

VALUE MEASURING METHODOLOGY (VMM)

FREQUENTLY ASKED QUESTIONS

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VMM FREQUENTLY ASKED QUESTIONS

1) What types of projects are VMM used for?

VMM may be used to assess and compare the value, risk and cost associated with any investment including those associated with programmatic or organizational changes, policies, and regulations.

2) How will VMM help in generating the OMB Exhibit 300?

The strategizing, planning and analysis associated with VMM are critical to selecting and justifying investments. Specifically, the efforts associated with VMM (both the process and products) satisfy or lay the groundwork for the planning and analysis that must be summarized in the OMB Exhibit 300.

Part I – Capital Asset Plan and Business Case (All Assets)	
Summary of Spending	Fully Addresses
Project Description and Justification	Fully Addresses
Performance Goals and Measures	Fully Addresses
Program Management	Supports
Alternatives Analysis	Fully Addresses
Risk Inventory and Assessment	Fully Addresses
Acquisition Strategy	Supports
Project and Funding Plan	Supports
Part II – Additional Business Case Criteria for Information Technology	
Enterprise Architecture	Supports
Security and Privacy	Supports
GPEA	Supports

As noted above, the 4 steps in VMM will fully address many sections of the Exhibit 300 while “supporting” others. A key part of the 4 steps in VMM is identifying and defining value measures. Through this process, technical and functional requirements for the proposed system are generated. These requirements “lay the groundwork” for other sections by providing important “supporting” information such as: how the project will need to be scheduled, what expertise is needed from a vendor, security issues that will be raised, and enterprise architecture implications of the system.

3) Which parts of VMM are critical?

All decisions can be deconstructed into three critical areas: value, risk and cost. VMM has been constructed to ensure that each of these areas are defined, analyzed and compared in quantitative terms. Therefore, there is no one aspect of VMM that should be considered optional when it is being used to support an investment decision. However, if an organization has already established analytical methods (e.g., cost estimating approaches, ROI calculations) that are working, they may incorporate those techniques into the VMM framework.

There are a number of suggested tools and steps incorporated into VMM that an organization might opt to omit:

- **Use of an Automated Decision Support Tool (e.g., Expert Choice):** Organization's may opt to prioritize measures and value factors without using an automated tool. If this is the case, it is highly recommended that a trained facilitator run the sessions during which the prioritizations will occur.
- **Performance of Uncertainty / Sensitivity Analyses Using Monte Carlo Simulations:** In order to perform thorough uncertainty and sensitivity analyses, it is necessary to conduct Monte Carlo Simulations using a software tool (e.g., Crystal Ball). If a decision is made **NOT** to perform Monte Carlo Simulations, the confidence in cost estimates and value projections is likely to be significantly lower than if they had been conducted.
- **Construct a Value/Risk/Cost Computer Model:** Popular software products such as Excel provide the functionality required to build models that range greatly in complexity. Use of a value/ risk/cost model is likely to have a significant impact on the transparency of calculations, confidence in estimates (e.g., running Monte Carlo simulations) and flexibility (e.g., ability to quickly determine the affect of changes in specific variables). It is, however, possible to calculate cost estimates, value estimates and scores and risk scores without the aid of specialized software or skilled modelers.
- **Develop and Incorporate Cost and Risk Tolerance Boundaries:** The process of developing and communicating risk tolerance boundaries provides senior management with the opportunity to explore and articulate a range of acceptable cost and value risk. Senior management may also use risk tolerance boundaries as an aide in the development of a balanced investment portfolio. The absence of risk tolerance boundaries should not impede sound decision-making regarding investments at the program/project or portfolio level. However, without insight into the tolerances of senior management, program-level managers may either restrict innovation for fear of the denial of funding or, conversely, propose investments that are considered too risky to be funded.

4) **What role does an Investment Review Board have in VMM?**

The fundamental role of an Investment Review Board is to make recommendations regarding the selection of initiatives for new or on-going funding. Typically comprised of senior program, financial, and information managers, this group of individuals has an enterprise-wide view of their organization. If VMM is used by an organization to assess their investments, the IRB, or its representative(s), should concur with or participate in:

- Prioritization of the Value Factors
- Identification and definition of "standard measures" (organization- or portfolio-wide)
- Determination of the cost and risk tolerance boundaries
- Review of and validation of assumptions and basis of estimates for both value and cost
- Identification and definition of value measures (specifically those for the Government Financial and Strategic Political Value Factors)
- Review outputs of analysis to select proposed initiatives to:
- Create a portfolio that contains the most advantageous mix of investments (based on business needs, political imperatives, performance, risks and cost)

- Identify opportunities for the simplification and unification of processes, policies and systems
- Utilization of the decision framework to monitor the on-going performance and management of investments.

5) What is an example of a decision tool and facilitator to use when prioritizing the value factors?

Expert Choice is an Analytical Hierarchy Process (AHP) tool that could be used to aid in the prioritization process. The facilitator chosen to lead a prioritization working session should be skilled in leading group discussions. If Expert Choice is being used, the facilitator should also be familiar with operating the tool and with AHP.

6) When prioritizing the value factors, what if an AHP tool is not available?

An AHP tool is recommended to facilitate the prioritization process. However, if such a tool is not available, it is recommended that the prioritization take place during a facilitated working session during which consensus may be reached regarding the relative importance of the factors or measures being considered. The importance of the quality of the facilitator should not be under-estimated. A successful prioritization process will be very productive and provide an opportunity for team building. A poor process could be very contentious and divisive. During these sessions it is important that all opinions be freely expressed and debated and that each individual feels “heard.” The best way to ensure a positive outcome is with the aid of a trained and objective facilitator.

7) How do I compare the rankings of VMM to already existing ranking systems that include different evaluation factors?

There are two ways in which this may be handled:

- 1) **Replace The VMM Value Structure With Existing Evaluation Factors.** This should be done with extreme care. The Value Factors were identified based on input from the public and private sectors and academia. If it is replaced, it is critical to ensure that the five perspectives represented by the Value Factors are represented by the organization’s established evaluation criteria. (Note: The definition of existing evaluation criteria may need to be refined if they have not been articulated in quantitative terms.)
- 2) **Organize Existing Criteria to “Fit” the Value Factors:** It is likely that the evaluation criteria can be categorized or “fit” into the VMM Value Factors. The process of matching the criteria to the factors will ensure that the full range of value has been considered.

QUESTIONS RELATED TO OMB EXHIBIT 300 PART I A: PROJECT DESCRIPTION

8) Why are assumptions important in documentation?

Assumptions set the groundwork for projecting, analyzing and defending value and cost estimates, as well as risk assessments. The earlier in the development of an initiative, the more assumptions will have to be made. By documenting all assumptions, an organization is “armed” with the information required to adequately defend its analyses and, by extension, its investment decisions. In addition, the comprehensive documentation of assumptions ensures the accurate and complete transfer of knowledge over time and among employees.

QUESTIONS RELATED TO OMB EXHIBIT 300 PART I B: JUSTIFICATION

9) Why is important that IT initiatives have sufficient justification?

Sufficient justification of IT initiatives is required for:

- Sound stewardship of taxpayer funds.
- Ensuring that IT initiatives will produce the desired results.
- Inclusion in the President’s Budget.
- The creation of a foundation for the management and evaluation of investments.
- Compliance with the Clinger Cohen Act and Circular OMB A-11

10) What is the difference between cost savings and cost avoidance?

- **Cost Savings** (Reduce spending from its **CURRENT** level should an alternative be implemented)

Cost savings are calculated by determining the difference between the current budget levels and the cost of alternatives. The following is a list of possible cost savings:

- Potential reduction of staff hours.
- Elimination or reduction of costs associated with paper processes, such as postage and printing.
- Elimination or reduction in the operation and maintenance of brick & mortar facilities.
- Elimination of redundant or outdated systems.

- **Cost Avoidance** (Avoid spending increases in the **FUTURE** that would otherwise be incurred)

The future costs avoided by using an alternative method to provide a service or a conduct a business process (compared to the Base Case). The following is a list of possible cost avoidance:

- Avoid the cost associated with increasing the size of the workforce due to increased demand by implementing a self-service initiative.

- Avoid the cost associated with expanding IT infrastructure due to increased demand by implementing a scaleable web-based system.
- Avoid the costs associated with leasing additional facilities to serve increased demand by moving services on line.

Resources that are identified to be saved through either Cost Savings or Cost Avoidance as a result of the proposed IT investment should be reflected in other agency strategic plans such as the Human Capital Plan. Agencies must answer the question of how the saved resources will be utilized or transferred to produce additional performance improvements.

11) What are the environmental drivers required for estimating costs and projecting value?

Environmental drivers may include:

- Number of users
- Demand Forecasts
- Workforce retirement / Attrition projections

QUESTIONS RELATED TO OMB EXHIBIT 300 PART I C: PERFORMANCE GOALS AND MEASURES

12) How can I further define the value factors?

During the working session to prioritize the Value Factors, the definition of each should be reviewed and validated, and if necessary refined to meet the specific mission of the organization. In order for the prioritization process to be effective, all those involved in the prioritization process must define the Factors in the same manner.

The way in which value in each factor is defined for a specific initiative is articulated through the definition of the value measures.

13) What is the objective of identifying measures?

The value measures define value in each of the Value Factors. They provide information to guide the following:

- Development of functional and technical requirements for a possible future statement of work for the chosen alternative
- Articulation of Outcome-Based Requirements
- Definition, Assessment and Comparison of Alternatives
- Communication of Value
- Roadmap during Implementation
- Evaluation of Performance

Simply stated, value measures, which may be considered synonymous with selection criteria, performance measures, outcome measures, or evaluation criteria, are the foundation for achieving and demonstrating results.

14) What is meant by the Strategic/Political value factor?

True to its name, the Strategic/Political Value Factor captures benefits that are both strategic and political in nature.

- **Strategic Value** is realized when an investment moves an organization toward efficiently and effectively meeting its mission through the achievement of specific organizational strategic goals and working toward the realization of the government-wide goals set forth in the President's Management Agenda. For example, does the investment help an organization become more "citizen-centered" by unifying like services provided to the same target audience by multiple organizations across government (e.g., government loans, services to retirees and veterans)?
- **Political Value** is realized when an organization fulfills specific legislative mandates or direction from senior agency management

15) Can you explain more about segmenting Direct User Value?

There are three primary reasons why it is important to segment value measures in the Direct User Value Factor by user type:

- **Value Is Defined Differently by Different Types of Users**
- **Benefits Are Prioritized Differently by Different Types of Users**
- **Targeted Allocation of Resources:** Understanding the relative importance of delivering value to one group over another can help guide implementation schedules or funding allocations.

Additionally, effectively segmenting Direct User Value will enable the identification and definition of Value Measures and therefore Performance Measures that allow you to write specific functional and technical requirements for the chosen alternative in a statement of work.

16) How should I state performance goals? How do I create good value measures? What is the difference between a measure and a metric?

Within the context of VMM, value measures are used to define desired performance or benefits in a particular Value Factor. For that reason, the terms performance goals and value measures may be used interchangeably.

As part of the Federal Enterprise Architecture (FEA), the Performance Reference Model (PRM) is a standardized performance measurement framework for the different business lines within the Federal Government as defined in the Business Reference Model (BRM). Version 1.0 of the PRM defines common performance indicators in the areas of "Inputs", "Outputs", and "Outcomes" across Government. Starting with FY05 submissions, Exhibit 300s will be required to identify at a minimum, one performance indicator in each of 4 areas: 1) Technology 2) Process and Activities 3) Mission and Business Results, 4) Customer Results. (For more information on the FEA and PRM see www.feapmo.gov) However, Exhibit 300 submissions are not limited solely to the PRM performance metrics and in many cases an IT alternative will offer other performance improvements. In those cases, in the context of VMM, additional value measures are identified and defined.

Each value measure is defined in terms that describe the desired outcome as well as the outputs that will lead to that outcome. As noted in the table below, metrics are an important part of the 4-part definition of a value measure.

Concise Illustrative Name	“Plain” language that encompasses the full breadth of the measure
Brief Description	Stated in the form of a question or statement. Provides enough information to ensure that any reader will be able to understand exactly what is being discussed. Avoid technical jargon and unnecessary detail.
Performance Metric	The means used to measure how an initiative is performing in a particular area. The metric should answer the question: “How will we know that the stated value has been achieved?”
Target / Normalized Scale	A target represents the level of desired performance. Ideally, targets are selected through a review of benchmarks, government-wide and agency planning documents and expert opinion. The normalized scale allows for both objective and subjective measures to be translated onto a single scale, allowing for the aggregation and comparison of value scores.

Note that by defining the value measures in this fashion, both expected outcomes (the name and description) and outputs (performance metric and target) are clearly articulated. In addition, this approach requires that all value – financial or non-financial – be defined in QUANTIFIABLE terms. Defining value measures in this fashion provides managers with criteria against which decisions may be made, value communicated, and on-going performance evaluated and managed.

For more information regarding the development of sound measures and metrics, refer to pages 30 – 34 and 94 – 98 of the *VMM How-To-Guide*.

17) What are the levels of standardized measures?

Standardized measures may be used at the following levels:

- Government-wide: Measures defined by OMB that must be applied to all government initiatives.
- Agency-wide: Measures defined by the senior management of an agency that must be applied to all agency initiatives.
- Portfolio-wide: Measures defined by the portfolio managers of each focus area that must be applied to all initiatives within that focus area.

18) Can you define the government-wide measures stewardship of public funds, prevention/detection of fraud waste or abuse, and government accountability (p.97)?

To accurately define these value measures, it would be necessary to have an understanding of the initiative under consideration. Therefore, the following are to be considered illustrative:

Concise Illustrative Name	Stewardship
Brief Description	Limited use of software customization Unification of like systems across Government
Performance Metric	Target
% of software customization	10% Customization
Number of government systems providing the same service	0
Concise Illustrative Name	Fraud / Waste / Abuse
Brief Description	Prevention and detection of fraud, waste and abuse
Performance Metric	Target
Implementation of fraud detection software	Yes
% resolution of detected fraud / year	95%
Concise Illustrative Name	Government Accountability
Brief Description	Transparency of government financial management and practices
Performance Metric	Target / Normalized Scale
Clean annual financial audit	Yes

19) How many metrics should be used in evaluating measures?

The goal of defining metrics is to provide a mechanism(s) to determine whether value in a specific area is being realized. Therefore, there is no rule regarding the number of metrics to evaluate a particular measure. As metrics are being identified, analysts may want to keep the following in mind:

- The need for many measures may indicate that the scope of the measure is too broad or the definition of the measure requires refinement.
- Metrics are helpful only if they can be used. Consideration should be given to whether an organization will be able to collect the required information.
- Metrics should directly reflect the value under consideration. For example, if citizens want to spend less time conducting a transaction with the government, the most appropriate metric may be the number of hours required to complete the transaction. If, however, the value being measured is the cycle time of a transaction conducted solely by government employees, the most appropriate metric may be the numbers of hours to complete the transaction multiplied by the average hourly wage of the employee.

20) What is the definition of a normalized scale?

A normalized scale is used to translate varying units of measure into a single scale allowing for aggregation and comparison of subjective and objective measures. Typically the normalized scale used when applying VMM ranges from 0 (low) to 100 (high). Remember, regardless of the scale chosen scale (e.g., 0-100, 0-10, etc.) it must be used consistently.

21) How does the normalized scale translate to a percentage of possible value?

If the ultimate target for a metric is set at 100 on a scale of 0 – 100, it is possible to determine what percentage of value is being realized.

<ul style="list-style-type: none">• Metric: number of customers served• Target: 10,000• Scale: 0 – 100 (10 points for each 1,000 customers served)		
Projected Performance	Translation onto Scale	% of Possible Value
Alternative A is expected to serve 3,000 customers.	30	30%
Alternative B is expected service 10,000 customers	100	100%
Alternative C is expected to serve 5,500	55	55%

22) How should the normalized scale be used with standard Likert Scales of 5,7, or 9 levels often used with surveys?

The Likert Scale measures how strongly an individual agrees or disagrees with a statement on a five-point scale similar to the one below:

- 1 Strongly disagree
- 2 Somewhat disagree
- 3 Undecided
- 4 Somewhat agree
- 5 Strongly agree

If the decision was made to use this method for predicting performance, the 1 - 5 scale should be translated into the normalized scale chosen for the assessment. For example, if the scale chosen was 0-100 and it was determined that a minimum value would be “Somewhat Disagree” and full value would be achieved with “Strongly Agree,” the Likert scale may translate as follows:

- Likert Score 1 = Normalized Scale 0
- Likert Score 2 = Normalized Scale 25
- Likert Score 3 = Normalized Scale 50
- Likert Score 4 = Normalized Scale 75
- Likert Score 5 = Normalized Scale 100

It must be noted that this type of metric would not be preferred using VMM. It is recommended that organizations focus on developing metrics that provide the means to measure activities that will result in the realization of a value rather than to judge attitudes.

23) How do you prevent double counting of value?

Each of the Value Factors represents a different dimension of value as seen from a specific perspective. When developing the value measures, that perspective must be kept in mind. There may be instances when the same metric is used to measure value in different Value Factors, however, the value measures or outcomes associated with the metric will be different. For example:

Value Factor	Value Measure	
	Measure	Metric
Direct User (citizen)	Timely Response from Help Desk	Average # of hours from help request to problem resolution
Operational Foundational	Help Desk Response Time	Average # of hours from help request to problem resolution

The area in which this task becomes most difficult is when determining whether value should be captured in the Government Financial Value Factor or in the Government Operational Foundational Factor. In these instances it is critical to consider whether the operational improvement will translate into a financial cost saving or avoidance to the government. Additionally, consideration should be given to the way in which value is captured in the direct user category when the user is a government employee. For example, consider whether reducing the cycle time of a particular function is a value to the employee, an operational value, or a value that leads directly to a financial savings for the government.

QUESTIONS RELATED TO OMB EXHIBIT 300 PART I E: ALTERNATIVES ANALYSIS

24) When does project value need to be reexamined? When is a revised alternative analysis necessary?

The requirement to submit an OMB Exhibit 300 each year for all e-Government initiatives (new or existing) on an annual basis compels organizations to examine the value of their initiatives on an annual basis. Although this does not necessarily mean that the analysis of alternatives should be completely re-done, it does require that the analysis of alternatives be re-examined. This effort should be used to determine whether changes in technology, the federal environment, or the needs of those being served has brought about new challenges or opportunities. In other words, have these changes created a new gap between the current initiative and requirements or have these changes created the opportunity for additional efficiencies and greater effectiveness? If it is determined that these changes have occurred, a new analysis of alternatives may be warranted. The rate of technological change makes implementing 'state of the art' essentially impossible. Additionally, a small change in user need may not create a substantial new opportunity. Therefore, to determine if a new alternatives analysis is warranted, project teams must consider the incremental improvements on projected performance measures and value along with the associated costs based on the new technology or user need.

Additionally, organizations should consider whether initiatives are realizing the planned financial and non-financial benefits, including meeting planned schedule and cost goals. If they are not, an evaluation must be conducted to determine where problems exist and

how they may be remedied. This too will likely require the performance of an analysis of alternatives.

Although the submittal of the OMB Exhibit 300 occurs on an annual basis, it is strongly recommended that all initiatives be re-examined on an on-going basis. This will help organizations ensure:

- The timely consideration of changes in requirements (e.g., changes in policies, organizational structures, priorities) and supporting technologies that may impact the efficiency and effectiveness of an investment.
- The timely identification and resolution of issues related to underperformance (e.g., failure to meet cost and schedule goals, failure to value projections).

25) How should I go about identifying alternatives?

When developing the decision framework (VMM Step 1), a list of value, risk and cost elements are identified. This list should be used by a multi-disciplinary team as an inventory of outcome-based requirements that should be satisfied by the alternatives. For example, the alternatives must consider the people, processes and technology required to ensure that the value sought by direct users is realized to the maximum extent possible. The alternatives must also incorporate risk mitigation strategies that – to the greatest extent possible or practical – mitigates the risks identified in the initial risk inventory.

26) What is the “base case”?

The base case is a projection of what will happen if current systems and processes are maintained over time. Unlike the status quo, which is a snapshot of a single point in time, the base case reflects the impact of changes such as demand, workforce (e.g., retirement, attrition) and technology. In the case of some cross-agency e-Government initiatives, the base case may represent what will happen if organizations continue to provide services in a patchwork of incompatible, disparate solutions. Keep in mind that no matter whether an investment represents a completely new service or the modernization of an existing service, there is ALWAYS a base case.

QUESTIONS RELATED TO OMB EXHIBIT 300 PART I H: PROJECT AND FUNDING PLAN

27) How can I make sure that value and cost are estimated accurately?

The only thing that is certain about estimating the value or cost of an investment is that it will not be **exactly** accurate. The only way to determine the exact cost and value of an investment is to calculate it retrospectively.

However, through the process of adjusting costs and value by risk, a much more realistic estimate is produced. VMM adjusts costs and value by estimating the probability of each risk occurring by alternative, and then the resulting effect on cost to each cost element or, on value to each value measure. Through this process a Risk Score is produced along with risk adjusted cost and value figures. This information will not only give you a more accurate cost and value estimation, but also give you another measure by which to compare alternatives.

Additionally, there are several steps organizations may be take to ensure confidence in cost and value estimates:

- **Planning and Definition.** The more complete the definition of an initiative and supporting plans, the more likely all elements of cost and value will be captured.
- **Holistic thinking.** Consider the people, processes, and technology associated with the initiative.
- **Structure.** If the decision framework has been carefully established, it will provide a complete and comprehensive framework for estimates, reducing – if not eliminating – repetition and redundancy.
- **Good Data.** The adage “garbage in / garbage out” certainly applies to estimating costs and value. Use the best, most up-to-date data information possible.
- **Ranges.** If the exact value of a cost element or variable impacting cost is known with 100% certainty, a point value should be used. However, if there is uncertainty regarding this value, a cost range should be used. The greater the uncertainty of the value, the broader the range will be.
- **Uncertainty Analysis.** By conducting an uncertainty analysis, it is possible to increase confidence in estimates by determining the most likely or expected value of cost elements or variables.
- **Sensitivity Analysis.** A sensitivity analysis will provide insight into which uncertain costs or variables have the greatest impact an investment. This information can be used to determine the merit of performing additional research or analysis.
- **Support and Documentation.** The greater level of consensus reached regarding the *basis* of the estimates (e.g., the value measures, the cost element structure, the risks, assumptions, drivers) the greater support and confidence there will be in the final estimate.

**28) How do I make a basic cost structure vs. a tailored cost structure?
Can the cost structure be modified?**

A basic cost structure or standard cost structure refers to a cost element structure (CES) that contains the standard elements of cost. An analyst may find a standard CES from the OSD PA&E, within ACE-IT, and MIL HDBK881 and cost estimating handbooks released by NASA, SPAWAR, and the Army and Navy Cost Analysis groups.

Using a standard CES as a starting point, a tailored CES is developed. This is done by reviewing each element of cost against the requirements of the alternatives under assessment. Some elements on the basic CES may need to be removed, while others may be added. For example, it is unlikely that a standard IT CES will include cost elements associated with public outreach or marketing. However, a citizen facing e-government initiative may indeed require that resources be expended on making citizens aware of the “new” e-Government service. Failure to consider this type of effort could result in failure to realize value projections and / or the need to request additional funding.

29) (HUD Step 1, Task 3, p.42) What is the difference between a fixed and variable cost?






Fixed Cost(s)	Costs that do not vary with the volume of business
Variable Cost(s)	Costs that change with the rate of production of goods, production quantity, or the performance of services.

30) Explain the Monte Carlo simulations

Monte Carlo simulations were named after the city of Monte Carlo, Monaco, which is known internationally for its casinos. Monte Carlo simulations act similarly to a slot machine, which randomly selects a series pictures and numbers every time a level is pulled. Similarly, when a Monte Carlo simulation is conducted, numerous scenarios of a model are calculated by repeatedly picking random values from the input variable distributions for each "uncertain" variable (including values of individual cost elements and other cost and value drivers). Typically, a simulation will consist of 2,500 to 10,000 iterations. The estimate distributions provide the decision-maker with a range of possible outcomes and bounds, with a minimum and maximum value. (The input variable distributions and value and cost estimate range is provided with each alternative analysis.)

31) How do you select the appropriate distribution curve? Why is the triangular probability distribution frequently used?

As seen in the table below, there are a few different types of probability distributions that may be used when performing an uncertainty analysis.

<p>Triangular</p> <ul style="list-style-type: none"> • Defined by least, most likely, and high values. • Good when data is limited. • Easily skewed lower or higher. 	<p>Normal</p> 
<p>Normal</p> <ul style="list-style-type: none"> • Natural phenomenon (e.g. inflation) 	<p>Triangular</p> 
<p>Lognormal</p> <ul style="list-style-type: none"> • Values are positively skewed • Values cannot be negative • Example: pay scales 	<p>Lognormal</p> 
<p>Uniform</p> <ul style="list-style-type: none"> • All values in range are equally likely 	<p>Uniform</p> 
<p>Custom</p> <ul style="list-style-type: none"> • Represents unique situations 	<p>Custom</p> 

The selection of the appropriate probability distribution depends in large part upon the information available. As can be noted from the table above, the triangular probability

scale provides the greatest level of flexibility. It is typically used when little is known about the distribution and can be completely defined by the lowest possible value and the highest possible value. By skewing the distribution, it is possible to compensate for the natural tendency to underestimate cost estimates and overestimate value projections.

QUESTIONS RELATED TO OMB EXHIBIT 300 PART I F RISK INVENTORY AND ASSESSMENT

32) Should the impact of risk be quantified by adjusting the ranges for value and cost factors?

Although uncertainty is a type of risk, in the VMM context ranges in lieu of point estimates is not recommended in order to account for other types of risk, but to improve confidence in cost estimates and value projections. By using ranges and conducting uncertainty analyses on both cost and value, it is possible to determine the most likely or expected cost and value. With VMM, risk is assessed and quantified through the performance of a risk analysis through which the impact and probability of identified risks on cost (driving cost up) and value (lowering performance) are determined. The final outputs of these analyses are a risk adjusted expected cost and risk adjusted expected value score. (It should be noted that OMB requires that cost estimates presented in the OMB Exhibit 300 be adjusted for risk).

33) What are examples of actions to mitigate risk?

Risk mitigation strategies must directly address the risks associated with a particular project and reduce its affect on a specific alternative. OMB Circular A-11 provides a list of options (summarized in the table below) for the treatment of risk:

- **Transfer:** Consider transferring the risk to a third party when appropriate and necessary. In this case a third party may be contractors, service providers or partners.
- **Avoidance:** The risks associated with an alternative may be so great, that the most prudent course of action would be the elimination of the alternative from further consideration.
- **Reduction:** Take the measures necessary to minimize the likelihood that it will occur, minimize the damage to program goals should it occur (e.g., contingency plans), or both.
- **Assumption:** Assume risks that cannot be managed by the contractor or service provider. This should only be done if the agency is confidence that it will be able to absorb that risk should it be necessary.
- **Sharing:** If an agency and contractor cannot assume the full burden of a risk, it may be necessary to distribute the risk between the two entities.

The table below provides a sample of risks and associated mitigation strategies. (Note: There is no one size fits all mitigation strategies! Consideration must be given to the particular needs, objectives and limitations of the initiative under consideration.)

Risk Type	Mitigation Strategy
Project Resources/ Financial	<ul style="list-style-type: none"> • Cost estimates prepared by neutral third party • Sound acquisition plan: competition, modular contracting, financial incentives for contractor performance, distribution of risk between contractor and the government • Project management: earned value management mechanisms
Technical/ Technology	<ul style="list-style-type: none"> • Maximize use of COTS/GOTS • Open competition • Piloting/prototype testing
Business/ Operational	<ul style="list-style-type: none"> • Cross-organizational/government involvement • Consistency with EA • Proven integrated management team • Consistency with FEA
Organizational and Change Management	<ul style="list-style-type: none"> • Outreach/communications plan • Employee involvement in the planning process • Training and implementation schedule • Incentives to use new system • Thorough, accessible, and effective training • Responsive support functions • Proven program management leadership • Phased implementation • Support of agency leadership
Data/ Information	<ul style="list-style-type: none"> • Data warehouse/backup • Process mapping • Leverage existing government data collection efforts
Security	<ul style="list-style-type: none"> • Implement a security plan • Consistency with applicable standards • Authentication method matching risk level
Strategic	<ul style="list-style-type: none"> • Cross-organization/government effort • Investment goals mapped directly to the PMA and organizational strategic plan • Consistency with FEA
Privacy	<ul style="list-style-type: none"> • Authentication • Controlled access channels and authorization policies • Firewalls

34) Can you clarify the risk scale with a “real world” example?

The risk scale is used to translate qualitative assessments of the impact and probability of risk into quantitative assessments of risk. For example, using inputs including professional judgment and business best practices, an organization may have established the following risk scale:

Risk	Probability	Cost Impact	Benefit Impact
High	50%	25%	-25%
Medium	30%	15%	-15%
Low	25%	5%	-5%

▲ Likelihood the risk will occur

▲ Impact of risk causes:

- Cost to Increase
- Benefits to Decrease

The following is a greatly simplified example of how this scale may be used on a project with only one risk and a:

- Expected Cost (PV) = \$10,000
- Expected Value Score = 90

Narrative assessments of the affect of risk on cost and value are translated using the risk scale.

Risk Factor	Affect on Cost Narrative		Affect on Cost Quantitative		Affect on Value Narrative		Affect on Value Narrative	
	Probability	Impact	Probability	Impact	Probability	Impact	Probability	Impact
Failure to maintain schedule	Medium	High	30%	25%	Medium	Medium	30%	-15%

Risk – adjusted cost estimates and value scores are calculated.

	Probability	X	Impact	X	Expected Cost/Value	=	Change Due to Risk	Risk-Adjusted Cost/Value
Cost	30%	x	25%	x	\$10,000	=	\$750	\$10,750
Value	30%	x	-15%	x	90	=	-3.4	86.6

35) Which risks have the greater likelihood for e-services?

The risks associated with an e-Government initiative are likely to be the same as those related to other IT or non-IT investments, but with greater potential impact or probability. For example, the potential increase in efficiency and effectiveness associated with the use electronic delivery channels may also expose an initiative to much higher privacy/security risks than those associated with paper-based processes. Additionally, risks associated with organizational change may also be increase in scope and magnitude when initiatives span across multiple business units or agencies.