appropriately accounted for, controlled, and managed; cost variance is within 20 percent of original estimates; system/service performance goals/measures established.
2	Telecommunications costs are not appropriately accounted for, controlled, and managed; cost variance is within 25 percent of original estimates; system/service performance goals/measures established.
1	Telecommunications costs are not appropriately accounted for, controlled, and managed; cost variance is within 25 percent of original estimates; system/service performance goals/measures not established.

Figure O-6. Rating Award Basis—Control Phase

5	Agency has done a commendable job in conducting post-implementation reviews of the telecommunications infrastructure; results confirm attainment of the goals/measures for the project.
4	Agency has done a commendable job in conducting post-implementation reviews of the telecommunications infrastructure; results were used to determine appropriate changes to the investment process and take remedial actions on this project.
3	Agency has done an average job in conducting post-implementation reviews of the telecommunications infrastructure with minor omissions; results used to assess desired benefits for this project; changes made in the investment process; remedial actions taken to maximize benefits.
2	Agency has made some effort to conduct post-implementation reviews of the telecommunications infrastructure with major omissions; results have not had sufficient impact on the project or investment process.
1	Agency has not performed any post-implementation reviews of the telecommunications infrastructure, or results were not documented and have not had sufficient impact on the project or investment process.

Figure O-7. Rating Award Basis—Evaluation and Steady-State Phases

Telecommunications Pre-Select Phase Activities

CPIC evaluation criteria assume that managers incorporate network development methodologies early in the planning stages of a project that help team members define customer requirements for accessing and transporting voice and data. Two steps evaluated during the Pre-Select Phase allow evaluators to make “go no-go” decisions about moving to the Select Phase, the next step in the CPIC process. They include a Gap Analysis and a Rough Order of Magnitude Lifecycle Cost Estimate.

Gap Analysis: System development methodologies address network development from a problem-solving perspective. During the Pre-Select Phase the project team studies the customer problem and the context in which the problem occurs. A preliminary investigation indicates whether problems are related to existing performance, a need for different information or data, a need for improved cost control, security requirements, efficiency requirements, or customer service issues. Once the current environment and customer concerns are understood, it becomes possible to define the perceived business problems, as well as the causes and effects. Preliminary network improvement objectives are defined, and an analysis determines the size of the gap between the legacy network and requirements for change. Team members can identify what technology exists in the legacy network that performs functions associated with improvement objectives, and assess the current state of network performance relative to those objectives. In the early stages, it should be possible to determine whether the problems are too minor or great to solve, or whether next steps should be taken to initiate a project. The gap analysis should have sufficient detail to determine the scope of a project.

Scope defines how big the project is and how long it may take to accomplish the improvement objectives. USDA telecommunications technology experts such as network design engineers, network operations technicians or network transmission engineers should be able to review the current state of the network and estimate in general terms how much development is required to achieve the desired state, and how long it might take.

Rough Order of Magnitude System Development Lifecycle Costs: Gap analysis

findings should define the general scope of the project including the current state of technology, the desired state of technology, and the delta between the two. Cost estimates for closing the gap between the current and desired state of network functionality helps evaluators determine the feasibility of moving forward. Costs may indicate that the problems are not worth solving, or that the team should continue to the next phase according to a reduced or expanded scope.

Depending on how much information exists about the current and desired state of the network, analysis during the Pre-Select Phase may involve varying levels of effort. The goal is to gather as much meaningful data as possible without moving into actual design analyses.

Telecommunications Cost Estimating Check Lists

The following section introduces checklists of telecommunications cost elements that project team members may want to include in budget plans.

Figure O-8—Cost Checklist for Telecommunications Labor includes recommended tasks that have telecommunications labor costs and are tied to evaluation criteria. It is important to consider what labor costs are likely to occur throughout the entire system development lifecycle and develop high-level estimates based on the general scope of the anticipated tasks. At this early stage during the Pre-Select Phase it is not necessary to go into a great level of detail calculating full-time-equivalent (FTE) hours, however.

Staffing costs make up a significant percentage of overall project costs because they are often recurring for key personnel throughout the life of the project. Conceptual checklists of personnel who may charge against a project include general administrative support staff responsible for tracking documentation, technical specialists knowledgeable about specific disciplines of telecommunications engineering, and managers at various levels of oversight. This list does not constitute an entire index of required personnel. It is intended to help CPIC authors think about multiple levels of staffing during various phases of a project. Personnel may include USDA internal staff, contractors, consultants, service providers, or a combination of each.

Beginning in the Pre-Select Phase, project costs should be captured in Universal Budget Object Class Codes that have been established by OMB for this purpose. Organizing costs according to this classification early in a project allows Project Managers to use a common frame of reference that is consistent throughout the entire project when discussing budgetary issues with team members and the EITIRB. An agency's Chief Financial Officer, Comptroller, or Procurement Specialist should be able to help project managers organize costs according to the correct Budget Object Class Codes.

Cost Checklist for Telecommunications Labor Based on Fiscal Year 2002 Approved Evaluation Criteria		
Tasks	**Components**	**Personnel**
Agency Telecommunications Plan	Planning	Agency head, agency sponsor, project sponsor or functional manager, IT manager, system analyst, capital planning analyst, budget analyst, quality assurance manager, configuration management specialist, administrative
	Design	Project manager, IT manager, system analyst, network architecture engineer manager, traffic modeling engineer, systems integration engineer, test engineer, quality assurance manager, configuration management specialist
	Acquisition	Contracting specialist, project manager, IT manager, capital planning analyst,
	Installation	Project manager, on-site technicians, integration engineer, test engineer, administrative, logistics (inventory tracking, handling shipping), training, administrative
	Operations and Maintenance	Functional manager, training manager, help desk logistics (maintenance, repairs), technical engineering, support, administrative, quality assurance manager, configuration management specialist
Assessments, Evaluations, Estimates	Gap Analysis	Project sponsor or functional manager, project manager, IT manager, system analyst, network architecture engineer
	Rough order of magnitude lifecycle cost	Project sponsor or functional manager, project manager, IT manager, system analyst, network architecture engineer
	Telecommunications infrastructure analysis	Project manager, IT manager, system analyst, network architecture engineer, traffic modeling engineer, systems integration engineer, test engineer
	Cost Estimate	Project manager, IT manager, system analyst, network architecture engineer, traffic modeling engineer, systems integration engineer, test engineer
	Systems/service performance goals/measures	Project manager, IT manager, system analyst, network architecture engineer, traffic modeling engineer, systems integration engineer, test engineer, quality assurance manager, configuration management specialist

Figure O-8. Cost Checklist for Telecommunications Labor (Page 1 of 2)

Cost Checklist for Telecommunications Labor Based on Fiscal Year 2002 Approved Evaluation Criteria		
Tasks	**Components**	**Personnel**
Reviews	Cost Estimate	Agency head, agency sponsor, project sponsor or functional manager, project manager, IT manager, system analyst, capital planning analyst, budget analyst, administrative
	Telecommunications infrastructure post-implementation	Project sponsor or functional manager, project manager, IT manager, system analyst, network architecture engineer, quality assurance manager, configuration management specialist
	Performance Goals/Measures	Project sponsor or functional manager, project manager, IT manager, system analyst, network architecture engineer, quality assurance manager, configuration management specialist
	Project Status	Project sponsor or functional manager, project manager, IT manager, system analyst, network architecture engineer

Figure O-8. Cost Checklist for Telecommunications Labor (Page 2 of 2)

Figure O-8—Cost Checklist for Telecommunications Labor provides a checklist of additional telecommunications components that may be useful in developing a rough order of magnitude lifecycle cost estimate for the Pre-Select Phase. Only high-dollar elements, significant volumes of lower cost elements, or recurring lease costs over a significant period of time should be considered during the Pre-Select Phase. This may not be an all-inclusive list of telecommunications costs; however, it is intended to provide CPIC authors with a quick reference list of frequently purchased equipment and services, and to remind project managers of frequently overlooked costs such as facilities and real estate.

Facilities

- Office space for project management office telecommunications team members
- Logistics including equipment staging, warehousing (spares), training, repairs
- Cost of new construction for implementation
- Cost of modifications for implementation
- Land mobile radio shelters.

Real Estate

Property for telecommunications facilities or infrastructure.

Network Design, Development, and Management Software Tools

- Requirements management
- Diagramming
- Design
- Traffic modeling
- Simulation
- Prototyping
- Optimization
- Network management
- Configuration management
- Quality assurance
- Help desk
- Inventory tracking.

Cost Checklist for Telecommunications Elements

Application Software

- Purchased COTS applications
- Periodic COTS license fees.

Hardware/Equipment (purchase and lease costs)

End user:

- Plain old telephone service (POTS) Handsets
- Secure phones
- Secure faxes
- Secure cellular telephones
- Fixed telephony
- Pay telephones
- Pagers
- Cellular telephones
- PCS telephones
- Satellite telephones
- Enhanced specialized mobile radios (Nextel)
- Land mobile radios
- Videoconferencing equipment
- Satellite dishes.

Hardware/Equipment (purchase & lease costs)

Network Infrastructure

- Web Servers
- Communications hardware (hubs, routers, bridges, switches, PBXs)
- Power protection devices (UPS, line conditioning equipment)
- Backup generators
- Network cabling
- Network interface cards
- Lab or test equipment (percentage of use dedicated to specific project)
- Operations support servers (e.g., billing, inventory tracking, maintenance)
- Microwave equipment
- Radio towers
- Repeaters
- Wiring.

Services

- Local voice, video and data transmission services (includes frame relay, voice over the Internet protocol (VoIP), digital subscriber line (DSL), integrated services digital network (ISDN), asynchronous transfer mode (ATM), etc.)
- Domestic long distance voice, video, and data transmission services
- International voice, video, and data transmission services
- Secure voice, video, and data transmission services
- Toll free number services
- Commercial wireless transmission services
- Microwave frequency management
- Land-mobile radio frequency management
- Automated attendant
- Voice mail
- Teleconferencing
- Videoconferencing
- Internet access
- Access for the disadvantaged
- Call center support
- Help desk support
- Redundancy
- Emergency response
- Recovery
- Repairs
- Capacity planning
- Cost estimating
- Cost management
- Records management (call detail records)
- Design
- Integration
- Installation
- Testing
- Optimization
- Training.

TELECOMMUNICATIONS SELECT PHASE ACTIVITIES

The first step in the Select Phase requires a Telecommunications Infrastructure Analysis leading to an Agency Telecommunications Plan. The following tasks describe specific activities that a project team may want to consider during the Select Phase that can help satisfy requirements

for both an Infrastructure Analysis and an Agency Telecommunications Plan.

User Requirements Definition

Fully define the business requirements (needs) of the customer. How does the customer see the system/application working? How many users will be accessing the system/application (internal, external, trusted partners, clients, public)? What are peak time periods of user activity? When does the customer need the telecommunications facilities/equipment to be operational? The development of annual projections by the customer for routine telecommunications and the wireless program is also an integral component. Do your customers anticipate any large purchases of cellular phones, pagers, or other personal communications systems?

Support from the OCIO, Telecommunications Services and Operations (Wide Area Network Support, Internet Access, Traffic Analysis)

The OCIO, Telecommunications Services and Operations (TSO), provides agency support on both a continuing and project basis for Internet access, data transmission and metropolitan area network (MAN) requirements using the USDA enterprise network. TSO also maintains, operates, and initiates orders for expansion of the enterprise network. Will the system/initiative/project require integration with the USDA enterprise network? If so, coordination with TSO can help project teams fully define telecommunications infrastructure requirements, anticipated data traffic, Internet or remote access, and interpretation of legislative implementation mandates.

Telecommunications Plan for System Infrastructure

A telecommunications plan for this system/ initiative should be prepared that reflects the design considerations and implementation requirements used in planning this project. This plan should include a detailed technical overview of the telecommunications services and equipment to be deployed for this project. In addition, the project's link to the objective s) in the agency strategic or business plan should be included.

Technical Overview with Graphic Depiction

The technical overview of the entire system/application should provide information on the location of hardware/software nodes requiring Internet access or other telecommunications support. It should include plans for additional telecommunications infrastructure. A graphical depiction of the telecommunications design should reflect the major components, network functionality, internal and external interfaces, and any security features planned or in place. Explain in narrative how the telecommunications infrastructure will be deployed; the use of Commercial Off the Shelf (COTS) software; and planned technology refreshments. Discuss the migration plan for the telecommunications infrastructure from the existing to the proposed technology and major transition details that affect the provisioning.

Sources for Telecommunications Services & Equipment

Identify any known sources for the telecommunications equipment and services required. Resource sharing of wireless equipment/ maintenance and telecommunications equipment/services should always be considered as the first source of supply prior to any new acquisitions. Consider the use of excess equipment available from CEPO or the General Services Administration (GSA). Include the use of mandatory sources of supply, Government-wide fully competed contracts, or non-Federal sources being considered for use.

Cost-Benefit Analysis/Component List

Conduct a cost-benefit analysis, identify and quantify benefits and costs, and prepare estimates for the telecommunications infrastructure supporting the system/initiative/project. Benefits should describe how the investment enhances the agency's ability to meets its mission needs, and should outline functionality or cost savings. Benefits are defined as a profit, advantage, or gain attained by using the investment. Cost refers to both the initial investment and capitalized costs, and can be categorized as direct or indirect. Costs that are unidentified in the Select Phase frequently account for a large number of IT project cost overruns.

Provide a list of system components to be ordered, the price, and time for delivery/installation. Incorporate a plan to mitigate and manage identified risks in the business case justification. Additional information on the factors considered in a Cost-Benefit Analysis can be obtained from the Federal CIO Council web site (www.cio.gov) in the publication "ROI and the Value Puzzle." The program managers or representatives who are familiar with technology solutions and their benefits to organizations should develop the analysis.

Department Enterprise Architecture

Describe how the telecommunications infrastructure design conforms to the Department's Enterprise Architecture Principles for interoperability, resources sharing, and use of COTS software/products. Information concerning the Enterprise Architecture (EA) can be obtained by accessing www.ocio.usda.gov/irm/e_arch/index.html, select the OCIO Staff Office, select IRM and Enterprise Architecture. General information on the considerations of EA can be found at the web site for the Federal CIO Council located at www.cio.gov/files/aaaq.pdf.

Performance Measures

Establish baseline performance measures for the telecommunications infrastructure that will be used to determine overall effectiveness and efficiency. These measures should include the capability to answer questions such as: Did the technology effectively support the system or application? Did the facilities support the user traffic volume? Were customers satisfied with the timeliness of the telecommunications provisioning? Did the telecommunications equipment function as anticipated?

Special Requirements of the Project (Waiver, Technology Search)

Does the telecommunications infrastructure required to support the investment require a waiver from the government-wide acquisition vehicles (FTS2001, WITS2001, Metropolitan Area Acquisitions) prescribed in Departmental Regulation 3300-1? If so, contact the OCIO's Associate CIO for Telecommunications Services and Operations for guidance on how to proceed.

Is a telecommunications acquisition moratorium waiver needed? The Office of the Chief Information Officer (OCIO) requires waiver approval for all telecommunications purchases regardless of the dollar amount. Although a waiver request is normally separate from an IT investment package, approved investments still require waivers for acquisitions. Planned data telecommunications acquisitions should be entered into the Department's Forecasting Inventory and Reporting (FIR) database. The FIR database is open twice a year for new entries and updates.

A waiver should be requested early in the pre-acquisition process, preferably concurrent with the investment package, to allow sufficient review by the necessary offices within OCIO. The waiver package should clearly identify reason(s) for the request, include comprehensive cost comparisons, and contain a strong justification for waiver approval. It should be sent to the USDA Chief Information Officer. IT acquisition should only commence after written approval has been obtained from OCIO.

Security Required, Identification of Data Sensitivity, Security Analysis

A Security Analysis is always required for any new IT initiative or project. This analysis should be conducted in conjunction with your agency Information Systems Security Program Manager (ISSPM). The results should be documented in a Security Analysis for the investment. A review of security should also be done for the ongoing telecommunications and wireless programs annually to ensure that any mission critical or sensitive data transmitted over wireless, satellite, or telecommunications facilities have the appropriate levels of encryption.

The Telecommunications Infrastructure is the full range of voice, data, and video services and equipment, including Internet, intranet, extranet, LAN, WAN, and wireless, toll-free network services, and calling card services. The telecommunications infrastructure has two components: (1) telecommunications equipment and (2) telecommunications service. Telecommunications equipment includes routers, switches, private branch exchanges (PBXs), cell phones, video cameras, etc., used for various

modes of transmission, such as digital data, audio signals, image, and video signals. Telecommunications carriers provide telecommunications services to move data, voice, or video signals from one location to another, regardless of the type of media used.

A telecommunications plan for this system/ initiative should be prepared that reflects the design considerations and implementation requirements used in planning this project. This plan should include a detailed technical overview of the telecommunications services and equipment to be deployed for this project. In addition, the project's link to the objective (s) in the agency strategic or business plan should be included.

GLOSSARY OF TERMS

Best Practices—Processes, practices, or systems used by public and private organizations that perform exceptionally well and are widely recognized as improving an organization's performance and efficiency in specific areas. Successfully identifying and applying best practices can reduce business expenses and improve an organization's efficiency.

Bridge—A network interconnectivity device that selectively determines the appropriate segment to which it should pass a signal. Through address filtering, bridges can divide busy networks into segments and reduce network traffic. (Or) Services provided by a carrier to connect three or more audio or video conferencing systems so they can all communicate.

Cost Benefit Analysis—A technique used to compare the various costs associated with an investment or project with the benefits it proposes to return. It should address both tangible and intangible benefits and use net present value figures.

Effectiveness—An assessment of the qualitative level of achievement of program goals and the intended results, as defined in strategic or other plans or documentation or in legislation.

Metropolitan Area Network—A data network covering an area larger than a local area network (LAN), but less than a wide area network (WAN). A metropolitan area network (MAN) typically interconnects two or more LANs. MANs may operate at a higher speed than LANs, may cross-administrative boundaries, and may use multiple access methods.

Performance Measures/Performance Measurement—The process of developing measurable indicators that can be systematically tracked to assess progress made in achieving predetermined performance goals and to benchmark an organization's performance against that of other organizations.

Post-Implementation Review—An review of an investment or project that compares the actual cost, schedule, performance, and other results achieved after an investment or project has been completed and is fully operational against the conditions that existed prior to the implementation of the investment or project, as indicated by baseline cost, schedule, and performance data, and against the planned cost, schedule, and performance goals established for the investment or project. A post implementation review can provide valuable "lessons learned" that can be applied to future investments or projects.

Private Branch Exchange (PBX)—a private telephone switching system usually located on a customer's premises with an attendant console. It may use traditional analog, ISDN, or data telecommunications protocols.

Router—An intelligent Internet work connectivity device that uses logical and physical addressing to connect two or more logically separate networks. Routers use algorithms to determine the best path by which to send a packet.

Security Analysis—A formal analysis conducted by the agency Information Systems Security Program Manager (ISSPM) or designee for the purpose of determining the importance of the information, assessing risks, formulating mitigation strategies, and other measures needed to safeguard the system/application.

Software—The detailed instructions to operate a computer or other type of equipment or hardware. The term was created to differentiate instructions (i.e., the program) from the hardware.

Telecommunications—For purposes of this questionnaire, telecommunications is the full range of voice, data, and video services and equipment, whether stand alone or connected, including Internet, intranet, and extranet services and equipment as well as wireless services and equipment (e.g., cellular and pager), toll-free network services, and calling card services. Also included are services that use multiple technologies, such as net conferencing with audio conferencing to facilitate group communications.

Telecommunications Equipment—Devices such as routers, switches, private branch exchanges (PBXs), cellular telephones, and video devices used in the transmission of voice or data.

Telecommunications Service—Any service provided by a telecommunications carrier. A specific set of user-information transfer capabilities

provided to a group of users by a telecommunications system. The telecommunications service user is responsible for the information content of the message.

Video—An electrical signal containing timing (synchronization), luminance (intensity), and often chrominance (color) information that, when displayed on an appropriate device, gives a visual image. Video is very bandwidth intensive and requires specialized transmission equipment to transport true images from one type of media (e.g., television) to another (e.g., computers). Non-compatible video systems can be linked via bridge services offered by carriers.

Wide Area Network (WAN)—A network typically extending a local area network (LAN) or metropolitan area network (MAN) over telephone common carrier lines to link to other LANs or MANS. A WAN typically uses common-carrier leased lines, for example, from an analog phone line to a T-1 line. The jump between a LAN or MAN and a WAN can be made through a device called a bridge or a router.

Wireless—Wireless communication is anything that support communications between mobile, portable or fixed facilities through use of the electromagnetic spectrum. Examples are: AM and FM broadcasting, UHF and VHF television, satellite, microwave, land mobile radio, citizen's band, paging, cellular telephone, wireless LANs, wireless telephone PBXs and Personal Communications Services (PCS).

CONTACT INFORMATION

This manual is facilitated and maintained by the USDA Office of the Chief Information Officer's (OCIO) Associate CIO for Telecommunications Services and Operations, Telecommunications Management Division. Questions or comments may be directed to Susan A. Moore at (202) 720-8021.

APPENDIX P—I-TIPS REQUIREMENTS BY PHASE

The following is a checklist for I-TIPS Investment and Portfolio Managers to use when entering information in I-TIPS on their agencies' investments. This list is divided into the five phases of the Capital Planning and Investment Control (CPIC) process. For further instructions on using I-TIPS, please refer to the *I-TIPS Users' Guide, Version 3.02* by selecting the following URL:

P.1 PRE-SELECT PHASE

- Create the new investment.
- Create a contacts list for this investment.
- Add the investment to your agency's Investment Pool and to the agency's Investment Portfolio.
- Designate the investment as Major, Significant, or Small/Other.
- Ensure that points of contact such as the Functional Manager and Project Sponsor are kept updated within the General Information folder.
- Complete the Select Screening Criteria checklist found in the Selection Screening information of the Selection Information section.
- As directed by your agency, use the established scoring weights and rules in I-TIPS to assist in ranking this investment with others in the portfolio.
- Complete Lifecycle Cost and Lifecycle Budget information located in the Financial Information folder.
- Add supporting information to the Resource Library for the investment, such as preliminary budget estimates and spreadsheets and the Investment Review submission package.
- Grant permissions to allow OCIO, OCFO, EWG, EITIRB, and others to view the investment.

P.2 SELECT PHASE

- Update the Lifecycle Cost and Lifecycle Budget information located in the Financial Information folder as required.
- Add any new or revised documentation that supports the initiative to the Resource Library. This includes documentation such as the Investment Review submission package, the Performance Measures Plan, Project Plan with schedule and costs, and Security and Telecommunications information. It also includes the Business Case, Risk Profile, Technical Profile, and Management and Planning Profile information.
- Complete the Performance Measures information.
- Complete the Planned Cost and Schedule information.
- Review and complete the Select Screening Criteria checklist found in the Selection Screening information of the Selection Information section.
- Complete the Select Scoring Scorecard Information located in the Selection Scoring Information section of the Investment Manager.
- Grant permissions as needed to enable editing, viewing, and scoring.

P.3 CONTROL PHASE

- Update the Lifecycle Cost and Lifecycle Budget information located in the Financial Information folder as required.
- Add any new or revised documentation that supports the initiative to the Resource Library, such as the Investment Review submission package.
- Update the Performance Measures information.
- Update the Planned Cost and Schedule information.
- Complete the Control Screening Criteria checklist found in the Control Screening Information section.
- Complete the Control Scoring Scorecard information located in the Control Scoring Information section of the Investment Manager.
- Review initiative history and background information to support assignment of individual

scores located in the General Information folder and in the initiative's Resource Library.

- Ensure all folders from the Select Phase are completed and the Selection Status folder indicates the investment is approved and finalized so it can advance to the Control Phase.
- Complete the Control Screening and Control Scoring data screens in the Control Information folder.
- Complete the Control Cost and Schedule Information folder, including milestones to the 2nd level, associated costs, and variances.
- Grant Permissions as needed to enable editing, viewing, and scoring.

P.4 Evaluate Phase

- Update the Performance Measures information.
- Update the Planned Cost and Schedule information.
- Add any new or revised documentation that supports the initiative to the Resource Library, such as the Investment Review submission package. Include copies of the Post-Implementation Review and Independent Verification and Validation.
- Grant permissions as needed to enable editing, viewing, and scoring.

P.5 Steady-State Phase

- Update the performance measures information.
- Update the planned cost and schedule information.
- Add any new or revised documentation that supports the initiative to the resource library, such as the investment review submission package.
- Add any new or revised documentation that supports the initiative to the resource library, such as the investment review submission package. include copies of the post-implementation review and independent verification and validation.
- Grant permissions as needed to enable editing, viewing, and scoring.

APPENDIX Q—QUARTERLY/MILESTONE CONTROL REVIEW CHECKLIST

During CPIC Control Reviews, the following critical areas should be addressed. The Control Review Team will discuss these areas, and a report shall be given to the team.

1. Status of the critical path:
   a. Where is the investment on the critical path?
   b. If it is behind schedule, by how much?
   c. Is there a strong plan for recovery, and what steps are being taken to recover?
2. Milestone hit rate:
   a. What is the total number of milestones planned vs. the total number actually met?
   b. What is the milestone hit rate since the last control review or since the most recent EITIRB review?
3. Deliverables hit rate:
   a. What is the number of deliverables provided to date vs. the number planned?
4. Issues:
   a. Have there been issues that had a major effect on the investment?
   b. Are issues logged and evaluated, and resolutions documented?
5. Actual cost-to-date vs. estimated cost-to-date:
   a. What is the total cost-to-date vs. the estimated cost-to-date?
   b. Is Earned Value Management used to measure actual resources expended against planned resources expended and to estimate future performance of projects?
   c. Are causes of cost variances tracked and addressed?
6. Actual resources vs. planned resources:
   a. Are there more or fewer FTEs working vs. number of FTEs planned?
   b. Has there been significant, unplanned turnover among the core team, Project Manager or Sponsor?
7. Have high-probability and high-impact risks been tracked and adequately addressed?
8. Has contractor reporting been adequate?
   a. Does the contractor report by WBS?
      i. Task progress
      ii. Deliverables
      iii. Planned activities
      iv. Expenditures
   b. Are the reports assessed and action taken?

APPENDIX R—GLOSSARY OF TERMS AND ACRONYMS

R.1 GLOSSARY OF TERMS

Acquisition Plan	Description of the acquisition approach including: ◆ Contract strategy (definition of government and contractor roles and responsibilities) ◆ Use of COTS software ◆ Major milestones (such as software releases, hardware delivery and installation, and testing).
	The costs actually incurred and recorded in accomplishing the work performed within a given time period.
	Degree to which the IT initiative is compliant with USDA's information technology architecture.
Architecture	An integrated framework for evolving or maintaining existing technologies and acquiring new technologies to support the mission(s).
Benefit	Quantifiable or non-quantifiable advantage, profit, or gain.
Benefit-Cost Ratio	The Total Discounted Benefits of an investment divided by the Total Discounted Costs of the investment. If the value of the Benefit-Cost Ratio is less than one, the investment should not be continued.
Budget at Completion	The sum of all budgets established for the contract.
Budgeted Cost for Work Performed	The sum of the budgets for completed work packages and completed portions of open work packages, plus the applicable portion of the budgets for level of effort and apportioned effort.
Scheduled	The sum of all WBS element budgets that are planned or scheduled for completion.
Business Case	Structured proposal for business improvement that functions as a decision package for organizational decision-makers. A business case includes an analysis of business process performance and associated needs or problems, proposed alternative solutions, assumptions, constraints, and risk-adjusted cost-benefit analysis (CBA).
Business Process	A collection of related, structured activities or chain of events that produce a specific service or product for a particular customer or group of customers.
Business Process Reengineering	A systematic, disciplined approach to improving business processes that critically examines, rethinks, and redesigns mission delivery processes.
Capital Asset	Tangible property, including durable goods, equipment, buildings, installations, and land.
Contract Budget Base	The total cost of all budgeted activities necessary to complete a task.

Figure R-1. Glossary (Page 1 of 5)

Control Phase	Capital planning phase that requires ongoing monitoring of information technology investments against schedules, budgets, and performance measures.
Cost-Benefit Analysis	An evaluation of the costs and benefits of alternative approaches to a proposed activity to determine the best alternative.
Cost Performance Index	Earned value divided by the actual cost incurred for an investment.
Cost Variance	Earned value minus the actual cost incurred for an investment.
Customer	Groups or individuals who have a business relationship with the organization; those who receive or use or are directly affected by the products and services of the organization.
	Compilation of materials including data dictionary, decomposition diagrams, and data models.
Description of Initiative	Brief overview of initiative of no more than 100 words to include: ◆ Short summary of proposed initiative ◆ Statement of the business functions or processes the initiative supports ◆ Brief summary of benefits resulting from the initiative (tangible or intangible).
	Document that includes system design diagrams.
Discount Factor	The factor that translates expected benefits or costs in any given future year into present value terms. The discount factor is equal to $1/(1 + i)t$ where i is the interest rate and t is the number of years from the initiation date for the program or policy until the given future year.
Discount Rate	The interest rate used in calculating the present value of expected yearly benefits and costs.
Earned Value Analysis	A structured approach to project management and forecasting including comparisons of actual and planned costs, work performed, and schedule.
Estimate at Completion	The actual costs incurred, plus the estimated costs for completing the remaining work.
	The cost necessary to complete all tasks from the actual cost of work performed end date through the investment's conclusion.
Evaluate Phase	Capital planning phase that requires information technology investments to be reviewed once they are operational to determine whether the investments meet expectations.
Expected Outcome	Projected end result of the initiative (e.g., system(s) being replaced or improved customer service) that is directly linked with performance measures.
Feasibility Study	Preliminary research performed to determine the viability of the proposed initiative by performing an alternatives analysis, including market research and extensive interviews with subject matter experts. Also includes a proposed technical approach and preliminary cost, scope, and schedule data.

Figure R-1. Glossary (Page 2 of 5)

Financial System	An information system used for any of the following: ◆ Collecting, processing, maintaining, transmitting, or reporting data about financial events ◆ Supporting financial planning or budgeting activities ◆ Accumulating and reporting cost information ◆ Supporting the preparation of financial statements.
Functional Requirements	A description of system capabilities or functions required to execute a required process such as a communication link between several locations and generating specific reports.
Hardware/Equipment	Includes any equipment used in the automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information (e.g., computers and modems); capital and non-capital purchases or leases.
Independent Verification and Validation	An independent review conducted by persons separate from the management and operation of the investment or system.
Inflation	The proportionate rate of change in the general price level, as opposed to the proportionate increase in a specific price. Inflation is usually measured by a broad-based price index, such as the implicit deflator for Gross Domestic Product or the Consumer Price Index.
Information System	A discrete set of information resources organized for the collection, processing, maintenance, transmission, and dissemination of information in accordance with defined procedures, whether automated or manual.
Information System Lifecycle	The duration of the system life typically organized into four phases: initiation, development, operation, and disposal.
	Any equipment or interconnected system or subsystems or equipment used in the automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information.
Infrastructure	The IT operating environment (e.g., hardware, software, and communications).
Lifecycle Benefits	The overall estimated benefits for a particular program alternative over the time period corresponding to the life of the program including: ◆ Cost/expense reduction (productivity and headcount), ◆ Other expense reductions (operational), ◆ Cost/expense avoidance, and ◆ Revenue-related savings.
Lifecycle Cost	The overall estimated cost for a particular program alternative over the time period corresponding to the life of the program, including direct and indirect initial costs plus any periodic or continuing costs of operation and maintenance.

Figure R-1. Glossary (Page 3 of 5)

Management Reserve	The amount of the total allocated budget withheld for management control purposes rather than designated for the accomplishment of a specific task or set of tasks; not part of the performance measurement.
Net Present Value	The difference between the discounted present value of benefits and the discounted present value of costs. Also referred to as the discounted net.
Opportunity Costs	Cost of not investing in the initiative or cost of a forgone option.
Payback Period	The number of years it takes for the cumulative dollar value of the benefits to exceed the cumulative costs of an investment.
Performance Indicator	Description of: ◆ What is to be measured, including the metric to be used (e.g., conformance, efficiency, effectiveness, costs, reaction, or customer satisfaction) ◆ Scale (e.g., dollars, hours, etc.) ◆ Formula to be applied (e.g., percent of "a" compared to "b," mean time between failures, annual costs of maintenance, etc.) ◆ Conditions under which the measurement will be taken (e.g., taken after system is operational for more than 12 hours, adjusted for constant dollars, etc.)
Baseline	The time-phased budget plan against which investment performance is measured.
	Method used to determine the success of an initiative by assessing the investment contribution to predetermined strategic goals. Measures are quantitative (e.g., staff-hours saved, dollars saved, reduction in errors, etc.) or qualitative (e.g., quality of life, customer satisfaction, etc.).
Post-Implementation Review	Evaluation of the information technology investment after it has been fully implemented or terminated to determine whether the targeted outcome (e.g., performance measures) of the investment has been achieved.
Pre-Select Phase	Capital planning phase that provides a process to assess whether information technology investments support strategic and mission needs.
Project Plan	A document that describes the technical and management approach to carrying out a defined scope of work, including the project organization, resources, methods, and procedures and the project schedule.
Return	The difference between the value of the benefits and the costs of an investment. In a cost-benefit analysis it is computed by subtracting the Total Discounted Costs from the Total Discounted Benefits, and is called the Total Discounted Net.

Figure R-1. Glossary (Page 4 of 5)

Return on Investment	Calculated by dividing the Total Discounted Net by the Total Discounted Costs. To express it as a percentage, multiply by 100. It can also be expressed as (Total Discounted Benefits minus Total Discounted Costs) divided by Total Discounted Costs.
Risk	A combination of the probability that a threat will occur, the probability that a threat occurrence will result in an adverse impact, and the severity of the resulting impact.
Management Plan	A description of potential cost, schedule, and performance risks, and impact of the proposed system to the infrastructure. Includes a sensitivity analysis to articulate the effect different outcomes might have on diminishing or exacerbating risk. Provides an approach to managing all potential risks.
Risk Management	The process concerned with identifying, measuring, controlling, and minimizing risk.
	Earned value minus the planned budget for the completed work.
Security	Measures and controls that ensure the confidentiality, integrity, availability, and accountability of the information processes stored by a computer.
	Description of system security considerations such as access, physical or architectural modifications, and adherence to Federal and USDA security requirements.
Select Phase	Capital planning phase used to identify all new, ongoing, and operational investments for inclusion into the information technology portfolio.
	An analysis of how sensitive outcomes are to changes in assumptions. Assumptions about the dominant cost or benefits elements and the areas of greatest uncertainty deserve the most attention.
Software	Any software, including firmware, specifically designed to make use of and extend the capabilities of hardware/equipment.
	Capital planning phase that provides the means to assess mature information technology investments to ensure they continue to support mission, cost, and technology requirements.
Sunk Cost	A cost incurred in the past that will not be affected by any present or future decisions. Sunk costs should be ignored in determining whether a new investment is worthwhile.
	Description of hardware, software, and communications requirements associated with the initiative.
	The difference between the total budget assigned to a contract, WBS element, organizational entity, or cost account and the estimate at completion; represents the amount of expected overrun or under run.

Figure R-1. Glossary (Page 5 of 5)

R.2 ACRONYMS

AB	Annual Benefit
AC	Annual Cost
ACWP	Actual Cost of Work Performed
	Agency Sponsor
BAC	Budget at Completion
BCR	Benefit-Cost Ratio
BCWP	Budgeted Cost for Work Performed
	Budgeted Cost of Work Scheduled
BPR	Business Process Reengineering
CBA	Cost-Benefit Analysis
CBB	Contract Budget Base
CCA	Clinger-Cohen Act
CFO	Chief Financial Officer
CIO	Chief Information Officer
COTS	Commercial-off-the-shelf
CPI	Cost Performance Index
CPIC	Capital Planning and Investment Control
CSBR	Cost, Schedule, Benefit, and Risk
CV	Cost Variance
DB	Discount Benefit
DC	Discount Cost
DF	Discount Factor
EAC	Estimate at Completion
EBT	Electronic Benefit Transfer
EITIRB	Executive Information Technology Investment Review Board
ETC	Estimate to Complete
EWG	Executive Working Group(s)
FAA	Federal Aviation Administration
FASA	Federal Acquisition Streamlining Act
FM	Functional Manager
FTEs	Full-Time Equivalents
FY	Fiscal Year
GAO	General Accounting Office
GISRA	Government Information Security Act of 2000
GPEA	Government Paperwork Elimination Act of 1998
GPRA	Government Performance and Results Act
GSA	General Services Administration
GWACS	Government-wide Agency Contracts
IDS	Intrusion Detection System

Figure R-2. Acronyms (Page 1 of 2)

IOC	Initial Operational Capability
IPT	Integrated Project Team
IRM	Information Resource Management
ISSPM	Information System Security Program Manager
ISTA	Information System Technology Architecture
IT	Information Technology
I-TIPS	Information Technology Investment Portfolio System
IV&V	Independent Verification and Validation
MB	Megabyte
MNS	Mission Needs Statement
	Management Reserve
NIST	National Institute of Standards and Technology
NPV	Net Present Value
O&M	Operations and Maintenance
OBPA	Office of Budget and Program Analysis
OCFO	Office of the Chief Financial Officer
OCIO	Office of the Chief Information Officer
OMB	Office of Management and Budget
OPPM	Office of Procurement and Property Management
PIR	Post-Implementation Review
PMB	Performance Measurement Baseline
PRA	Paperwork Reduction Act
RFP	Request for Proposals
ROI	Return on Investment
SV	Schedule Variance
SME	Subject Matter Expert
USDA	United States Department of Agriculture
VAC	Variance at Completion
VPN	Virtual Private Network
WBS	Work Breakdown Structure

Figure R-2. Acronyms (Page 2 of 2)

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