EA-STD-01-07
PBGC Alternatives Analysis Standard

Purpose	This standard defines the approved process for identifying and recommending an information technology (IT) product or solution that is best overall fit for PBGC use. This standard also describes how to properly conduct and document the decision for input into the PBGC acquisition process. Use of this standard applies in two situations: 1) When a Business Needs Analysis (BNA) target state recommendation identifies a specific business need, but not the solution and an alternatives analysis is required or 2) When a business requirement is identified, but a product solution does not exist on the Technical Reference Model (TRM) or in the IT environment as a business solution.
Scope	The Alternatives Analysis Standard and Methodology applies to all PBGC employees and contractors whose organizations have a business need to evaluate and recommend a technology product or solution for use by PBGC. This standard applies to all types of IT products and solutions, including managed or shared services, cloud or non-cloud deployments. Note: Procurement activities for the product or solution will need to be properly coordinated with the Procurement Department (PD) after Technical Review Board (TRB) review and decision.
Authority/ References	▪ Clinger-Cohen Act of 1996 ▪ e-Government Act of 2001 ▪ OMB Circular A-130 ▪ OMB Circular A-11 ▪ OMB Circular A-94
Approving Body	Technical Review Board (TRB) and IT Portfolio Review Board (ITPRB)
Owner	Enterprise Architecture Division (EAD)
Supersedes	EA Standard 01-02 *IT Product and Technology Selection Standard and Methodology*
Collaborators	▪ Office of Information Technology ▪ Technical Review Board ▪ IT Portfolio Review Board (ITPRB) ▪ Procurement Department (PD) ▪ Office of General Counsel (OGC)

Implementers	All PBGC Business Units, Office of Information Technology (OIT), Procurement Department, Technical review Board (TRB), and IT Portfolio Review Board (ITPRB)
Standard Type	Technical
Control Number	EA-STD-01-07
Standard	IT solutions and products recommended for use in the PBGC business IT environment must have an identified business need documented and adhere to the Alternatives Analysis Standard and Methodology. Prior to a technology product or solution being analyzed and selected, the business sponsor and the Enterprise Architecture Division (EAD) must confirm that the business need is not already fulfilled by an approved and existing PBGC solution or TRM standard. Use of a Restricted Standard requires TRB approval. If the business need warrants an IT product or technology that is not listed in the TRM, the Alternatives Analysis (AA) Integrated Project Team (IPT) will use the AA Methodology to determine the product or solution that is the overall best fit for PBGC. The following process steps are required when conducting an Alternatives Analysis: 1. Establish AA IPT 2. Define Business and Technical Requirements and Use Cases 3. Define Evaluation Criteria and Weightings 4. Identify Alternative Options and Conduct Market Research 5. Conduct Initial Assessment, Score and Evaluate and eliminate options 6. Conduct Cost Benefits Analysis with Risk adjusted costs and eliminate options 7. Recommend Solution - Presentation for Pre-Acquisition Review - Viability and Technical Acceptance 8. IT & Business Project Managers Manage through Procurement Process The recommendation shall be presented to the TRB and ITPRB for their approval prior to initiating activities with the Procurement Department to acquire the IT product or solution.
Metrics	Reserved for future use.
Owner Signature	John Larsen, Chief Enterprise Architect
Approval Signature	John Larsen, Technical Review Board Chair

PBGC

Protecting America's Pensions

Alternatives Analysis Methodology

v1.0

Enterprise Architecture

Revision History

Document Version	Release Date	Description/Comments
1.0	April 2016	Initial version of Standard and Methodology

Approval

Signer/Title	Signature	Date
John Larsen Chief Enterprise Architect Manager, Enterprise Architecture Division		
John Larsen Chair, Technology Review Board (TRB)		

Contents

Introduction

Purpose

This document describes the methodology a comprehensive lifecycle approach to implement the Alternatives Analysis Standard used to identify, analyze and recommend an information technology solution or product for use in PBGC. This methodology defines the repeatable process that ensures the analysis of information technology is fact based, eliminates or mitigates individual and vendor bias and represents the most optimal solution for PBGC. This methodology shall be used by all PBGC employees and contractors when determining the technology product or solution that is best for PBGC overall.

This methodology seeks to:

- Determine the most appropriate information technology with a reasonable amount of effort;
- Encourage the identification and use of a limited number of criteria based on important business needs and technical requirements;
- Be easy to implement and cost-effective to use; and
- Support the capital and acquisition planning activities required by Federal statutes and policy including the Federal Acquisition Regulations (FAR).

Scope

The Alternatives Analysis Standard and Methodology is applicable to all PBGC employees and contractors that need to assess and select a business technology based solution or a technology component to meet business requirements or address a performance need. This methodology may be applied to any type of information technology product, component or solution. When applied to technology component selection significant tailoring is required. Please also refer to the TRB Processes and Procedures and TRB documents and templates when analyzing technology products to assist in the tailoring process. This standard and methodology applies only to new business-IT solution or technology products or components. It does not apply to the renewal of hardware or software maintenance.

This methodology enables the Alternatives Analysis Integrated Project Team (AA IPT) to determine the best information technology available to meet the identified business need or performance gap. This standard and methodology is applicable to technologies for internal PBGC infrastructure or other externally hosted environments, including the Federal Line of Business (LOB) shared services, and cloud and non-cloud managed and shared services deployed externally to PBGC's business and technology environment.

Federal Statutory and Regulatory Requirements

Several statutes and policies focus on improving the efficiency and effectiveness of both Alternatives Analysis and Cost Benefit Analysis by Federal agencies. Four of the most applicable are:

- The *Clinger-Cohen Act of 1996* requires agencies to use a disciplined capital planning and investment control (CPIC) process to acquire, use, maintain and dispose of information technology (IT);
- OMB Circular A-130, *Management of Federal Information Resources* is OMB's policy for management of Federal information resources;
- Office of Management and Budget (OMB) Circular A-11, Part 7, *Planning, Budgeting, Acquisition and Management of Capital Assets* (updated annually) establishes policy for planning, budgeting, acquisition and management of Federal capital assets, and instructs on budget justification and reporting requirements for major IT investments; and
- OMB Circular A-94, *Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs* (October 29, 1992) provides guidance for conducting benefit-cost analyses.

OMB Circular A-11

The Office of Management and Budget (OMB) Circulars No. A-94 and A-11 form the primary basis for PBGC's approach to conducting alternatives analyses. OMB Circular A-11, Part 7, Section 300, Exhibit 300, requires:

1. A narrative description of the performance gap that each major IT investment is expected to address;
2. A description of 4 viable alternatives along with risk-adjusted life cycle cost and benefits estimates;
3. A Cost-Benefit Analysis;
4. A summary of how investment risks are reflected in the lifecycle cost estimate; and
5. Identification of the alternative chosen and justification for selecting the alternative.

Business and IT Program Managers of all IT investments must address Exhibit 300 requirements in accordance with applicable guidance including OMB Circulars A-11, including OMB's Capital Programming Guide (a supplement to OMB Circular A-11) and A-94, Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs and PBGC guidance and governance.

A-11 requires agencies to identify and consider at least 4 viable alternatives. For IT investments, agencies should use the Federal Enterprise Architecture (FEA) to identify potential alternatives for partnering, or joint solutions that may be used to close the identified performance gap. As one of the Exhibit 300 sections that are scored by OMB, the AA section is an important component of the overall IT Program. The evaluation criteria include verification that at least 4 viable alternatives were considered, costs and benefits in all the alternatives were compared consistently and assumptions are well-supported and documented.

OMB Circular A-94

A-94 "provides general guidance for conducting benefit-cost and cost-effectiveness analyses. It also provides specific guidance on the discount rates to be used in evaluating Federal programs whose benefits and costs are distributed over time. The general guidance will serve as a checklist of whether an agency

has considered and properly dealt with all the elements for sound benefit-cost and cost-effectiveness analyses."

As part of the capital planning process, A-94 guidelines must be followed in all analyses submitted to OMB in support of legislative and budget programs in compliance with OMB Circular A-11. The guidelines in the A-94 apply "to any analysis used to support Government decisions to initiate, renew, or expand programs or projects which would result in a series of measurable benefits or costs extending for three or more years into the future. This Circular applies specifically to: (1) Benefit-cost or cost-effectiveness analysis of Federal programs or policies, (2) Regulatory impact analysis, (3) Analysis of decisions whether to lease or purchase, and (4) Asset valuation and sale analysis."

Alternatives Analysis Methodology

An Alternatives Analysis (AA) is the process that PBGC business units us to identify, compare and assess viable information technology alternatives to address a given business need or performance gap, determine and recommend the best alternative, and document the associated rationale. A sound Alternatives Analysis that incorporates a cost benefit analysis is required by OMB and facilitates and documents a sound decision-making process. An Alternatives Analysis also helps the agency perform acquisition planning and market research during procurements.

A Cost Benefit Analysis (CBA) is generally used to analyze the quantitative financial aspects of the investments. While financial factors play a significant role in AA, the alternative selected might not generate the most financial benefits or cost the least amount. AAs should distinguish the option that generates the most benefits to the organization as a whole. Non-financial benefits may include qualitative factors such as risk considerations, mandated standards and integration of business unit processes, as well as quantitative factors such as improved productivity or improved service performance.

The AA must include an analysis of potential costs, benefits (quantitative and qualitative), technical feasibility, and an architectural assessment to ensure alignment and fit with the PBGC technology environment. Each Alternatives Analysis is unique and must be tailored to fit the unique circumstances. While traditionally this may include reducing the scope, depth and breadth of the alternatives analysis based on budget or process complexity, tailoring may also mean that additional iterations, progressive elaborations of evaluation and elimination of alternatives and options may be required prior to conducting the cost-benefit analysis.

As defined in the Business Needs Analyses standard, BNAs are required to identify target state recommendations. BNA recommendations are required to be prioritized with the business sponsor and it must identify which recommendations require an AA. The Target State recommendations from a BNA may require an AA in order to determine the best alternative and plan for follow on acquisition activities. As a result, most of the process steps conducted during the AA are necessary prerequisites to any type of procurement action. The AA helps business units determine their business and technical requirements, establish evaluation criteria and the relative weights of those criteria, and develop market research to learn and discover alternatives that the business unit may not be aware of prior to an acquisition. These processes and documentation all feed directly into the acquisition process.

After a PBGC business unit completes a BNA, the business unit may either plan for the AA in the next ITPRB prioritization meeting or re-program existing funds to conduct the AA immediately. The AA should be planned to be conducted to coincide with solution implementation funding when possible. Having the AA and solution implementation (i.e., project) planned sequentially will prevent the need for an update to the AA and delay in implementation and the resolution of an identified PBGC business need or performance gap.

Tailoring

This guidance applies to a wide range of situations each with unique circumstances. When applying this guidance to a technology component or product that will be presented to the TRB, follow all the steps as closely as possible, but tailor the process to fit each requirement. Occasionally, the cash flow statement comparison may not be as detailed as presented in this methodology. Project Managers should review the TRB Processes and Procedures and TRB Standard templates for additional information.

Alternatives Analysis Process

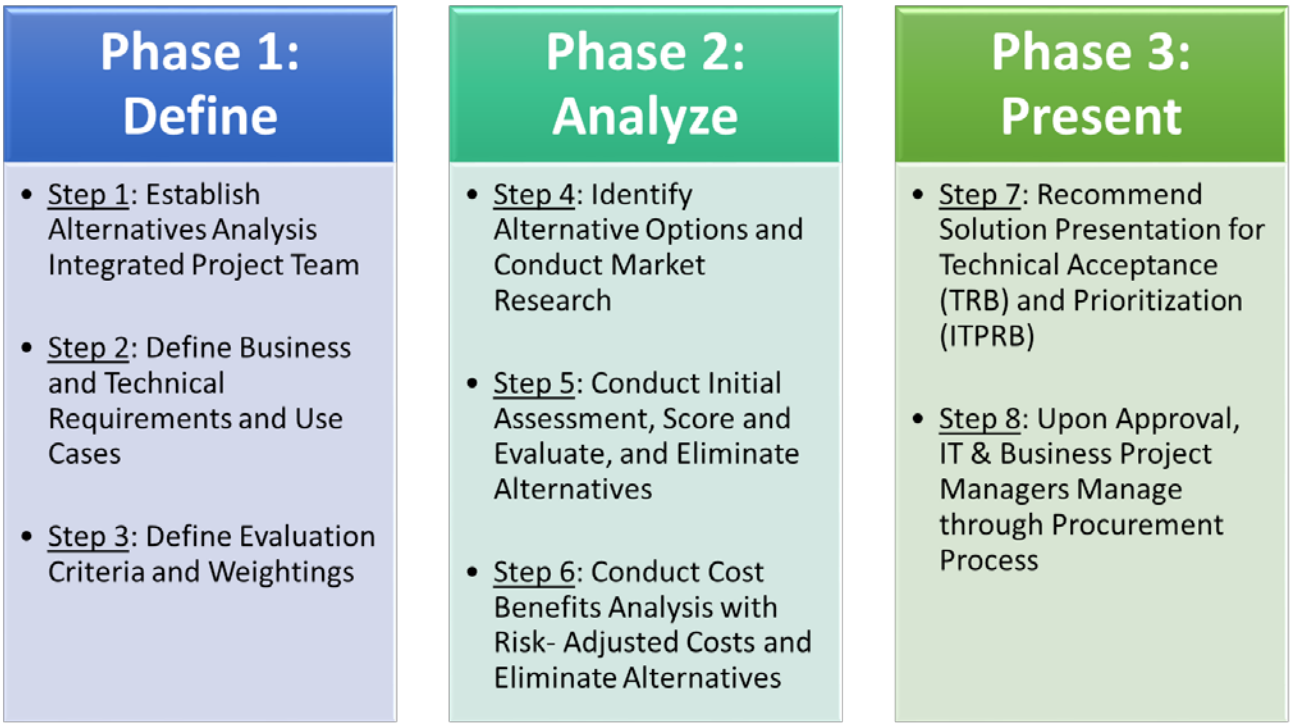


Figure 1: Alternatives Analysis Process

Phase I: Define

Step 1: Establish Alternatives Analysis Integrated Project Team

Before starting any alternative analysis, the sponsoring business unit and the assigned Enterprise Architect should confirm that the request to identify analyze and recommend an information technology product or solution is derived from a Business Needs Analysis (BNA). Once this evaluation is completed, key stakeholders and decision-makers who will conduct the analysis and recommendation of the IT product or solution are identified and form the AA IPT. An AA is unnecessary if the Technical Reference Model (TRM) contains a technology that meets the business need.

The AA IPT is composed of members from the units listed in the Table 1, to ensure that all aspects of PBGC are represented. While contractors may participate on the AA team, any decision-making and voting must be deferred to the Federal employee they are representing.

Phase 1: Define

- Step 1: Establish Alternatives Analysis Integrated Project Team
- Step 2: Define Business and Technical Requirements and Use Cases
- Step 3: Define Evaluation Criteria and Weightings

ROLE	RESPONSIBILITY
Executive or Functional Sponsor	The sponsor is the person in the functional area that is requesting the identification of alternatives to fulfill a business need. The sponsor is responsible for ensuring that the AA and all required backup materials are prepared. The sponsor is also responsible for ensuring that the AA is conducted in accordance with this standard and methodology and all applicable Federal policy and PBGC directives.
Federal IT Project Manager (PM)	Ensures information technology conforms to AA standard requirements and facilitates the AA IPT. This person is typically the project manager that will lead the selected alternative through execution to deployment. Provides guidance on the tailoring of the Alternatives Analysis approach.
Business users and representatives	Ensure information technology meets business requirements and the needs of the end user in a straightforward manner. This includes representatives from all business units that may benefit from or use the selected alternative.
EA Representative	Ensures information technology conforms to the EA Target Architecture, standards, and meets enterprise needs. Provides input on the tailoring of the Alternatives Analysis approach.
ITIOD Representative	Ensures information technology elements and components aligns with PBGC infrastructure. Provides subject matter expertise on all aspects related to IT infrastructure.

ROLE	RESPONSIBILITY
ECD Representative	Ensures information technology adheres to PBGC security controls. Provides subject matter expertise on all aspects related to cyber-security.
Procurement Representative	Ensures information technology selection activities conform to the Federal Acquisition Regulation (FAR) principles and PBGC procurement directives and processes.
Other stakeholders such as Privacy and Records Management	Ensure information technology meets the requirements as identified for the stakeholders' area of interest and expertise.

Table 1: Alternatives Analysis AA IPT Roles and Responsibilities

When the AA IPT members are identified, a kickoff meeting is held to describe the roles and responsibilities of each team member. The AA IPT should discuss the business need or performance gap the team is seeking to solve, the scope, the process, the deliverables, the necessary resources, the project timeframe and other criteria and inputs that need to be reviewed prior to conducting the alternative analysis. The Federal project manager will facilitate the development of the preliminary schedule of activities.

Other stakeholder representatives may opt-out from participating in the technology selection effort if the technology does not affect and/or is not of interest to the group they are representing. A formal withdrawal will be communicated to the Federal project manager.

Sponsors, business and IT program and project managers should exercise caution when using a contract vendor to conduct the alternatives analysis when it is anticipated the same vendor is or will be supporting the end solution that is procured. Having an independent third party conduct the alternatives analysis provides removes any potential bias that an implementation vendor may use in their favor. Approval to use the same vendor for analysis and implementation requires consultation with the Procurement Department and the Office of General Counsel to ensure there is no organizational conflict of interest.

In this step, the AA IPT performs the following activities:

1. Documents events, time schedule, and costs in schedule tool such as MS Project
2. Initiates the analysis and tracks the AA IPT progress against the schedule
3. Keeps track of all the meetings/proceedings/agreements and decisions for audit purposes
4. Identifies location and method to store and retrieve evaluation matrix
5. Defines the scope, deliverables timeframe and assignments of the AA IPT members

Step 2: Develop Business and Technical Requirements and Use Cases

Based on the documented performance gap, the AA IPT shall work with the business and technical stakeholders to identify business functional requirements, technical requirements and use cases as

needed. In addition to business functional requirements a number of other inputs are necessary to evaluate an information technology solution or product. They include:

- Document the performance gap(s)
- Business process requirements – identify and document upstream and downstream processes
- Document As-Is and To-Be business processes and the technology impacts
- Identify and document existing and desired internal controls
- Document impact to existing application architecture
- Data requirements, migration requirements, data entry and output requirements
- Security requirements - Federal guidelines[1] such as NIST security requirements
- EA requirements (Strategy, Performance, Business, Data, Information, Application, Infrastructure, Security)
- Infrastructure requirements (hardware, network, and operating system)
- Task constraints, such as schedule, staff, and cost[2]

If the business process (es) are not analyzed as part of a BNA, they must be analyzed before or as part of the alternatives analysis.

In some situations, PBGC may decide to simply use the processes embedded in a technology solution. The decision to not analyze a business process prior to an AA must be documented and approved by the executive sponsor. The decision must state that PBGC will use the process embedded in a commercial product.

The risk of using a vendor's embedded process is that PBGC stakeholders may require significant enhancements to make a commercial product conform to PBGC processes, potentially customizing poorly designed processes in custom code that may make upgrades to new versions of the commercial product more complex, costly and time consuming.

Step 2 Output: Business And Technical Requirements and Use Cases

As business and technical requirements are being developed, the IPT should consider this step as a means to complete a draft of Section C of any future solicitation that may be required. This is a means to become more agile in achieving a desired business solution.

Step 3: Define Evaluation Criteria and Weightings

This section discusses the development of evaluation criteria for use in an AA. As in many AA process steps, establishing evaluation criteria is part of the acquisition planning process, and as such is a reusable process step that may help speed the competitive procurement process upon the AA completion and approval.

The AA IPT must identifies evaluation criteria and relative weightings are established. Criteria should go beyond basic feature and functionality as because many vendors offer mirrored capabilities in these

[1] Federal guidelines include guidance/solution recommendations from OMB, NIST, GSA and other authoritative Federal sources.
[2] Market research shall serve as a source for cost information that will form the basis for an Independent Government Cost Estimate (IGCE). Note: Only the Procurement Department may request formal quotes from vendors.

areas. Things to consider include "ease of use, ability to deliver and support the solution, platform infrastructure, support of open standards, application integration, implementation processes and resources, training and knowledge transfer approaches, and support for going live." The AA IPT will determine which criteria may be more important than others and set weightings as appropriate. The AA IPT performs the following activities for each functional component in the architectural design that may be satisfied through acquisition:

1. Defines the selection criteria for each functional component
2. Defines the 'Weight' values for each selection criteria
3. Defines scoring algorithms to determine the percent satisfaction for each selection criteria (See, Score (%) column).
4. Identifies initial, high level acquisition, implementation and on-going support cost drivers applicable to this specific technology or service (See IT Cost Comparison).
5. When selected technology solutions for comparisons include managed service solutions (cloud or non-cloud).
6. Documents the selection scoring method in an evaluation matrix form.

The AA IPT shall negotiate and obtain stakeholder concurrence on the selection scoring method defined for evaluation criteria.

Having too many criteria and assigning all criteria the same weight may have the effect of hiding important differentiators among technologies or solutions. The team must take the time to determine which criteria are relevant and to what degree the criteria are necessary to fulfill the business need. The weights of the criteria will be different depending on the type of business need or performance gap to be solved. This step is especially important when multiple stakeholders have disparate needs, and vigorous discussion leading to well-understood criteria and weights should be encouraged.

At the end of this step all AA IPT members must come to a consensus on the set of criteria and their weights before proceeding to the next step. Any changes to the criteria or weights after this point will require concurrence of all stakeholders.

Background

The purpose of the AA evaluation process is to provide a mechanism to determine which alternative best meets the PBGC's needs. Because the AA recommendation is based on this evaluation, it is important that the evaluation criteria clearly reflect the PBGC's need. The evaluation criteria should facilitate an accurate evaluation of the alternatives; represent key areas of importance and emphasis to be considered in the analysis and evaluation process; and support meaningful discrimination and comparison between and among competing alternatives.

Establishing Evaluation Criteria

The evaluation criteria used to assess alternatives consist of the factors that reflect the areas of importance to PBGC in its alternatives recommendation. Through the evaluation factors, the PBGC is able to assess the similarities and differences and strengths and weaknesses of competing alternatives

and, ultimately, use that assessment in making a sound recommendation. A well-integrated evaluation scheme provides consistency, discipline, and rationality to the analysis process.

The AA must define the relative importance of the criteria to all of the other evaluation criteria. In doing so, alternatives will be evaluated and recommended based on which one best meets PBGC's needs. This step ensures that:

- Evaluation criteria should be tailored to each alternatives analysis and include only those factors which will have an impact on meeting PBGC's business needs
- The nature and types of evaluation criteria to be used for an AA are within the broad discretion of the AA IPT

Non-Cost Factors - Non-cost factors address the evaluation areas associated with technical and business management aspects of the proposal. Examples of non-cost factors include technical and business factors. Examples available for IPT tailoring are provided below.

Cost and Past Successes **-** When considering cost or past successes in the Federal or private sector, seek the advice of the Procurement Department representative on the AA IPT.

Evaluation Criteria Thresholds - The development and use of thresholds are key to uniform application of evaluation criteria. Thresholds establish the minimum level of acceptability for a requirement and provide the basis on which the ratings above and below the minimum level are set. Stated another way, a standard is the measurement baseline that will be used by the AA IPT to determine whether an alternative meets, exceeds, or fails to meet an evaluation requirement. Thresholds provide a consistent and uniform measurement target and promote an objective evaluation of alternatives. Thresholds may be quantitative or qualitative in nature. Cost may have a threshold to ensure the recommended alternative does not exceed budget allocations. Cost information is requested early in the evaluation process to avoid additional time and expense associated with alternatives that clearly exceed the budget available. Regardless of whether a threshold is quantitative or qualitative in nature, the threshold should be:

- Structured to specify the minimum acceptable level and the ratings levels that can be assigned
- Developed using precise language that is clearly and easily understood by the AA IPT members
- Structured to evaluate substance, not form
- Consistent with the minimum requirements to meet the business need, performance gap and the business and technical requirements

Relative Importance of Evaluation Criteria

After determining the evaluation criteria, their relative importance must be established. The relative importance of the factors that comprise the evaluation criteria must be consistent with the alternatives analysis objectives and requirements. There are several methods that may be used to establish the relative importance of the evaluation criteria.

Rating Mechanisms

There is no one best approach for rating alternatives. Accordingly, AA IPTs are free to design rating plans which best meet their needs in light of the facts, circumstances, and requirements of a business need or set of alternatives. Typically, numerical, adjectival, or color coding rating schemes have been relied on for proposal evaluations. The key in using a rating system is consistent application by the AAIPT members. Regardless of the approach selected, AA IPT members must come to a consensus on the definitions of the evaluation criteria, thresholds, weighting and other factors.

Evaluation Criteria Guiding Principles

- Evaluation criteria must represent the key areas of importance
- More important criteria should be weighted greater than less important criteria

Sample Technology Evaluation Criteria

- 508 Compliance – Mandatory
  - Simply requesting a Voluntary Product Accessibility Template (VPAT) may not be sufficient to comply with the Americans with Disabilities Act statues, Section 508. See the 508 User and Reference Guide as well as the Design and Development standards for additional information about 508 Accessibility.
- Security (utilize existing security groups/rights and ensure FISMA and NIST compliance)
- Architectural compatibility (in line with the PBGC segment architectures, TRM, EA principles, Enterprise Architecture Standards or use of open standards)
- Records Management in accordance with PBGC Directive IM 15-1
- Performance suitability (throughput, disk requirements, memory requirements)
- Scalability and Availability
- Interoperability (Avoid proprietary aspects that lead to vendor lock-in),
- Transparency (documentation, internal specifications – interfaces and organization of the PBGC information, means to obtain PBGC information, selectively or in its entirety)
- Maintainability (What is the effort required to move to new versions? What monitoring mechanisms are available?)
- Update Cycle (How often is there a new release of the Information Technology?)
- Maturity (How long has the technology been on the market? The size of the technology's customer base)
- Flexibility (Easy to change to meet new business requirements)
- Maintenance costs/fees (Annual license cost per unit and total annual license cost covering PBGC needs)
- Ease of Use (How easy is the technology to use by users/Administrators/DBA support/SA support)
- Programming languages (JAVA, .NET, those that fit within the existing TRM and PBGC)
- Technology Deployment Model (internal, Federal Shared Service, external managed service, cloud service provider)

Sample Vendor Selection Criteria

- Competitive standing in the industry market space
- Technical support (scope and responsiveness)
- Training support
- Periodic vendor release dates and calendar to accommodate target systems delivery dates
- References from Federal Government agencies and commercial customers
- Availability of vendor technology vision, evolution plans

Stakeholder Acceptability Selection Criteria

- Business unit openness to new technology offered by an alternative
- Training requirement to develop Alternative expertise
- Amount of currently unsupported technology introduced by the technology in PBGC environments

Step 3 Output: List of Evaluation Criteria and Relative Weightings.
Evaluation criteria developed here will help in potential follow on procurement activities and help to inform Section M of a solicitation.

Phase II: Analyze

Step 4: Identify Alternative Options and Conduct Market Research

Market research is defined as collecting and analyzing information on the market for a government requirement (refer to FAR 2.101). It is an essential element in acquiring commercial items and provides information to the procurement activity in understanding the requirement and what is available in the commercial marketplace.

To perform effective market research, the AA IPT must first identify the various alternative options of technology products, solutions and suppliers, then collect and analyze information about the capabilities within the market to satisfy the agency's need. The results of market research will determine the availability of the different types of solutions in the marketplace and potential acquisition strategies and approaches.

Phase 2: Analyze

- Step 4: Identify Alternative Options and Conduct Market Research
- Step 5: Conduct Initial Assessment, Score and Evaluate, and Eliminate Alternatives
- Step 6: Conduct Cost Benefits Analysis with Risk- Adjusted Costs and Eliminate Alternatives

Identifying Alternative Options

In Circular A-11, Project managers must identify and consider at least four viable alternatives. According to OMB Circular A-94, AAs should consider alternative means of achieving program objectives by examining different program scales, different methods of provision, and different degrees of Government involvement.

Alternatives may be identified by researching the market for solutions that will help the program achieve its objectives. This may include issuing Requests for Information (RFIs) and/or Requests for Comments (RFCs). In evaluating alternatives, the analysis should generally consider: (i) doing nothing (Status Quo); (ii) direct purchase (COTS); (iii) upgrading, renovating, sharing, or converting existing government property; or (iv) leasing or contracting for services (Managed or Federal Shared Services).

For example, when looking for a solution for a new business need, the program may evaluate Build vs. Buy options. If a legacy system is currently servicing the business need, Expand vs. Replace options may be evaluated. The alternatives may be related to different technical options or different vendor solutions that can address a given business need. A program must select the alternatives that are most appropriate for them. Below are five acceptable generic alternatives the AA IPT may consider:

1. **Maintain the Status Quo** - The Status Quo should always be described, like any other alternative. It is not sufficient to reference Status Quo without describing it further.
2. **Managed Service Provider** -- The AA PM finds it advantageous to fully contract out services to contractors. Deployment options may be cloud or non-cloud in nature.
3. **Federal Shared Services Provider** – In this alternative, PBGC pays a separate federal agency as a service provider in order to leverage existing services possessed by this other Government entity. Deployment options may be cloud or non-cloud in nature.
4. **Enhance or Upgrade** – In this alternative, the AA IPT chooses to enhance or replace an existing system as a method of achieving the same results and strategic goals.
5. **Commercial-Off-the-Shelf** – This alternative is about procuring a commercially (or potentially government (GOTS) off the shelf software package for internal use, potentially with customizations. Hosting may be internally or externally; cloud or non-cloud.
6. **Complete all Work In-House** – In this alternative it, may be more effective and economical to custom develop a solution and build/maintain exclusively by the PBGC.
7. **Open Source Software** – In accordance with OMB M16-21, the AA IPT should consider whether open source code or open source software is a viable candidate for consideration.

It is not sufficient to use these generic alternatives verbatim. When employing one or more of these generic alternatives, the alternative title and accompanying description must be investment-specific.

Market Research

Once various alternative options of service delivery are identified, the IPT may continue with market research into these specific delivery options. The Federal Acquisition Regulation prescribes policies and procedures for federal procurement activities and in conducting market research (in Part 10) to arrive at the most suitable approach to acquiring, distributing, and supporting supplies and services. Part 10 implements the requirements of 41 U.S.C. 3306(a)(1),41 U.S.C 3307, 10 U.S.C. 2377, and 6 U.S.C. 796. The FAR policy in section 10.001 (excerpted) states that agencies must:

> "(1) Ensure that legitimate needs are identified and trade-offs evaluated to acquire items that meet those needs;
> (2) Conduct market research appropriate to the circumstances --

(i) Before developing new requirements documents for an acquisition by that agency;
(ii) Before soliciting offers for acquisitions with an estimated value in excess of the simplified acquisition threshold.

Step 4 Output: Market Research report listing market space providers.
Market research is required by the Procurement Department.

Step 5: Conduct Initial Assessment – Score, Evaluate, and Eliminate Options

Once the AA IPT has identified business and technical requirements, evaluation criteria and weightings and has conducted market research, the AA IPT conducts an evaluation. This assessment consists of applying the information gathered during the market research activity to the evaluation criteria and scoring model. During this step in the process, the AA IPT performs the following activities:

- Organize the information on each alternatives option and enter it into the evaluation matrix
- Perform analysis and develop a total composite score for each alternative
- Determine the identified solutions' applicability to the identified evaluation criteria
- Produce a composite report of the results, ranking the alternatives

Please Note: Business and Technical requirements must be evaluated concurrently by the entire IPT. All members of the IPT must be involved during the identification and evaluation of business and technical requirements.

Alternative Analysis Scoring Sheet

The table below is provided as an example to be used to develop composite scores for each alternative. The 'Weight' field would contain an integer value assigned by the AA IPT during their analysis in Step 3. As an example, the weight may be from 1 to 100 and a score may be from 1 to 5 (Deming Scale) or 1 to 10; with 5 or 10 as the highest score. The 'Score' field would indicate degree of satisfaction achieved by the alternative. A composite value for each selection criteria is calculated (Alt. X Score = 'Weight' x Alternative's 'Score (%)'). For example, if a criteria is judged to have a 'Weight' of 50 and the alternative's 'Score (%)' was evaluated as "8" then the 'Composite' value for criteria is 400. The total for each category is then multiplied by the Category weight to obtain a fully weighted evaluation criteria for each alternative.

SAMPLE CRITERIA	**Weight (W)** 1-10, 1-100		**Status Quo** Result (R) & Score (A)		**Alt. 1 Score** Result (R) & Score (B)		**Alt. 2 Score** Result (R) & Score (C)		**Alt. 3 Score** Result (R) & Score (D)	
Category: Technology										
Performance	W		WxR	=A	WxR	=B	WxR	C	WxR	D
Reliability	W		WxR	=A	WxR	=B	WxR	C	WxR	D
Transparency	W		WxR	=A	WxR	=B	WxR	C	WxR	D
Maintainability	W		WxR	=A	WxR	=B	WxR	C	WxR	D

Privacy	W		WxR	=A	WxR	=B	WxR	C	WxR	D
Scalability	W		WxR	=A	WxR	=B	WxR	C	WxR	D
Availability	W		WxR	=A	WxR	=B	WxR	C	WxR	D
Flexibility	W		WxR	=A	WxR	=B	WxR	C	WxR	D
Interoperability	W		WxR	=A	WxR	=B	WxR	C	WxR	D
Ease of Use	W		WxR	=A	WxR	=B	WxR	C	WxR	D
Programming languages	W		WxR	=A	WxR	=B	WxR	C	WxR	D
508 Compliance	W		WxR	=A	WxR	=B	WxR	C	WxR	D
Information Security	W		WxR	=A	WxR	=B	WxR	C	WxR	D
Deployment Mode	W		WxR	=A	WxR	=B	WxR	C	WxR	D
Records Management	W		WxR	=A	WxR	=B	WxR	C	WxR	D
Category: Business Functionality										
The AA IPT identifies the required business and functional requirements below	W		WxR	=A	Wx R	=B	WxR	C	WxR	D
	W		WxR	=A	Wx R	=B	WxR	C	WxR	D
	W		WxR	=A	Wx R	=B	WxR	C	WxR	D
Category: Vendor										
Technical support / Help desk	W		WxR							
Training capabilities/support	W		WxR	=A	WxR	=B	WxR	C	WxR	D
Competitive standing	W		WxR	=A	WxR	=B	WxR	C	WxR	D
References (Federal Govt/Commercial)	W		WxR	=A	WxR	=B	WxR	C	WxR	D
Technology vision & roadmap	W		WxR	=A	WxR	=B	WxR	C	WxR	D
Category: Stakeholder Acceptability										
Acceptance of new technology	W		WxR	=A	WxR	=B	WxR	C	WxR	D
Training requirements	W		WxR	=A	WxR	=B	WxR	C	WxR	D
Amount of currently unsupported technology	W		WxR	=A	WxR	=B	WxR	C	WxR	D
Category: Cost										
Cost of Technology or Solution										
Initial Acquisition and Licensing Costs										
Ongoing Maintenance Costs										
Hardware and Software Costs and Maintenance										
Implementation Costs										

Support and Enhancement Costs						
Total:						

Table 2: Example Alternatives Analysis Scoring Sheet

Based on the initial scoring on business and technical requirements, solutions are removed from consideration or eliminated. This reduction of alternatives by elimination is essentially to ensure only the best alternatives are more completely analyzed in Step 6.

Step 5 Output: Initial results of scoring and elimination of some alternatives

Step 6: Conduct Cost Benefits Analysis with Risk-Adjusted Costs and Eliminate Options

AAs are required to demonstrate that viable alternatives were examined and the most optimal alternative was chosen after examining the costs and benefits associated with each alternative. As with previous sections of the Alternatives Analysis standard and methodology being applicable to future procurement activities, the cash flow helps to define and populate the Internal Government Cost Estimate required in the Advanced Procurement Plan.

The Clinger-Cohen Act addresses Cost-Benefit Analysis (CBA) as a key component of IT management in Section 5122, CPIC (under Executive Agencies Responsibilities). Furthermore, the Office of Management and Budget (OMB) Circular A-130 requires agencies to prepare a cost-benefit analysis for all information systems at a level of detail appropriate to the size of the investment. A-11 also requires an Alternatives Analysis to be part of the IT Program Plan submission.

The CBA is used to identify the most economically beneficial resolution to a business need or performance gap; that is, to identify the alternative that will result in resolving the business issue with either the highest return on investment (ROI), net present value (NPV), lowest costs, or greatest cost avoidance or savings, and to determine the financial impact of the alternatives. The financial analysis may also be used to determine the priority among projects across multiple IT Programs competing for limited funds. CBAs are required when the five year total cost of ownership exceeds $1 million. Tailoring of the CBA will be required consistent with the TCO value and complexity of the alternatives analysis. Waiver of this requirement requires the approval of the ITPRB. While a CBA is not required for a TCO value under $1 million over the initial 5 year period, a less rigorous analysis should still be used to determining the financial impact of those proposed alternatives acquisitions.

Definitions

- **Cost Benefits Analysis —** A tool for making an alternatives recommendation decision based on a comparison (in current dollars) of the economic costs and benefits of two or more alternatives to a given business need or performance gap.
- **Time value of money —** Time, or the timing of an investment, is an important consideration in any economic or financial decision. The purchasing power of a dollar changes over time because of

inflation. At the same time, money that is invested grows according to the laws of compound interest.

- **Future value —** The compound interest rate determines the future value of invested dollars (e.g., $100 invested today at a 10 percent interest rate will grow to $121 in 2 years).
- **Present value discounting —** A mathematical process for determining the value today of future costs and benefits. It uses the reciprocal of the compound interest rate to discount, in terms of present value, sums of money to be spent or benefits to be realized at a future date. It provides a method for evaluating the tradeoff between current dollar outlays (investments) and future benefits (cash inflows) over a period of time. This concept is integral to the evaluation of alternatives.
- **Cash flow —** A timeline that shows the anticipated flow of required funding, costs, and savings for a given alternative, and also calculates mathematical measurements such as return on investment (ROI), net present value (NPV) for the alternative.

Discounted Cash Flow Method

PBGC uses the discounted cash flow method of financial analysis to identify the most economically beneficial solution to a business need. This is accomplished by discounting the anticipated costs and benefits of alternative solutions and calculating the various alternative investment measures (NPV and ROI). These alternative investment measures are used to compare the expected results of each alternative and also bring into focus additional factors affecting the decision (e.g., the time value of money, qualitative factors) that cannot otherwise be expressed quantitatively.

Because a financial evaluation is only as good as the assumptions and input data, the assumptions and data must be as accurate and realistic as possible. To achieve the most reliable results, AA IPT members should obtain input from all available resources (including internal specialists, external consultants, and other subject matter experts) regarding the selection of options and use of resources. Final responsibility for an assumption or estimate rests with the sponsoring business unit. The AA IPT members and governing bodies are expected to apply common sense judgment. *All cash flow costs and benefits in the analysis must be supported by the source of the estimates.* A separate cash flow analysis must be developed for each alternative considered. The cash flow analysis for the recommended alternative is included in the AA, while the other cash flows are included in the AA backup documentation.

Determining Baseline Costs

The baseline, or existing situation, provides a uniform reference point for defining the operational and economic impacts of each alternative. In order to determine the present value of an alternative, a schedule of cash flows is constructed in which the anticipated investments and operating savings and costs of alternatives are compared to the baseline over the economic life of the project. This requires that the costs of the existing situation be analyzed.

Current baseline costs are escalated into the future through the end of the analysis period (usually the service life of the asset but not more than 10 years following move-in or final deployment) using the escalation rates in OMB A-94.

According to OMB Circular A-11, the cost of a capital asset is its full lifecycle costs, including all direct and indirect costs for planning, procurement, operations and maintenance, including service contracts, and disposal.

All costs, recurring or one-time, including Government and contractor costs, related to the investment must be captured in the Alternatives Analysis, since this feeds the Summary of Spending table in the IT Program Plan.

Lifecycle Cost Formulation

Lifecycle costs are the overall estimated costs from all funding sources for both Government and Contractor, for a particular alternative over the time period corresponding to the life of the alternative. They include direct and indirect initial costs plus any periodic or continuing costs of operation and maintenance.

PBGC has established an IT budget programming process that links mission needs and financial resources in an effective and efficient manner. Effective capital programming requires long-range planning and a disciplined budget decision-making process as the basis for managing a portfolio of assets to achieve performance goals and objectives with minimal risk, lowest lifecycle costs, and greatest benefits to PBGC.

OMB Circular A-11 states that new investments must be justified based on the need to fill a gap in the agency's ability to meet strategic goals and objectives with the least lifecycle costs of all the various possible solutions and provide risk-adjusted cost and schedule goals and measurable performance benefits. Investments that are still in the planning or acquisition stages must demonstrate satisfactory progress toward achieving baseline cost, schedule and performance goals. Assets that are in operation (steady state) must demonstrate how close actual annual operating and maintenance costs are to the original lifecycle cost estimates and whether the level or quality of performance/capability meets the original performance goals and continues to meet agency and user needs.

The following are rules to be followed for lifecycle cost formulation:

- Lifecycle costs must include Government and Contractor costs for each of the alternatives analyzed. See Table 3 for a list of potential costs to consider.
- The costs must be comprehensive and include both one-time and recurring expenses anticipated for each alternative. PBGC requires all costs to be expressed as nominal values.
- The costs must be broken out into the different cost types for each alternative. The “Other” cost category may not be used. Sufficient description and definition of cost categories must be provided.
- Security costs should include ISSO contractors which may address an initial Controls Assessment and the cost to develop Authority to Operate (ATO) and on-going security costs such as Continuous Diagnostic Monitoring.
- Lifecycle costs for each alternative must be risk-adjusted. Risk-adjusted lifecycle costs refer to the overall estimated cost for a particular investment alternative over the time period corresponding to the life of the investment. It includes direct and indirect initial costs plus any periodic or continuing costs of operation and maintenance that has been adjusted to accommodate any risk

identified in the risk management plan. If alternative funding is to be requested for specific phases, segments or modules of the alternative, each of these parts must be risk adjusted for its individual lifecycle.

- If the investment changes its level of funding as a result of OMB, or Congressional adjustments during the budget cycle, the lifecycle costs must be adjusted and financial metrics recalculated.
- AA IPTs are encouraged to use the techniques described in the *GAO Cost Estimating and Assessment* Guide (GAO-09-3SP)

Develop the Sustaining Baseline

- In rare circumstances, the sustaining baseline situation is used to quantify measures that a reasonable manager would take to sustain PBGC operations during the analysis period in the event the proposed alternative is not approved. It is based on a continuation of present operations, including all the resources (e.g., labor, space) required to sustain existing operations from concept proposal development through the analysis period. In general, capital funds are not used when developing a sustaining baseline. When use of a sustaining baseline is warranted, it becomes the basis for computing the incremental rate of return (IRR) and Net Present Value (NPV) between the alternatives.
- When selecting a technology to fulfill a business need, the AA IPT should develop a cost comparison that discusses the estimated costs associated with planning, implementing, operating, and maintaining the information technology.
- When the AA IPT assesses the financial differences between on-premise hosting and cloud alternatives, a comparative cash flow analysis helps to define the financial costs and benefits. IPTs should estimate the costs to provide the solution internally for the selected application or services. Cost savings will be a significant driver but not the only factor in the alternatives recommendation decision. Other factors that may be considered, including the quality of service, the redirection of resources to core mission activities, additional functionality and capabilities, more efficient processes, and improvement of information management and decision-making capabilities. If actual data is not available, the AA IPT should use the best possible estimates. Both IT and business unit costs should be included. IPTs should include the human resources costs (e.g., for Federal employees and contractors) that exist in both the business and IT organizations if those costs are a significant cost driver.
- PBGC requires that analysis be conducted either in constant dollars or in terms of nominal values.

Nominal vs. Real – Costs and Benefits

PBGC requires the cost-benefit numbers to be reflected in *nominal* terms rather than real or constant dollars. The difference between these terms is described below

- *Real* or *constant-dollar* values measure benefits and costs in units of stable purchasing power. The inflation impact on costs and benefits is not considered.
- *Nominal* values measure benefits and costs in terms of the future purchasing power of the dollar.

Logical consistency requires that nominal and real values not be combined in the same analysis.

Benefits

Quantitative (also referred to as tangible benefits) and qualitative (also referred to as Intangible Benefits) benefits must be considered for each Alternative.

Quantitative Benefits are expressed in dollar terms and should be included in the calculation of the financial metrics for the Cost-Benefit Analysis. Benefits that result in an increase of cash inflow to the organization or a reduction in cash outflow are considered "hard" savings.

Qualitative benefits are intangible benefits that cannot be quantified, but play an important role in the selection of one alternative over another. These benefits are expressed in terms of improved mission performance, improved decision making, or more reliable or usable information. These benefits may be quantifiable, but cannot be expressed in dollar values. Though qualitative benefits are difficult to quantify reliably, the intangible benefits may be vital to understanding the total outcome of implementing a particular IT system. Such benefits, like reduced risk, better strategic fit or improved technical feasibility must be considered as a part of the Alternatives Analysis. Such benefits must be captured, but are not included in the CBA calculations.

Determining the Analysis Period

Once the viable alternatives have been determined, a schedule of costs (or cash flow) for each alternative is developed. The schedule reflects the anticipated investments and future operating costs or benefits compared to the baseline during the analysis period. The analysis period is typically the investment period plus 5 or 10 years following final deployment.

Determining the Number of Years

The useful life of the recommended alternative normally determines the time period for the economic evaluation of all the alternatives. For IT Solutions, the analysis period begins with the first year of expenditures and ends in the last year of life of the alternative after final deployment (normally not to exceed 10 years). However, a longer analysis period may be required under certain circumstances.

Selecting the Zero Point

The cash flow begins with the first significant investment. Thus the zero point of a cash flow is not necessarily the current year. The same zero point must be used for all alternatives under consideration. Costs and benefits are calculated on an annual fiscal year basis to reflect the budget process.

Comparing Alternatives with Different Investment Periods

When two or more alternatives being evaluated have different investment periods (reflecting differences in lead time, construction time, or availability), the recommended alternative determines the cash flow time line. Since the evaluation period must be the same for all alternatives (i.e., the zero point for each alternative is the same actual point in time), the evaluation period may have to be adjusted for the non-recommended alternatives.

Example: If Alternative B (the recommended alternative) has 5 investment years and Alternative A has 2 investment years and the anticipated useful life of 10 years for each alternative, then both cash flows will have an analysis period of 15 years. Alternative B will show 5 years of investment followed by 10

years of ongoing operational support costs (O&M), while Alternative A will show 2 years of investments followed by 13 years of ongoing operational support costs (O&M). (Alternatively, when the cash flow for Alternative A may show 3 years of "lag" time followed by 2 years of investments and 10 years of ongoing operational support costs (O&M)) If, on the other hand, Alternative A were the recommended alternative, the cash flow would show 12 years (2 investment years and 10 operating years for Alternative A, and 5 investment years and 7 operating years for Alternative B).

Comparing Alternatives with Different Useful Lives

When an economic evaluation compares two alternative assets with different periods of useful life, the cash flows are based on the useful life of the asset in the recommended alternative:

- If the recommended alternative has a shorter life than another alternative being analyzed, the evaluation period for the asset that is not being recommended is cut short and the residual value of this asset is credited to the last year of the evaluation period.

Calculating Investment Costs

The investment expenditures that are itemized in the cash flow include the planning, initial costs, and other direct costs of the alternative, plus all related expenditures, both Development Maintenance and Enhancement (DME) and Operating and Maintenance costs that are necessary to complete the AA.

Discounting the Cash Flow and Calculating Financial Metrics

Once the cash flow has been developed (i.e., the investment amounts and s from baseline have been determined), the next step is to determine the present value of each alternative. This is accomplished by discounting the cash flow.

In a typical cash flow, an alternative at the beginning of the evaluation period may result in a stream of benefits (versus the baseline situation) during the remaining years of the analysis period. The annual benefits totals are multiplied by decreasing discount factors related to the time of the benefit, which greatly reduces their present value. Because most investments occur early in the analysis period, discounting has a significantly greater impact on benefits than on investments. Since the effect of discounting also increases with higher discount rates, benefits decrease faster than the investment as a cash flow is discounted at successively higher rates. The discount rate that the PBGC uses is published periodically by OMB in Circular A-94. It reflects the rate of return required from proposed investments to meet the established investment objectives. The risk in capital investments relates to uncertainty about future inflation, changing technology, uncertainty concerning the life of an asset, interest rate volatility, and uncertainty in economic forecasting.

Financial Metrics

Three economic indexes — NPV, ROI, and a NPV comparison — are calculated and used to compare alternatives analyzed. These are used to measure the relative financial impact and cost efficiency of proposed alternatives by converting the anticipated economic results of each alternative to a common financial basis.

Net Present Value

Net Present Value (NPV) is the difference between the present value of cash inflows and the present value of cash outflows. NPV is used in capital planning to analyze the financial impact of an alternative, investment or project. Present value discounts the value of a dollar in the future as compared with the value of a dollar today, taking inflation and potential alternative returns (opportunity cost) into account. If the NPV of a prospective alternative is positive, it is a good investment from a financial perspective. However, if NPV is negative, the alternative should probably be rejected because cash flows will also be negative. However, in the federal space qualitative benefits or legislative mandates may require investing in an alternative with negative NPV. In such a case, this reasoning should be provided as justification for selecting an alternative with a negative NPV. If all the alternatives being considered have a positive NPV, the alternative with the highest NPV is considered better than the others from a financial perspective.

Return on Investment (ROI)

The ROI (technically known as the internal rate of return) is the discount rate corresponding to a zero net present value — that is, when the NPV of all benefits equals the NPV of all investments. The ROI calculations have a different purpose than the NPV measurements, and the alternative with the highest ROI may not be the most cost-beneficial choice. If the economic measures provide conflicting pictures, the alternative with the highest NPV should become the recommended alternative unless there are overriding non-economic considerations in favor of a different alternative.

Return on Investment (ROI) is the net benefits for the period being analyzed divided by total cost incurred during the same period. This is expressed as a percentage. If all the alternatives being considered have a positive Rate of return, the alternative with the highest Rate of Return is considered better than the others from a financial perspective.

Payback Period is the length of time required to recover the cost of an investment. All other things being equal, the better investment is the one with the shorter payback period. This is an optional financial metric that may be used by the AA IPT.

Note: A NPV comparison is only required when the alternatives being analyzed do not have a positive ROI.

Discount Rates

The discount rate is the value used to determine the present value of future cash flows arising from an implemented alternative.

The proper discount rate to use depends on whether the benefits and costs are measured in Real or Nominal terms. A real discount rate that has been adjusted to eliminate the effect of expected inflation should be used to discount constant-dollar or real benefits and costs. A real discount rate can be approximated by subtracting expected inflation from a nominal interest rate. A nominal discount rate that reflects expected inflation should be used to discount nominal benefits and costs. Market interest rates are nominal interest rates in this sense.

Since Cost-Benefit numbers are to be reported as nominal values, the 5-year nominal discount rate published in Appendix C to the Circular A-94 – *Discount Rates for Cost-Effectiveness, Lease Purchase, and Related Analyses* should be used for the Cost-Benefit Analysis.

Developing Assumptions

Assumptions document the foundation that the Alternatives Analysis (AA) and Cost Benefit Analysis (CBA) are built and are necessary to bridge any informational gaps in the alternative analysis. The most accurate forecast possible of an investment's expected costs and benefits must be used in developing the AA/CBA.

The AA IPT must carefully develop and document all assumptions so reviewers understand how the costs and benefits of the alternatives identified in the CBA were developed. Assumptions must clearly define any internal or external factors that will have an impact on the alternative schedule or cost, as well as address any political, organizational, business, or technical factors driving or affecting the CBA.

Assumption generation is an on-going activity that extends throughout the entire alternative analysis process. Early in the investment analysis, the PM will only be able to identify general (or global) assumptions. These general assumptions will be applied to all alternatives addressed in the CBA equally. Later in the CBA analysis, it is not unusual to add, change or delete some assumptions as more information is gathered. As the AA IPT refines the CBA, alternative–specific assumptions must be developed, providing a more comprehensive understanding of the investment environment.

The CBA must explicitly state all assumptions about alternative dependencies and constraints for each alternative. Some examples of the assumptions that must be documented include:

- Recommended Alternative's dependency upon other projects/investments
- Recommended Alternative's dependency on specific infrastructure and an acknowledgement of whether or not this infrastructure is included in the Business Area's Enterprise Architecture plan
- Recommended Alternative's dependency on data derived from another source
- Identification regarding other systems that play an integral role in the Recommended Alternative that are not currently accessible or available

When developing assumptions, the following guidelines apply:

- Assumptions must be made only when there is a need to bridge informational gaps.
- Assumptions must be realistic and validated as such.
- If a conclusion would be valid if one of the assumptions did not hold, it should be eliminated as the assumption is not relevant to the analysis.
- Assumptions may differ for each alternative.

The following table provides an example Cost Comparison for an Alternatives across the determined number of cash flow years. Not all of the criteria may be applicable to every AA IPT.

ALTERNATIVES ANALYSIS - CASH FLOW COST COMAPRISON												
Fiscal Year			2017	2018	2019	2020	2021	Total				
			Project Year	0	1	2	3	4				
			Escalation Rates	1.30%	1.70%	1.40%	1.50%	1.30%				
			I. AA #1 CURRENT STATE - STEADY STATE STATUS QUO									
			Hardware					Refresh				
	$	(700,000)	Production/Dev/Test	$ (700,000)								
			Servers									
			Storage									
			Network & Telecom									
	$	-	Disaster Recovery Env	$ -								
	$	(400,000)	Software	$ (400,000)								
	$	-	Services									
,000)			Requirements Management	$ (150,000)		$ (100,000)		$ (100				
,000)	$	(2,000,000)	Application Development	$ (750,000)	$ (500,000)	$ (500,000)	$ (500,000)	$ (500				
,000)	$	(900,000)	Database Administration	$ (250,000)	$ (250,000)	$ (250,000)	$ (250,000)	$ (250				
,000)	$	(750,000)	Testing Management	$ (200,000)	$ (200,000)	$ (200,000)	$ (200,000)	$ (200				
,078)	$	(1,557,339)	Project Management	$ (250,000)	$ (254,250)	$ (257,810)	$ (261,677)	$ (265				
	$	-	On-Going Support									
,345)	$	(6,852,292)	Hosting - Internal or External	$ (1,100,000)	$ (1,118,700)	$ (1,134,362)	$ (1,151,377)	$ (1,166				
-	$	-	Development /Enhancement Labor		$ -	$ -	$ -	$				
-	$	-	Maintrnenance Labor		$ -	$ -	$ -	$				
-	$	-	Help Desk		$ -	$ -	$ -	$				
,238)	$	(747,523)	Federal Labor Costs	$ (120,000)	$ (122,040)	$ (123,749)	$ (125,605)	$ (127				
,288)	$	(959,321)	HW Maintenance	$ (154,000)	$ (156,618)	$ (158,811)	$ (161,193)	$ (163				
,308)	$	(548,183)	SW Maintenance	$ (88,000)	$ (89,496)	$ (90,749)	$ (92,110)	$ (93				
,000)	$	(400,000)	Information Security	$ (150,000)	$ (50,000)	$ (50,000)	$ (50,000)	$ (50				
	$	-	Network & Telecom- Bandwidth	$ -								
,500)	$	(387,500)	Training	$ (200,000)	$ (100,000)	$ (50,000)	$ (25,000)	$ (12				
-	$	-	Communication	0	$ -	$ -	$ -	$				
,424)	$	(13,159,631)	Current State Status Quo TCO	$ (3,800,000)	$ (2,322,950)	$ (2,442,171)	$ (2,363,054)	$ (2,481				
			RiskAdjustment Factor	Low	10%							
			NPV @ 4% of NCF									
			Ten Yr ROI			NA						

Table 3: Example Cost Comparison Sheet

The recommendation of the best alternative (product or solution) is guided by, among other criteria, a comparison of internal legacy status quo costs to those of the potential alternatives and the performance and quality they deliver to end users. In the transition year, typically costs will be higher. However, in the out-years, cost savings may accumulate. Additional cash flows are developed for other alternative options including managed (external) services, Federal shared services, COTS or custom developed solutions.

The resulting cost comparison forms the financial basis of an alternatives analysis to inform the IPT and executive sponsor leadership team whether or not to proceed with a particular alternative. Other aspects of the alternatives analysis include strategic alignment, qualitative value such as cost avoidance, improved management information, quality of service and risk analysis. Ultimately, the alternative that PBGC implements is based upon our own unique business model, culture, and risk tolerance.

Risk

This section addresses the process to be used to identify, analyze, prioritize and quantify, and control risk as part of the alternatives analysis process. Risk is a measure of the probability and consequence of not achieving a desired business outcome. The term risk is used to define the class of factors that (1) have a measurable probability of occurring, (2) have an associated cost or effect on the an alternatives' outcome.

Risk Management

Risk management includes the process associated with identifying, analyzing, prioritizing and controlling, and mitigating investment risk. There are four major processes involved in the risk management process:

1. **Risk identification —** determining which risks are likely to each alternatives and documenting the characteristics of each risk.
2. Risk **prioritization and quantification —** Defining opportunities and response to potential threats and rank them in the various alternatives.
3. Risk **analysis —** Evaluating risks and risk interactions to assess the range of possible alternatives options.
4. Risk **response control —** Responding to change in risk over the course of the alternative analysis options and recommended alternative.

Risk identification, prioritization and quantification, and analysis, fit easily into the alternative analysis process. Risk response control is a process that involves more than agreement with assumptions and their accompanying calculations. An integrated multifunctional approach for responding to and controlling risk provides for the overall mitigation of alternatives' risks and will influence the extent with which senior management may favorably view an alternative. A process that identifies and mitigates known risks combined with identified strategies that may be implemented when the magnitude and range of risks become known may make alternatives with relatively higher than average risk potential become viable and suitable for recommendation. For example, if a new technology adoption is identified as a risk, then actions that describe how adoption will be addressed may contribute to the eventual approval of the investment, even when a specific risk has been identified.

Risk Identification Process

The suggested method for identifying and quantifying risk is to use a process that involves the appropriate subject matter experts (SMEs) to identify and quantify the risk elements into the following three categories:

1. Technological
2. Operational
3. Integration

Risk Quantification — Element Ranking

There are many ways to quantify risk ranging from models that employ complex Monte Carlo simulations that can be used to project the likelihood of a particular risk component or simulate many interrelated risk components simultaneously.

However, simple processes that rely on the AA IPT members available (i.e., subject matter experts) to project the potential impacts of identified risk elements are among the most often used methodologies during an alternative analysis process. The process and calculations used to determine the alternative's risk level (i.e., high, medium, low) must be included in the AA backup documentation.

Risk Analysis

Some degree of risk always exists in alternative analysis recommendation. Procurement, project management, technical, testing, deployment, and on-going operational support areas may present risks to the selected alternatives. Alternative risks also include funding, accuracy and completeness of requirements, and political risks. Technical risks may involve the risk of meeting a performance requirement, but it may also involve risks in the feasibility of a design concept or the risks associated with using state-of-the art technology. The understanding of these risks evolves over time. The methods for identifying risk are numerous and any source of information that allows recognition of a potential problem can be used for risk identification.

Risk Analysis — Using the Risk Analysis Matrix

After the SMEs have categorized the selected risk elements, the rating of each risk element must be determined based upon the potential programmatic impact. This process is repeated until all the risk elements selected have been evaluated. The rating of the risk element is an estimate of the likelihood of the risk element actually happening and impact of the risk element being evaluated would have on the project if the risk was to materialize. After the risk elements in each of the three categories are evaluated, a composite rating is determined (i.e., low, medium, high). This activity is repeated until all the elements within the three risk categories (i.e., operational, technical, and integration) are examined. A Risk Analysis Matrix is a required element in the AA backup documentation.

Risk Adjusted Cash Flows - Sensitivity Analysis

Performing a sensitivity analysis is a component of risk analysis. Most of the basic inputs in a financial analysis are estimated or a forecast, resulting in a degree of uncertainty. These elements include all the major assumptions that are contained in the AA backup. This uncertainty may be reduced by assessing the sensitivity of the results to changes in key variables. Often a sensitivity analysis is included in the AA backup documentation for alternatives analysis that may result in a large financial commitment from PBGC. The number of sensitivity analyses should be consistent with the importance of the alternative being evaluated. The effect of changes in costs, savings, and other factors on an alternative that is economically justified may be calculated to establish the sensitivity of the expected returns to varying conditions. Sensitivity analyses are particularly helpful when benefits from an alternative may vary significantly based on assumptions or other factors.

Discount Rate

The discount rate includes the cost of borrowing and a risk factor, which varies with the type of AA project. The risk in capital investment relates to uncertainty about future inflation, obsolesce of technology due to changing technology, uncertainty concerning the life of the asset, interest rate volatility, and uncertainty in inflation and economic forecasting.

Risk may be reflected in the cash flow with a positive correlation, that is, the higher the risk the higher the discount rate.

Risk Response Control and developing options and fallback positions to permit lower-risk alternatives. To avoid risk is to avoid the potential failure consequence and/or its probability. There is no risk control if there are no provisions for handling the identified and quantified risk. The AA IPT must use established PBGC risk processes throughout various phases of projects, including the alternative analysis process, to reduce or control risks. As an example, risk avoidance may be reflected the alternative recommended.

Lessons Learned

After an alternative is recommended and deployment of a solution is complete, the IPT conducts a lessons learned analysis. Alternatively, the time to deployment may be elongated and the IPT may elect to conduct a lessons learned session upon the completion of the alternatives analysis. At a minimum, the lessons learned should cover what went well, what could have been conducted better and how the process, and standard can be improved. Project Managers should consider reviewing the accuracy of the cost estimates, benefits achievement, and identification of risks from the AA in comparison to actual events. The use of this information by new and future project managers and the institutionalization of successful risk mitigation solutions is often an undocumented activity, and its importance should not be discounted.

Performance Metrics

It is the responsibility of the sponsoring organization to establish with the AA IPT metrics (indicators and methods for data capture and reporting) that will be used to evaluate the recommended alternatives performance prior to and after solution implementation. Metrics belong to the sponsor, who is responsible for ensuring the collection of appropriate data and reporting of metrics to the appropriate governing authorities. The metrics answer the following questions for the sponsor:

- How well is the selected alternative performing versus planned AA expectations?
- Do actions need to be taken to ensure mid-course corrections to ensure benefits attainment?

The purpose of this is to establish recommended alternative relevant measurements that enable management to identify lessons learned and take corrective actions (as appropriate) in the preliminary implementation phase of selected alternative while determining the likelihood of achieving the savings or other benefits (i.e., customer satisfaction, improved productivity, etc.) identified in the AA. The metric(s) may also be used in after cost studies in conjunction with other traditional financial related indicators to evaluate the success of the project.

Process

The process for developing metrics consists of six steps:

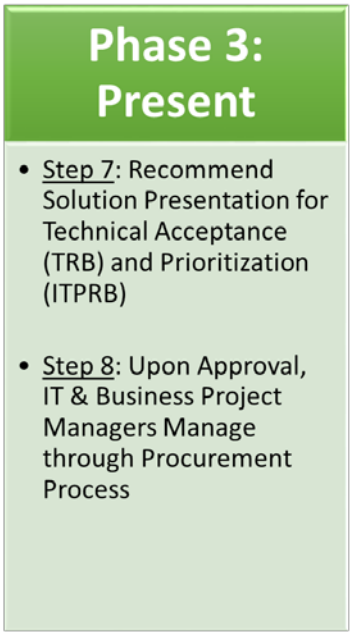
1. Identify the source(s) of benefits in the AA
2. Select and develop metrics that have a direct relationship with the source of the benefits and/or other indicators related to assumptions contained in the AA (e.g., workhours, training costs, productivity)
3. Gain consensus from applicable AA IPT stakeholders
4. Identify the data collection activity that will be required
5. Identify the database and systems where the metrics will be retained (if applicable) — for report generation
6. Incorporate the metrics into the AA
7. Establish measurements at intervals that allow useful judgments. Those intervals may include at 10 percent completion, 30 percent completion, and 70 percent completion, and solution implementation (i.e., deployment phases of the program). Consider statistical sampling or surveys if existing systems cannot provide the required metrics.
8. Describe how the measurement is made.
9. Identify the source of the data and the systems used to capture and generate reports.

Incorporation of Metrics into Alternatives Analysis

It is necessary to incorporate the appropriate metric(s) into the AA. Issues raised by stakeholders in the review and concurrence process must be resolved. Validation of the draft AA by the ITPRB will ensure that the proposed metrics are sufficient to provide corporate oversight of the program throughout implementation and post-deployment.

Step 6 Output: Comparative Cash Flow Statements and recommendation for deserted alternative(s)

Phase III: Present



Step 7: Recommend Technology Product or Solution - Present Findings for Viability and Technical Acceptance

The AA IPT presents their business need, criteria, requirements, analysis, and recommendation to the TRB for technical review and the ITPRB for capital planning and financial validation. The AA IPT follows the TRB Processes and Procedures to obtain TRB review and decisions. The outputs from this approach that are presented to the TRB are:

- Market Research and Identified and Analyzed IT product(s) or solution(s)
- Documented evaluation criteria and the resultant evaluation matrices

- Evaluation report documenting the methodology and the results of the approach
- Known weaknesses of each of the evaluated information technology

The AA IPT also presents the AA to the IT Portfolio Review Board. The ITPRB reviews the AA for accuracy and completeness (i.e. financial, cost estimate, research, and weightings accuracy and completeness), ensuring the analysis was objective and free of bias and meets the requirements set forth in the Alternatives Analysis Standard and Methodology. Once approved by the ITPRB, the alternative may be reviewed by the executive sponsor for approval. The recommended alternative may then be added to the IT Program Plan and be considered during the annual prioritization process and BPIT recommendations. If appropriate, it may be considered for re-programming of existing funds.

Step 7 Output: Technical Viability approval from TRB and financial approval from ITPRB

Step 8. Hand-off for Acquisition to IT and Business Project Managers

The AA IPT identifies the recommended technology solution based on an evaluation of each Alternative's ability to meet functional, technical and cost requirements identified in the Composite Scoring Sheet. Prior to the presentation to the TRB, the associated IT Program Manager or IT Service Division Manager must approve the presentation by sending an email to AskTRB email address. This is to ensure that the TRB is reviewing a management approved recommendations.

If the AA IPT identifies and recommends a single or multiple solutions or products, the results shall be presented to the TRB prior to engaging with the Procurement Department on acquisition activities. If multiple products or solutions are presented, the TRB has the authority to remove a product or solution from the final recommendation or deny the approval of any product or solution recommended.

The final acquisition approach is decided by the Procurement Department in consultation with IT, the business customer and the Office of General Counsel. It is recommended that the requirements and criteria developed during the Alternatives Analysis process be used by the Procurement Department during a subsequent competitive procurement. If the competitive acquisition process reveals a better solution that was not previously identified by the AA IPT, that product does not need to be presented to the TRB as long as the evaluation was based on established evaluation criteria and the Technical Evaluation Panel (TEP) includes members from EA, ECD and ITIOD. Simply having TRB members or their representatives on the TEP as TEP advisors is not sufficient.

Conclusion

The 8-step Alternatives Analysis approach guides the identification, analysis and recommendation of information technology products or solutions for PBGC. The procedures described in this document helps the acquisition process become more efficient and consistent in a manner that meets procurement and investment mandates. This Alternatives Analysis Standard and Methodology provides a consistent approach to ensure all stakeholders objectively determine the best possible alternative, approach, and cost of technology to fulfill PBGC's business needs.

Appendix I: Alternative Analysis Deliverable Outline

As part of required reporting, the investment must include the minimum criteria to be applied in considering whether to undertake a particular investment, including criteria related to the quantitatively expressed projected net, risk-adjusted return on investment, and specific quantitative and qualitative criteria for comparing and prioritizing alternative investments. IT investments should use the Federal Enterprise Architecture (FEA) to identify potential alternatives for partnering or joint solutions that may be used to close the identified performance gap. The following details must have been considered:

- A narrative description of the performance gap that each major IT investment is expected to address
- A description of the viable alternatives along with risk-adjusted life cycle cost and benefits estimates
- A Cost-Benefit Analysis
- A summary of how investment risks are reflected in the lifecycle cost estimate
- Identification of the alternative chosen and justification for selecting the alternative
- Description of the alternative solutions considered for accomplishing the agency or Business Areas strategic goals or for closing the performance gap that the investment is expected to address
- Summary of the results of the feasibility/performance/benefits analysis, with comparisons of the returns/benefits (financial and other) for each alternative
- Identification of risks that affect cost/benefit calculations
- Summary of the market research that was conducted to identify innovative solutions for this investment (e.g., used an RFI to obtain four different solutions to evaluate, held open meetings with contractors to discuss investment scope, etc.)
- Assumptions used to make estimates such as, past or current contract prices for similar work, (e.g., contractor provided estimates from RFIs or meetings, general market publications, etc.)

An AA is composed of a narrative section, exhibits, and required backup documentation. The complexity and projected investment amount of the alternatives determines the level of detail required. The AA must be concise, direct, and detailed enough to enable the reviewing and approving authorities to adequately assess the alternatives and recommendation. The following are brief descriptions of each required component of the AA in the order they should appear in the document:

Cover Page

The cover page includes the PBGC logo, the words ALTERNATIVE ANALYSIS, the name of the business need or solution, the preparation date and unit that is authoring the AA. The AA should be marked – PROCUREMENT SENSITIVE INFORMATION - to ensure confidentiality.

Signature Page

Signing the Alternatives Analysis document indicates agreement with the recommendation, concepts, assumptions, and operational and budgetary impacts. Signatures of acting managers for reviewing and approving officials are not accepted except in cases of long-term absence or for details that have

documented temporary change in authority. The signature page should conform to the following format:

PREPARED BY: *<Signature and date signed>*
<Typed name, title, and organization> Date

REVIEWED BY: *<Signature and date signed>*
<Typed name, title, and organization> Date

APPROVED BY: *<Signature and date signed>*
<Typed name, title, and organization> Date

In most cases the executive sponsor signs the APPROVED BY block. When a recommended alternative affects multiple approval levels or multiple functional areas, additional APPROVED BY signature blocks may be added. In some situations, an additional SPONSORED BY block may be necessary if more than one C-level business unit is sponsoring the recommended alternative.

Table of Contents

The table of contents lists each main heading and exhibit title and the beginning page number.

Executive Summary or Introduction

The AA for a solution or product determination begins with an executive summary or introduction that briefly highlights each major section of the AA. The executive summary or introduction must be detailed enough to convey an accurate understanding of the project. An executive summary usually runs 1 to 2 pages. If the AA narrative is less than 10 pages, a brief introduction may suffice.

Follow these guidelines when preparing the executive summary or introduction:

- Write this section after completing the rest of the AA.
- Avoid using technical terminology. Explain any terms that may be unfamiliar to the management or technical staff.
- Do not include any information that is not discussed in more detail elsewhere in the AA.

Background

The background section describes the business need, performance gap, problem or opportunity that requires the alternatives analysis. The background includes information needed to understand the business and technical issues, such as relevant history, what prompted the need for the analysis, the function(s) to be performed, and how the investment fits into the PBGC mission, strategy and IT strategic plans. Some of the following factors often cited are:

- Corporate strategies, goals, and objectives
- Efficiency or productivity improvements
- Service improvements
- Customer service enhancements
- Technological advances

- Solution obsolescence
- Elimination of support for an existing system
- Costs to maintain or upgrade an existing system
- Process re-engineering efforts
- Demographics (changes impacting revenue and volume growth)
- Safety, health, and environmental issues
- Capacity issues
- Avoidance of catastrophic failures
- Future or next phases
- Pilot site or prototype testing results
- Proof of concept results
- Review team findings
- Work group or functional recommendations (e.g., productivity improvements, or component changes)
- Outside consultant studies
- Inspector General reviews or audits

Alternatives

In the alternatives section, the AA IPT discusses and analyzes all viable solutions to the problem that were considered and that meet the requirements of the project. Clearly indicate which alternative is recommended, why the recommended alternative was selected, and how this alternative will solve the identified problem(s). If any alternatives were eliminated, explain why. In this section also address, if applicable, the costs of sustaining the existing systems (sustaining baseline), and include a net present value (NPV) analysis.

Market Research

Provide a summary of the market research that was conducted to identify innovative solutions for this investment (e.g., used an RFI to obtain four different solutions to evaluate, held open meetings with contractors to discuss investment scope, etc.).

Justification

The justification section identifies and explains how the alternative was investigated and the reasons for making the investment. The sponsoring organization must state and agree with the expected benefits to be derived from the recommended alternative.

Include the scope of the alternative, criteria, and considerations other than economics that were used in evaluating the options, along with the current status of the opportunity. Illustrations, tables, and references may be included.

Alternative Recommended

Describe the recommended alternative, using diagrams and illustrations as applicable. Explain any technical jargon and concepts so that someone who is not an expert in the field can understand the

recommended alternative. If features or attributes are cited, explain their relevance, importance, and benefit(s).

Recommended Alternative Benefits

The expected system benefits typically include factors such as the following:

- Provides a management tool to improve efficiency or decision making
- Improves PBGC fiscal posture
- Meets customer needs
- Provides service and productivity improvements.
- Improves working conditions (e.g., safety, health, and environmental concerns)
- Moves manual operations to an automated environment
- Improves downstream operations
- Reduces downtime and maintenance costs
- Avoids catastrophic failures
- Adds necessary functionality
- Satisfies a legal requirements

Use graphics and cite test results if they will provide a clearer understanding of the benefits.

Financial Analysis

The Financial Analysis section includes a discussion of economic issues that are relevant to the alternatives considered. If the alternative justification is based upon non-economic considerations, this must be clearly stated. If the sponsoring AA IPT completed multiple analyses, summarize those that are applicable to the recommended alternative (e.g., expected results, sensitivity, risk, break-even, minimum hurdle rate, and threshold, lower-bound, and upper-bound scenarios). The minimum hurdle rate is the minimum ROI acceptable to the approval authority for a given alternative. The lower-bound and upper-bound economic scenarios correspond to the minimum and maximum performance scenarios, respectively. Additional analysis may include payback period or total cost of ownership, and an NPV analysis comparing the baseline to the proposed alternative with projected cost avoidances.

Risk Assessment

In the risk assessment section of the AA, identify the technological, operational and integration risks of the proposed investment, and rank each risk as low, moderate, or high. Risk is a measure of the probability and consequence of not achieving a defined alternative goal. The risk section of the AA is used to identify the class of factors that:

1. Have a measurable probability of occurring
2. Have an associated cost or effect on the outcome

Risks are determined based upon a number of factors, including the maturity of the technology, experience with previous deployments, the results from any pilot or prototype tests, and the projected impacts on existing systems or operations. Include this type of information, if applicable, in the AA backup section.

Performance Metrics

Identify the specific metrics or indicators that will be used to measure the recommended alternative's performance during implementation and after deployment. These should be specific metrics that can be used to track actual system implementation and performance versus the projected operational and financial benefits cited in the decision document (e.g., improved worker productivity, improved customer service). See section x for details.

Financial Summary

Include a chart in the established format showing the total capital and expense investments, and the results from the cash flow analysis, including ongoing operational costs from baseline operations.

Recommended Alternative Financial Summary
#-Year Period
($ in thousands)*

Capital Investment	$ xx,xxx
Expenses Investment	$ xx,xxx
Total Investment	$ xx,xxx
Net Present Value	
Discounted at __%	$ xx,xxx
Return on Investment	xx.x%

** The minimum number of years depends upon the economic or technical operating life of the alternative recommended.*

Recommendation

In the recommendation section, briefly state in one or two paragraphs the recommended alternative, including the funding required, what will be delivered, and the major benefits that are expected to result from implementing the alternative. Include in this section only information that has been discussed in detail elsewhere in the AA.

Appendices

AAs should include the following appendices:

- Comparative Cash flows.
- Cash flow line-item descriptions.
- List of major assumptions.
- Roadmap (Gantt chart).

The following additional exhibits may be included if they serve to clarify the proposed investment and ensure a sound business decision:

- Net present value (NPV) analysis.
- Conceptual or logical charts and graphics.

- Service and productively improvements.
- Sensitivity analysis (if deemed necessary)
- Visualizations

Cash Flow Analysis

A cash flow is required for all PBGC alternative analysis. A cash flow analysis is used to itemize investment costs and benefits over the applicable analysis period (usually the investment period plus the standard service life of the technology or solution). This information is used to determine the return of investment and net present value that will result from implementing the approved alternative. Comparative cash flow statements are required. They are included as part of the backup documentation. The AA must include a cash flow for each scenario (i.e., threshold, upper-bound, and lower-bound).

Cash Flow Line-Item Descriptions

Use this exhibit to explain each line item in the cash flow analysis. Capital and expense investments, and costs or savings. Provide all costs, calculations, charts, and references as appropriate.

Major Assumptions

This exhibit lists the significant assumptions used in the analysis of the alternatives.

Roadmap

PBGC AAs must include a milestone chart that shows each major step to achieve the desired objectives and benefits. This roadmap will assist sponsoring senior executives in determine whether to approve the alternative based on the quality of the planning and the length of time to fulfill the identified business or performance gap.

Net Present Value Analysis

Where applicable, the AA should include an exhibit detailing the NPV analysis. An NPV analysis is typically used to compare the present values of mutually exclusive alternatives with the continuation of present, or baseline, conditions.

Appendix II: Criteria Considerations for Managed and Shared Services - Cloud and Non-Cloud Deployments

Technical criteria must be used when comparing managed services solutions – whether they are cloud or non-cloud services, federally or private sector hosted. This is to ensure there is a minimal threshold for these type of solutions to be minimally acceptable to operate in the PBGC environment. A TRB Review is required during the Planning Phase of the ITSLCM Framework.

Below are the criteria considerations:

Business Architecture

- What business processes are impacted by this solution? What are the up and downstream processes impacted?
- What existing application supports the same and adjoining business processes?
- Have the applications related to these business processes been analyzed to determine if there is a redundancy in function and/or data?
- Have business process models been developed to capture business processes?
- Are there external policies or PBGC directives that impact the solution?

Data Architecture

- What type of data are being sent and received by the solution?
- What are the interfaces to the solution?

Infrastructure

- Are any existing of new infrastructure products or services required for the implementation or ongoing use of the service?
- The IPT needs to list any products or technologies that will need to be purchased in order to complete the solution.
- If product(s) need to be purchased:
    - Costing: one-time purchase cost, yearly subscription renewals, other?
    - Is the product going to be a permanent addition to the TRM or will it be used temporarily and decommissioned? Time frame on decommissioning?
    - Licensing, security, other requirements?
- How are back-up and archiving handled?
- Is there a COOP / business recovery service option

Performance Requirements

- Scalability: Can the solution be expanded or reduced in size to meet business requirements?
- Reliability: Can the solution be failure-free, such as 24/7 or a specified period of time to meet business and performance requirements?
- Flexibility: Can the solution guarantee the level of reliability required by the business for performing consistently under both normal and adverse operational conditions?

- Performance: Does the solution meet the performance metrics required by the business? (e.g. ability to quickly route HTTP traffic, handle SSL sessions, return a 3rd party service call, etc.)
- Manageability: Does the solution contain the instrumentation or tool to be proactively managed?

Information Security

- Is the service/solution currently provided by a PBGC's common control service provider?
- Has the service/solution been approved by the business area representative, and an IT Compliance Checklist has been completed?
- Does this system process, store or transmit any sensitive data such as PII that requires special protection such as encryption in database or in transit?
- Will a PIV-card solution be used for the identification and authentication? If not, how will access and authorization be managed?
- Is this solution FedRAMP approved? If not, is there an ATO approved by another Federal agency?

Compliance

- Does the User interface comply with the Americans with Disabilities Act (ADA) Section 508?
- Is Section 508 Accessibility testing conducted or planned? Are the results documented?

Post Deployment management

- How is Help Desk Tiers 1, 2, and 3 handled? Are the service level documented and if so what are they?
- Has an exit strategy been documented?
    - What is the timeframe allowed for exiting the services?
    - Is there a cost to exit or recover data?