

***The Guide to the
Business Analysis
Body of Knowledge®***

Version 2.0

Draft for Public Review

A Guide to the Business Analysis Body of Knowledge®

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Chapter 1: Introduction

1.1 What is the Business Analysis Body of Knowledge?

The Business Analysis Body of Knowledge® is the sum of knowledge within the profession of Business Analysis and reflects what is considered currently accepted practice. As with other professions, the body of knowledge is defined and enhanced by the business analysis professionals who apply it. The *BABOK*® describes Business Analysis areas of knowledge, their associated activities and tasks and the skills necessary to be effective in their execution.

This guide provides a basic reference for anyone interested in the profession of Business Analysis. This includes, but is not limited to:

- Senior Executives
- Managers of Business Analysis Professionals
- Business Analysis Professionals
- Project managers
- Educators and Trainers teaching Business Analysis and related topics
- Consultants and other specialists in Business Analysis

The primary purpose of this guide is to identify the Business Analysis Knowledge Areas that are generally recognized and accepted as good practice. The Guide provides a general overview of each Knowledge Area and the list of activities and tasks associated with each.

The BABOK is intended to describe and define business analysis as a discipline, rather than define the responsibilities of a person with the job title of business analyst (which may vary significantly between organizations). Business analysis may be performed by people with job titles such as systems analyst, process analyst, project manager, product manager, developer, QA analyst, business architect, or consultant, among others.

1.1.1 Purpose of the Public Review Draft

This document represents a complete draft of version 2 of the knowledge areas contained in the *Guide to the Business Analysis Body of Knowledge*. This draft is being made available to the business analysis community to gather feedback on the content and quality of this material in order that the IIBA™ may assess the current state of the draft and make decisions about which changes should be included in the final release of version 2.

The public review will be conducted between March 31, 2008 and May 15, 2008. During this time, this draft of the *BABOK* will be available for download from the IIBA's website at <http://www.theiiba.org/BABOK2>. We ask that members of the business analysis

community or those with an interest in business analysis, whether or not they are members of the IIBA, provide the IIBA with feedback regarding the quality and content of this draft at <http://www.theiiba.org/BABOK2/survey>. The survey will request that you provide us with a rating of the quality of each task, technique, and competency, and provide you with an opportunity to suggest additional tasks and techniques that might be missing from this draft. You may also provide feedback directly to bok@theiiba.org, although we regret that we will be unable to respond directly to such feedback.

Following the completion of the public review, the IIBA will conduct additional surveys to assess the importance of each task and technique to the business analysis community in order to make a final determination of the content that will be included in the final draft.

In conjunction with the public review, we are conducting practitioner and expert reviews which will provide us with additional qualitative feedback on the content and quality of this release. When all of the reviews are complete, we will begin revising the text of the BABOK to include the changes suggested by the community, with the final release of version 2 targeted for the third quarter of 2008. The CBAP™ exam will continue to be based on version 1.6 until the final release of version 2. Once version 2 is generally available, the IIBA will announce a date for conversion of the exam.

In addition to addressing issues identified through this feedback process, the final draft will require:

- Elimination of overlapping content between tasks or techniques, or gaps in coverage
- Revision of inputs, outputs, and stakeholders to ensure that a consistent listing is used throughout
- Editing and revision of the draft content to improve readability and consistency
- Addition of diagrams and other materials to assist understanding of the content
- A substantially expanded introduction with additional content on the profession of business analysis, and how the BABOK applies to different methodologies and domains
- Techniques that apply to a single task will be merged with those tasks,
- Stand-alone techniques will be placed in a separate section
- A complete glossary of terms
- A bibliography of works consulted during development of the BABOK
- A description of the major changes included in this release from 1.6
- A complete listing of all contributors to the BABOK

1.1.2 **Copyright Notice and Trademark Information**

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1.2 **What is Business Analysis?**

Business analysis is the set of tasks and techniques used to work as a liaison among stakeholders in order to understand the structure, policies, and operations of an organization, and recommend solutions that enable the organization to achieve its goals.

1.2.1 **Business Analysis as a Profession**

The IIBA is an organization that is dedicated to advancing the professionalism of its members as well as the business analysis profession itself. IIBA recognizes the important contributions business analysts make to organizations every day. As the governing body, IIBA is seeking to establish common standards of knowledge within the BA profession and is committed to work with practitioners around the globe to continually add to those standards through education, research, and the sharing of effective tools and techniques. A universally recognized certification is the first step

towards creating a profession unique to the functions of business analysis. Establishing a certification for the profession will create a common expectation by organizations of the skills and knowledge they will receive from certified business analysts.

1.2.2 *Relationships to Other Disciplines*

While many people working as business analysts specialize in the business analysis role, it's common for them to act as a “generalizing specialist” and fill other necessary roles on a project team. The *Guide to the Business Analysis Body of Knowledge* does not address the skills, competencies and knowledge required to fill those other, related professions. Those professions include:

- Organizational development and change management
- Product management
- Project management
- Quality assurance
- Software development/engineering
- System architecture
- Training
- User experience and information architecture

1.3 Requirements and Solutions

A solution meets a business need, by solving problems or allowing the organization to take advantage of an opportunity. A solution can be subdivided into components, including the information systems that support it, the processes that manage it, and the people who operate it. Business analysis helps organizations to define the optimal solution for their needs, given the set of constraints (including time, budget, regulations, and others) under which that organization operates.

1.3.1 *Scope*

The term “scope” is used to mean a number of different things, but two definitions predominate:

- **Solution scope** is the set of capabilities a solution must support to meet the business need.
- **Project scope** is the work necessary to construct and implement a particular solution.

When the BABOK refers to “scope”, the solution scope is meant unless the document is explicitly addressing the project scope. The definition and management of the solution

scope is central to business analysis, and differentiates it from project management (which is concerned with the project scope).

1.3.2 **Requirement**

A requirement is:

1. A condition or capability needed by a stakeholder to solve a problem or achieve an objective.
2. A condition or capability that must be met or possessed by a solution or solution component to satisfy a contract, standard, specification, or other formally imposed documents.
3. A documented representation of a condition or capability as in (1) or (2).

As implied by this definition, a requirement may be unstated, implied by other requirements, or directly stated and managed. The elicitation, analysis, and communication of requirements, with the objective of ensuring that they are visible to and understood by all stakeholders, is central to the discipline of business analysis.

.1 Requirement Levels

For the purposes of the Business Analysis Body of Knowledge, the following levels of requirements have been defined:

- **Business Requirements** are higher-level statements of the goals, objectives, or needs of the enterprise. They describe such things the reasons why a project is initiated, the things that the project will achieve, and the metrics which will be used to measure its success.
- **Stakeholder Requirements** are statements of the needs of a particular stakeholder or class of stakeholders. They describe the needs that a given stakeholder has and how that stakeholder will interact with a solution. Stakeholder Requirements serve as a bridge between Business Requirements and the various classes of solution requirements.
- **Solution Requirements** describe the characteristics of a solution that meets the business requirements and stakeholder requirements. They are frequently divided, particularly when the requirements describe a software solution, into:
 - **Functional Requirements** describe the behavior and information that the solution will manage. They describe capabilities the system will be able to perform in terms of behaviors or operations – a specific system action or response.
 - **Non-functional Requirements** capture conditions that do not directly relate to the behavior or functionality of the solution, but rather describe environmental conditions under which the solution must remain effective or qualities that the systems must have. They are also known as quality or supplementary requirements.

- **Implementation requirements** describe capabilities that the solution must have in order to facilitate transition from the current state of the enterprise to the desired future state, but that will not be needed once that transition is complete. They are further described in the *Solution Assessment and Validation KA*.

1.4 Structure of BABOK 2.0

1.4.1 Task

A task is an essential piece of work that must be performed as part of business analysis. Tasks may be performed formally or informally. The definition of the task should be universally applicable to business analysis efforts, no matter what type of initiative it is. It does not mean that it is done frequently or that most BAs will necessarily perform the tasks.

A task must have the following characteristics:

- A task accomplishes a result in an output that creates value—that is, if we perform a task we agree that something useful has been done
- A task is complete—in principle, successor tasks that make use of outputs should be able to be performed by a different person.
- A task is a necessary part of the purpose of the KA to which it belongs.

Tasks are not necessarily performed at a particular time in the lifecycle of a project. Even lifecycles with clearly defined phases will require tasks from most if not all KAs to be performed in every phase. Iterative or agile lifecycles may require that tasks in all KAs be performed as close to simultaneously as possible. Tasks may be performed in any order, as long as the necessary inputs to a task are present.

1.4.2 Technique

.1 Relationship to Tasks

Techniques describe how tasks are performed under specific circumstances. A task may have none, one, or more related techniques. A technique must be related to at least one task.

The techniques described in the BABOK are intended to cover the majority of techniques used by the business analysis community at this time. Business analysts are expected to apply their experience and best judgment in determining which techniques are appropriate to a given situation, and this may include techniques that are not described or mentioned in the BABOK. As our field evolves, we expect that techniques will be added, changed, or removed.

.2 Multiple KAs

Techniques frequently apply to multiple KAs. In this case there are two options:

- If the technique applies to significantly more tasks in one KA than any others, it will be described there.
- If the technique applies to a similar number of tasks, it will appear in the first KA in which it is described.

1.4.3 ***Input/Output***

An input represents the information necessary for a task to begin. Inputs should not be optional (at least not as the basic definition)—if something is merely helpful we do not define it as an input.

Inputs may be:

- Explicitly generated outside the scope of business analysis (e.g., a project plan).
- Generated by a business analysis task. In this case the input is maintained by the BABOK task that created it.

An output is a necessary result of the work described in the task. Outputs should in general be produced by one and only one task. In other words, we should avoid the listing an output as simply being updated by a task—the output should actually be transformed or change state as a result. A particular output should be created and maintained by a single task, although a task can have multiple outputs.

Outputs may be produced at any level of formality, from verbal discussion with affected stakeholders to being captured in a software tool and placed under strict change control. The form of an output is dependent on the type of initiative underway, standards adopted by the organization, and best judgment of the business analyst as to an appropriate way to address the information needs of key stakeholders.

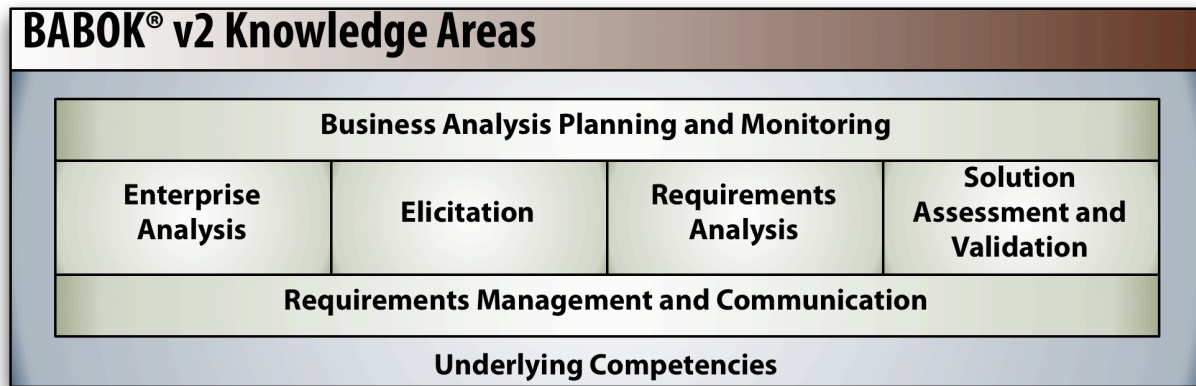
There is no assumption that the presence of an input or an output means that the associated deliverable is complete and/or final. The I/O only needs to be sufficiently complete to allow successive work to begin.

1.4.4 ***Knowledge Area***

A knowledge area groups together a related set of tasks and techniques. The Body of Knowledge is not a methodology. While it defines the activities, tasks and knowledge that a business analysis professional needs to know, it does not do so from the perspective of prescribing an order or sequence.

Specifically, the knowledge areas do not define a business analysis methodology. They do define what the BA needs to know to work within any analysis process or overall solutions development methodology. While the flow between tasks and knowledge areas may appear to follow a well-defined and progressive sequence, this structure was primarily developed for pedagogical purposes. In reality, business analysts are likely to find themselves performing tasks in all knowledge areas in rapid succession, iteratively, or, in the case of a requirements workshop, simultaneously!

By looking at the following picture, however, we understand the relationships between the areas of the Body of Knowledge and the broader world that business analysis fits into.



Business Analysis Planning and Monitoring is the knowledge area that covers how we determine which activities are necessary to perform in order to complete a business analysis effort. It covers identification of stakeholders, selection of business analysis techniques, the process we will use to manage our requirements, and how we assess the progress of the work in order to make necessary changes. Business analysis planning is a key input to the project plan, and the project manager is responsible for organizing and coordinating business analysis activities with the needs of the rest of the project team.

Requirements Management and Communication describes how we manage conflicts, issues and changes and ensure that stakeholders and the project team remain in agreement on the solution scope. Depending on the complexity and methodology of the project, this may require that we manage formal approvals, baseline and track different versions of requirements documents, and trace requirements from origination to implementation.

Enterprise Analysis describes how we take a business need, refine and clarify the definition of that need, and define a solution scope that can feasibly be implemented by the business. Here we will talk about problem definition and analysis, business case development, feasibility studies, and the definition of a solution scope.

Elicitation describes how we work with stakeholders to find out what their needs are and ensure that we have correctly and completely understood their needs.

Requirements Analysis describes how we progressively elaborate the solution definition in order to enable the project team to design and build a solution that will meet the needs of the business and stakeholders. In order to do that, we have to analyze the stated requirements of our stakeholders to ensure that they are correct, assess the current state of the business to identify and recommend improvements, and ultimately verify and validate the results.

Solution Assessment and Validation covers the role of business analysis once the project team is ready to propose a solution. It describes how we assess proposed solutions to determine which solution best fits the business need, identify gaps and shortcomings in solutions, and determine necessary workarounds or changes to the solution. It also describes how we assess deployed solutions to see how well they met the original need in order to enable businesses to assess the performance and effectiveness of projects.

Underlying Competencies describes the behaviors, knowledge, and other characteristics that support effective business analysis.

Chapter 2: Business Analysis Planning and Monitoring

2.1 Introduction

2.1.1 **Knowledge Area Definition and Scope**

The *Business Analysis Planning and Monitoring* Knowledge Area defines the tasks associated with the planning and monitoring of business analysis activities throughout the requirements process. The Business Analyst (BA) helps to identify stakeholders, helps define roles and responsibilities, develops estimates for business analysis tasks, plans requirements communications, plans how requirements will be approached, traced, and prioritized, determines what requirements process will be used, and determines the metrics that will be used for monitoring the business analysis work. In addition, this Knowledge Area provides for monitoring and reporting on work performed to ensure that requirements work produces the expected outcomes. If not, the business analyst must take corrective action to meet stakeholder requirements and expectations.

These business analysis activities are typically closely related to the project management activities, making it essential for the business analyst to work closely with the project manager (PM). Project Management Institute's *A Guide to the Project Management Body of Knowledge® (PMBOK®)* outlines many tools and techniques that can be used by the business analyst. Examples include tools and techniques for estimating activities, planning communication, and developing quality metrics. Use of these tools and techniques will help ensure alignment between the requirements plan and the overall Project Management Plan.

Because the project manager and the rest of the project team rely on the business analyst (BA) to provide clearly defined requirements deliverables for the project, the BA needs to assist the PM in planning and monitoring the tasks associated with the business analysis effort. To that end, the business analyst considers the many facets of requirements planning and ensures that the right amount is done. Working closely with the project manager, as well as other stakeholders, the business analyst recommends an approach and the associated deliverables appropriate for the project. BAs assist in ensuring that:

- All necessary requirements stakeholders are identified and properly represented during the requirements planning process.
- The most appropriate activities related to the requirements process are planned.
- The nature and importance of business analysis work is understood by key stakeholders.
- The communications relating to business analysis work are planned and reflect stakeholder preferences.

- The recommended requirements process is appropriate to the project.
- Traceability is appropriately structured to ensure that each requirement adds business value and is tracked throughout the project.
- The attributes that describe the requirements are determined at the beginning of the project or project phase and captured throughout the business analysis work.
- How the requirements are prioritized during execution is planned for the project or project phase.
- The BA or BA team can effectively monitor and react to requirements challenges and slippage.
- Reporting on the health of business analysis activities is clear, timely, and accurate.

2.1.2 ***Inputs***

- Organizational Standards
- Identified need
- Stakeholder list
- Stakeholder roles and responsibility designation
- Business Analysis Plan(s)
- Organizational Performance Standards
- Actual Performance Metrics (optional)
- Requirements Management Plan

2.1.3 ***Tasks***

- 2.2 Plan business analysis approach
- 2.3 Conduct stakeholder analysis
- 2.4 Plan business analysis activities
- 2.5 Plan business analysis communication
- 2.6 Plan requirements management process
- 2.7 Plan, monitor, and report on business analysis performance

2.1.4 *Techniques*

- Stakeholder analysis, such as:
 - Stakeholder influence analysis
 - Stakeholder role analysis
- Data collection methods, such as:
 - Networking
 - Interviews
 - Decomposition
- Estimating techniques, such as:
 - Analogous
 - Bottom up
 - Three-point estimate
 - Delphi
 - Rolling wave
 - Parametric
 - Expert judgment
 - Historical analysis
 - Vendor bid analysis
- Communications requirements analysis
- Communications media analysis
- Change control system (process for changing the requirements baseline, authorization levels for approval, tracking process to recognize changes)
- Configuration management system to establish how changes to the product deliverables and versions will be controlled, changed, approved and documented.
- Traceability system including such things as:
 - Process for tracing requirements

- Numbering structure
 - Hierarchy structure
 - Requirements for traceability linkages
 - Guidelines for level of granularity
 - How to find orphan elements and inconsistencies
 - Complexity analysis
 - Templates
 - Who, when and how traceability will be maintained
- Time and cost reporting systems (to capture the actuals)
 - Variance analysis
 - Performance information gathering, compilation, and presentation
 - Replanning
 - Process analysis

2.1.5 Outputs

- Stakeholder list
- Stakeholder roles and responsibility designation
- Business Analysis Communication Plan
- Requirements Management Plan
- BA Performance Assessment
- Lessons Learned
- Process improvement recommendation
- Business Analysis Plan

2.2 Task: Plan Business Analysis Approach

2.2.1 Purpose

How the business analysis work is planned depends on the approach that will be taken. Some organizations have methodologies which dictate the approach, others do not. The purpose of this task is to plan how the business analysis work will be approached. Much

of the planning cannot be accomplished without determining which approach (see introduction for a discussion of Waterfall, Incremental, and Agile approaches). Until the approach is known, we will not be able to fully understand such things as:

- The nature of the work that will be completed in each of the Knowledge Areas.
- Which deliverables will be produced
- Which tasks that will be completed
- Which techniques will be used to elicit requirements
- The content and format of the requirements
- The level of detail and formality required
- The method for prioritizing requirements
- The metrics that will be used to measure the business analysis work

2.2.2 ***Description***

This task describes how we plan the appropriate approach that will be taken for completing the business analysis work for a particular initiative. It describes how we determine what life cycles and methodologies are currently in place in the performing organization for which types of projects, how to recommend an appropriate approach if none exists, which stakeholders need to be involved in the decision, who will be consulted with and informed of the approach, and the rationale for using it.

There are multiple established ways to approach business analysis work, ranging from the traditional Waterfall approach to the use of more recent Agile techniques. Elements from different approaches may be combined; however only a subset of all possible combinations will be viable for the particular organizational environment in which a project is being conducted.

The business analyst reviews any existing organizational process assets, including standards, guidelines, and processes relating to the current initiative. These may suggest or dictate which approach to use. If none exist, the business analyst works with the appropriate stakeholders, such as the project management office (PMO) representative(s) and project manager to determine how the work will be completed.

2.2.3 ***Inputs***

- Defined Business Problem/Opportunity
- Organizational Standards

2.2.4 *Elements*

The two approaches that have been considered in the Elements sections below are Waterfall and Agile. Because both Waterfall and Agile approaches can be done incrementally, an Incremental process, as a separate approach, is not discussed.

.1 When the business analysis work occurs

When the business analysis work occurs varies by the approach that has been chosen. Specifically:

Waterfall. With the Waterfall process, most business analysis work occurs at the beginning of the project or during one specific project phase. The exact name of the phase varies by the specific methodology, but the main focus of the phase includes such activities as eliciting, analyzing, and communicating the requirements, as well as reporting on the status of the business analysis activities work for the project. In general there is more formality with the Waterfall approach.

Agile. On some Agile projects enough of the business analysis activities occur in an initial project phase to produce a list of requirements, which are analyzed and developed iteratively. On others, there is less work completed in the beginning of the project, and business analysis activities can occur iteratively throughout the project.

.2 Formality and level of detail of the business analysis work

Waterfall. This approach typically calls for a significant amount of detail when completing the business analysis work. Commonly there is a formal requirements specification that is produced at the end of this project phase, with detailed information about the requirements. The specific content and format of the requirements document can vary, depending on the organizational methodologies and/or processes, and templates.

Agile approaches favor focusing on a working solution over documenting that solution. Requirements documentation is often limited to a prioritized requirements list. Additional documentation may be created at the discretion of the team. Note that the relative lack of requirements documentation does not equate to a lack of understanding regarding the requirements among the team, since the understanding of the requirements is demonstrated through mechanisms other than a formal, written document.

.3 Requirements prioritization

Waterfall. Requirements are often prioritized at the end of the project phase. Although a broad-brush prioritization using general categories, such as high medium, low are sometimes applied as requirements are identified, determining which are in or out of scope usually occurs at the end of the phase. In addition, prioritization tends to be completed with more formality.

Agile. The requirements on the requirements list are prioritized, estimated at a high level, and the most important requirements from a technical and business perspective are selected for the first/next increment. Once the requirements have been assigned to the increment, those specific requirements for the increment are drilled down to a

lower level of detail. This general process repeats each time one increment ends and another begins. The distribution of business analysis work load is spread more or less evenly throughout the project.

.4 How change is handled

Changes to requirements may occur at any time during the project. The process for handling changes is different for each approach.

Waterfall. Each change is often handled as a 'mini project,' complete with requirements gathering, estimates, design, etc. Changed requirements often mean changes to the project baselines and are usually incorporated into the overall project management plan.

Many organizations have a formal process which includes a request for change, a change log that tracks the changes that have been received, and an analysis of the impact of the change not only to the project, but also to other business and automated systems.

Agile. The Agile approach work on the premise that it is difficult to identify all requirements at the beginning of a project. Agile approaches build change into their core processes. Change is documented by maintaining and comparing the requirements lists at the end of each increment. New and removed requirements are noted, as are changes in priority for each requirement, the estimates for each requirement, and the assignment of requirements to increments.

.5 Communication with stakeholders

Communications may be written or verbal, formal or informal.

Waterfall. The communication between stakeholders and the project team tends to be more formal. Much of the communication of the actual requirements is in writing, and often uses pre-defined forms requiring signatory approvals.

Agile projects tend to focus more on frequency of communication than on formal documentation. Official documentation is often in writing, but informal communication takes precedence over more formal written communication. Standard good business practices i.e. meeting agenda, meeting minutes remain in force.

.6 Final considerations for selecting the business analysis approach

In selecting the appropriate approach, the complexity of the project should be taken into consideration. Such factors, as those listed below, will affect the approach chosen. As any of these project attributes increase, the level of project complexity also increases, which in turn increases the need for more formal communication and coordination. While Agile projects can scale to large, complex projects, the Waterfall approach may be more appropriate for such projects.

- number of stakeholders
- number of business areas impacted

- number of business systems impacted
- amount and nature of risk
- uniqueness of requirements
- number of technical resources required

Some projects, such as government projects or projects where the final product carries a high risk if produced incorrectly (e.g. pharmaceuticals and aircraft), require a high level of control and documentation. Because documentation and control are strengths of the waterfall approach, it will better lend itself to supporting such projects.

Note that the level of rigor used should be appropriate to the specific project. If more rigor is applied to a project than is required for the project characteristics, there is a risk that additional time and money will be spent that is not needed.

Below are additional factors that should be weighed when planning the approach that will be taken during business analysis:

Corporate culture/environment/history

The corporate culture and environment will have a major impact on the approach chosen. If the organization's process requires either a Waterfall or Agile approach, it will be difficult to change the organization's mindset,

Level of uncertainty in requirements

Agile methodologies, by design, are designed for the evolutionary uncovering of requirements. As such, they are suitable for projects where the level of requirements uncertainty and the probability of requirements change are high. Waterfall methodologies can work well where the requirements uncertainty is lower.

The level of requirements uncertainty is partly dependent on the subject domain of the project. For example, marketing and research projects tend to have a higher requirements uncertainty, while accounting and finance projects tend to have a relatively lower level of requirements uncertainty.

Length of project/turnover of personnel

The length of a project can affect the approach chosen. In general, the longer the project continues, the greater the likelihood there will be some level of personnel turnover. Under such circumstances, increased documentation is desirable in order to ensure project knowledge and minimize ramp-up time for new project members in the later project stages. Waterfall is more likely to provide the needed level of documentation required for knowledge transfer than Agile.

2.2.5 **Techniques**

- Expert Judgment

2.2.6 **Stakeholders:**

- Business Analyst
- Domain Subject Matter Expert (SME)
- End User
- Implementation Subject Matter Expert (SME)
- Operational Support
- Project Manager
- Quality Assurance.
- Sponsor

2.3 **Task: Conduct Stakeholder Analysis**

2.3.1 **Purpose**

This task covers the identification of stakeholders who may be impacted by a proposed initiative or who share a common business need. This task includes determining appropriate stakeholders for the project or project phase, and analyzing stakeholder influence, authority approve, sign off, (veto), and project attitude.

2.3.2 **Description**

Stakeholder analysis requires that the business analyst:

.1 Identify and document all team roles relating to requirements-related activities

During this activity, the Business Analyst works closely with the Project Manager in identifying stakeholders for the business analyst work, in identifying, understanding, and documenting team roles and responsibilities for the entire spectrum of business analysis activities. The BA will be involved with roles and activities related to business analysis work, while the PM is concerned with all project roles and responsibilities.

It is important for the Business Analyst to understand the difference between a role and a job title. Different organizations will certainly have varied job position titles involved in their organizations and on their projects. The roles that are discussed in this section may be titled very differently in different organizations, so the Business Analyst must take into account the work performed, not the job title, when reading this section and executing these tasks on their projects.

.2 Assist in the identification of requirements stakeholders

Once the roles and responsibilities required for the project or project phase have been identified, the BA may recommend stakeholders to fill those roles. While obtaining resources for the project is within the project manager's domain, the BA can be called

upon to help. The BA is often familiar with subject matter experts and technical staff who can add significant value to the business analysis effort. Once the stakeholders have been identified, the BA may assist the PM in documenting roles and responsibilities in a responsibility assignment matrix, such as a RACI matrix. However, because creating such a matrix is primarily a PM task, we have not described it in this section.

.3 Categorize stakeholders participating in business analysis work

Once stakeholders have been identified, it may be useful to categorize them. There are many different ways to categorize stakeholders, some of which are discussed later in this chapter.

.4 Analyze stakeholder influence on the project and within the organization related to their attitude toward the project or project phase.

The importance of stakeholder influence and attitude towards the project or project phase should not be minimized. Influential stakeholders who recognize the project benefits and promote its value can support the project manager and BA in numerous ways. The BA needs to recognize both positive and negative behaviors which might determine how much buy-in the business analyst can expect and which could impact the outcome of the project or project phase.

.5 Assist in determining authority levels of the identified stakeholders

Once the stakeholders have been identified and assigned their roles and responsibilities, the BA can assist the PM and the stakeholders themselves in determining their level of authority for the project or project phase. Since BAs will identify the business analysis deliverables and planning the activities as well as the process for handling changes, their input can be invaluable.

2.3.3 *Inputs*

Organizational Standards and Process Assets. Standards and Organizational Process Assets (OPA) are usually comprised of such things as actions that must be taken and/or forms that must be completed suggested or prescribed methodologies, templates, and project authorization guidelines. They may be mandated or expressed in the form of guidelines. An example of an OPA is an organization's process and templates for managing projects, including how projects are initiated. Organizational Process Assets are defined in Project Management Institute's A Guide to the Project Management Body of Knowledge (PMBOK).

Identified need from sponsor. This need can be in the form of a formal Project Charter, a document which sanctions the project and provides authority to the project manager. The Project Charter addresses the business need for which the project is undertaken, how the project aligns with the strategic direction of the organization, and a high-level description of the end product, service, or result of the project. The Project Charter is further defined in the (PMBOK). This need identified by the sponsor can also be expressed informally, either in writing or verbally, and while the above information is

helpful (business need, alignment with the business, and description), it may not always be expressed.

2.3.4 Elements

Requirements stakeholder roles should be identified early in the project to help ensure timely delivery of requirements deliverables. Some individuals may be called on to play a variety of roles on the same project, as well as on different roles on different projects.

.1 Identify and document team roles

The BA works with the project manager to assist in identifying and documenting roles related to requirements definition. The BA may also be involved in assisting the PM in creating a responsibility assignment matrix, such as the RACI, related to requirements roles and responsibilities.

Some typical roles include, but not are limited to the following:

- Business Analyst
- Customer
- Domain Subject Matter Expert (SME)
- End User
- Implementation Subject Matter Expert (SME)
- Operational Support
- Project Manager
- Quality Assurance
- Regulator
- Sponsor

.2 Assist in identifying stakeholders

Understanding who the stakeholders are and the impact of the project on them is vital to understanding what needs, wants, and expectations must be satisfied to successfully complete the project. Identifying the project stakeholders at the beginning of the project is an important step that should not be overlooked or minimized. Stakeholder interests that are not identified until later stages of the project can have a negative impact on all areas of both the project and the end solution.

Because project requirements are based on stakeholder needs, wants, and expectations, those that are uncovered either late in the project or not at all could require a revision to requirements that changes or nullifies completed tasks or tasks already in progress, increasing project costs and decreasing stakeholder satisfaction.

Many people on the project have the responsibility for identifying stakeholders. The sponsor identifies business subject matter experts to help with requirements definition. Designated SMEs can recommend other business experts to assist in defining requirements. The project manager and members of the technical and/or testing teams can recommend stakeholders.

Who participates in which business analysis activities can vary from organization to organization. For example, in some organizations, members of the technical team attend requirements workshops to provide costs, technical effort, and information on technical impacts. In other companies, no technical discussion is permitted during these meetings. As another example, in some organizations, technical staff elicits information requirements or participates in prototyping sessions. In others, the business analyst completes these activities. While who performs the business analysis work is not dictated, having it clarified before the work begins is essential.

.3 Categorize stakeholders

Grouping stakeholders into multiple categories uncovers both commonalities and uniqueness. These groupings may also assist the business analyst in other planning tasks, such as planning requirements workshop based on stakeholders' geographic locations.

The Business Analyst can create a document, either formally or informally, listing each stakeholder, stakeholder categories, and how each stakeholder is recognized within each category. Examples of stakeholder categories are:

- **Influence** required during requirements definition and influence of each stakeholder within the organization. The PMBOK has defined influence as the ability to get things done through other people. For a discussion of influence analysis, see discussion below.
- **Geographic locations** can be useful for such things as planning elicitation techniques, determining the most appropriate medium or media for elicitation, for assigning business analysts to the effort, for determining the best way to document requirements, for developing a communications plan, for reporting activities against plan, for escalating issues, and for many other purposes.
- **Number and variety of direct end users** in their constituency. Different approaches, plans, reports, amount of formality, amount of documentation, all can be customized based on the number of stakeholders each SME represents. Stakeholders with fewer constituents may have less formality during business analysis. For those stakeholders with large number of constituents or representing those from different functional areas or divisions may require more rigor.
- **Number of interfacing business processes and automated systems.** The planning for stakeholders who represent those performing complex, interfacing, or overlapping business processes is different from those whose processes are more discrete. Complex processes usually indicate that more rigor is required. They can also be a source for identifying additional stakeholders, since those

performing the interrelated processes are sometimes ignored. In addition, categorizing stakeholders by the systems that support their business processes can be useful when changes need to be made to those processes and systems. Since not all stakeholders can or want to attend all requirements workshops, they can be more easily persuaded if the workshop pertains to their process and the associated automated system.

.4 Analyze stakeholder influence

Once stakeholders have been identified and categorized, the business analyst can study the makeup of the team members who will be involved in the business analysis effort. The BA can then analyze several factors that work together and which can greatly affect the outcome of the project or project phase. These factors might include but are not limited to:

- **Attitude** towards:
 - The project or project phase. Do they believe in the project benefits? Will the benefits affect them directly? Will the benefits be accrued elsewhere? Are the perceived risks greater than the rewards?
 - Attitude towards business analysis. Do they see the need to define their requirements? Do they present solutions and expect the requirements to be contained in that solution, making the need to spend time on requirements unnecessary?
 - Attitude towards collaboration. Have they had success on previous collaborative efforts? Does the organization reward collaboration? Is the organization hierarchical in nature, rather than being team-based? Are personal agendas the norm?
 - Attitude towards sponsor. On cross-functional efforts, do all the SMEs support the sponsor? Are there SMEs who would prefer another sponsor?
 - Attitude towards PM and BA. Have both the PM and BA built trusting relationships or have there been prior failed projects or project phases?
- **Influence.** Because it is essential for BAs to build relationships and work towards building trust, understanding the nature of influence and the influence structures and channels within an organization can prove invaluable as they plan for and execute business analysis activities. Understanding the influence each stakeholder exerts on the project or project phase, as well as their attitude, can help the BA to develop strategies for obtaining buy-in and collaboration. Some factors relating to influence that the BA needs to consider are:
 - Influence on the project. How much influence does the stakeholder have on the project? For example, because sponsors obtain funding, including resources, and make vital decisions, they usually exert more than end-users.

- Influence in the organization. There are usually formal and informal structures within organizations, and one's title or job role, while it can provide what is called authority or positional power, does not always signal the real organizational influence. The business analyst should be aware of the ways influence occurs in the organization, as it could impact the business analysis activities.
- Influence needed for the good of the project. The BA can analyze how much influence is needed to make the project succeed compared with the amount of influence the key stakeholders, like the project sponsor, has. For example, on a large, complex project requiring many internal and external resources, the project will need a sponsor with effective relationships with the executives to ensure that adequate resources are obtained. Projects that are smaller may require sponsors with less influence. If there is a mismatch between the influence required and the amount of influence the stakeholder has or is perceived to have, PM and BA can develop risk plans and responses and other strategies that might be needed to obtain the required level of support.
- Influence with other stakeholders. Within most organizations there is an informal way influence occurs. It is best to be aware of this informal influence structure. For example, if there are stakeholders who consider themselves project champions, they can be used to help convert those who are less enthusiastic or outwardly hostile to the project outcome.

.5 Assist in determining authority levels for business analysis work

The business analyst can provide assistance in helping the business analysis team decide which stakeholders will have authority during business analysis activities, in relation to both business analysis work and product deliverables including who:

- Approves the deliverables
- Inspects and approves the requirements
- Requests and approves changes
- Approves the requirements process that will be used
- Reviews and approves the traceability structure
- Has veto power (individually or in a group)

Authority levels are discussed in detail at the end of the chapter.

2.3.5 **Techniques**

- Stakeholder analysis, such as:
 - Stakeholder influence analysis

- Stakeholder role analysis
- Data collection methods
 - Networking
 - Interviews

2.3.6 Stakeholders

- Business Analyst
- Customer
- Domain Subject Matter Expert (SME)
- End User
- Implementation Subject Matter Expert (SME)
- Operational Support
- Project Manager
- Quality Assurance
- Regulator
- Sponsor

2.3.7 Output

- Stakeholder list, which can be documented in a variety of ways, including but not limited to:
 - Names and titles of stakeholders
 - Category of stakeholder
 - Location of stakeholders
 - Special needs
- Stakeholder roles and responsibility designation, which can be documented in a variety of ways, including but not limited to:
 - List of required roles
 - Roles and responsibilities matrix, such as RACI
 - Text documenting roles and responsibilities

2.4 Task: Plan Business Analysis Activities

2.4.1 Purpose

This task will document the steps or requirements planning activities that must be completed during business analysis. It will define each task, and will provide a management tool for business analysis activities to measure the progress of each task.

The activities that are executed during the project phase and how they are executed will determine the quality and timeliness of the requirements deliverables and ultimately of the solution. The business analyst should select a complete set of requirements activities that result in a clear, concise set of requirements on which the realization of the solution can be based. The resource types required to complete each activity also need to be defined.

To accomplish this, the Business Analyst will consider what activities need to be undertaken to complete the appropriate end-to-end business analysis activities, which consist of:

- Requirements Management and Communication
- Enterprise Analysis
- Elicitation
- Requirements Analysis
- Solution Assessment and Validation

2.4.2 Description

In this task, the business analyst determines which activities are required to define the solution to a business problem, how those activities will be carried out, the work effort involved, and an estimate of how long the activities will take. The business analyst provides input to the Project Manager, who develops the plans. This task includes activities to:

- Identify business analysis deliverables
- Determine the scope of work for the business analysis activities
- Determine tasks for the business analysis activities, considering the work that will be needed in all of the Knowledge Areas: Requirements Management and Communications Enterprise Analysis, Requirements Analysis, and Solution Assessment and Validation. Detail will vary from Knowledge Area (KAs) to Knowledge Area
- Identify task dependencies, and interfaces between tasks
- Develop estimates for business analysis work

Regardless the methodology or the life cycle approach taken, and even when not developing a formal planning document, the Business Analyst considers all deliverables and activities related to requirements planning.

2.4.3 *Input*

- Stakeholder list
- Stakeholder roles and responsibility designation
- Organizational Standards

2.4.4 *Elements*

.1 Identify business analysis deliverables

Planning business analysis activities begins with defining the business analysis deliverables, either formally or informally. A formal approach might include creating a Business Analysis Scope Statement, which is a component of the overall project Scope Statement and documents, among other things, the deliverables which will be decomposed to create the Work Breakdown Structure described below. An informal approach might include developing a list of business analysis deliverables, which could be a list, a set of stickies, notes on a board, etc.

When determining deliverables, the business analyst needs to think about the appropriate deliverables for each knowledge area for the specific project or project phase. Since each project is unique, it is important to review each of the KAs to determine which deliverables are most appropriate. For example, on some projects, there may be few deliverables in Enterprise Analysis and more in Requirements Analysis. In others, the opposite might be true. Listing out deliverables by KAs reduces the risk that some will be omitted, and helps ensure that estimates are realistic.

A few examples of business analysis deliverables are interview questions, meeting minutes, use case diagrams, business analysis communication plan, and as-is/to be business process models. For example, use cases may be included, but user interface design may not, or prototypes to capture requirements are included, but user interface development is not.

There are many ways to identify business analysis deliverables. Below are just a few examples:

- Hold one-on-ones or facilitated sessions with the project manager, sponsor, the BA team, and key SMEs
- Review project documentation
- Review organizational process assets, such as methodologies and templates, which may dictate which deliverables are required
- Any combination of the above

.2 Define the scope of work for the business analysis activities

The scope of the business analysis work comes from the business analysis deliverables and becomes part of the overall project scope. The business analyst, in defining the business analysis scope or work, works closely with the project manager to ensure that the approved business analysis work is included in the overall project scope.

An important tool in both defining the scope of work as well as in developing estimates is the work breakdown structure (WBS). There are different ways to break work down. One is to break down the project into iterations, releases, or phases. Another is to break deliverables into work packages. Another is to break activities into tasks. Both the breakdown of deliverables and activities requires use of the technique of decomposition, where larger pieces of work are broken into subsequently smaller and smaller pieces, creating a hierarchy of work.

Both work breakdown structures (deliverable and activity) and the technique of decomposition are described further in PMI's A Guide to the Project Management Body of Knowledge © (PMBOK), where the breakdown of deliverables is called a WBS and the breakdown of activities is called an Activity List.

The BA, to be in alignment with the project management plan, can use these same tools and techniques not only in defining the business analysis scope, but also in estimating business analysis activities.

Some considerations when developing both the scope of work and activities include:

The requirements approach

Each of the requirements approaches will define the requirements process in different ways and will have very significant impacts on the business analyst's planning efforts. Each will offer descriptions of the project phases, deliverables, and tasks that should be included in the project and will greatly impact the requirements plan.

For example, the traditional waterfall method advocates gathering all requirements in the beginning of the project; while in the Iterative/Agile approaches requirements may be defined throughout the lifecycle. These differences will lead to different deliverables and tasks being identified as well as different sequences and dependencies of tasks.

Examples of common requirements approaches include:

- Waterfall
- Incremental
- Agile

These approaches are discussed in the Introduction to the BABOK .

Specific stakeholder preferences

Typically some stakeholders will exhibit individual behaviors and preferences and that must be met in order to have a successful project. For example, one key stakeholder

may prefer the use of process maps, which could influence the planning of business analysis tasks related to this stakeholder. Another stakeholder may have some experience using a particular technology and be in favor of its choice for the current project, which might also influence the business analysis deliverables, tasks, and estimates.

If these can be identified and factored into the business analysis planning process, the project has a better chance of success.

Location

The Business Analyst must also consider the location of the key stakeholders on the project. Some projects will have the stakeholders located in a single location while others will have some of their key stakeholders dispersed over a wide area. These latter projects may well involve increased complexity, which will have an impact on the estimate of some activities and tasks in the project.

Collocated: All key stakeholders are located in the same local geographic area. There are no special location-related planning considerations for the BA involved in these projects.

Dispersed: These more complex projects have some key stakeholders located in different geographic regions or countries. The factors of distance, possible time differences and cultural and language differences increase the complexity for business analysis and will require analysis to identify and account for these differences.

An example of the impact of this type of situation might be the necessity to have more tele- or videoconferences rather than face to face meetings, due to the various locations and the difficulty in scheduling. Or the organization's desire to have at least one face-to-face and the complexity of arranging such a meeting could result in additional tasks and schedule lags (delays).

Another common situation involves an outsourced development project where the development team is physically located many time zones away. This type of situation, for example, will be accounted for during business analysis planning and might be better served with more detailed requirements documentation and acceptance criteria, more frequent review sessions or more detailed documentation.

The type of project or project phase to which the Business Analyst is assigned may have a significant impact on the estimating process. For example, in a project to purchase a new software package, the tasks will be different from an effort to develop a new process. Different projects with different deliverables and tasks might include some combination of the following:

- Feasibility study
- Process improvement
- Organizational change

- New software development (in-house)
- Outsourced new software development
- Software maintenance
- Software package selection

The differences in the business analysis planning activities in these different types of projects will be significant; since the purpose of, objectives and tasks involved in the business analysis work will be quite different.

.3 Determine tasks for the business analysis activities in the Knowledge Areas: Enterprise Analysis, Elicitation, Requirements Analysis, Solution Assessment and Validation.

After the scope or business analysis work has been defined, each piece of work, sometimes called a work package is assigned at least one and usually many activities, which can be further broken into smaller and smaller tasks. This process is called decomposition (see above). The goal of this decomposition is to identify tasks associated with specific units of work that need to be completed in order for the deliverable to be produced. This decomposition of activities and tasks creates the Activity List, described above.

For example, the activity of 'Interview Stakeholders' could be decomposed into sub-activities: Prepare interview questions, interview stakeholders, document interview responses. The sub-activity of interview stakeholders could be decomposed into the tasks of setup meeting with stakeholder 1, interview stakeholder 1, setup meeting with stakeholder 2, interview stakeholder 2.

The Activity List can be created in different ways, such as by:

- Taking each deliverable, assigning the activities required to complete the deliverable, and breaking each activity into tasks.
- Dividing the project into phases, iterations, increments, or releases, identifying the deliverables for each, and adding activities and tasks accordingly.
- Using a previous similar project as an outline and expanding it with detailed tasks unique for the business analysis phase of the current project.

The elements identified for each Activity List can but do not have to include:

- Milestones, which while not tasks, are significant events in the business analysis activities. Milestones are used to measure the progress of the project and compare actual progress to earlier estimates. Milestones can be used as a time to celebrate the completion or delivery of a major deliverable or section of project work. An example of a major milestone of business analysis is the stakeholders' and sponsor's approval of the requirements and/or other mandatory deliverables defined by the project.

- Dependencies – Identify logical relationships, such as which activities have to be completed before subsequent tasks can begin.
- Optionally, assumptions – For each task, there may be factors or conditions which are considered to be true. The BA can document these factors, and where present estimates will be developed using these assumptions. This list of assumptions helps determine effort.

The elements identified for each activity and task can but do not have to include:

- Unique Number – to uniquely identify each task.
- Activity/task description– labeled with a verb and a noun, the detailed tasks comprise each activity or task.
- Identifying resources, resource availability, begin and end dates, calendar information, and activity cost is the work of the project manager and will not be addressed here.

.4 Develop estimates for business analysis work

Estimates are developed in conjunction with the project manager, other team members, and according to the approved organizational process assets, including methodology and templates for developing estimates. This estimate will provide the project team with a tool for measuring the status and progress of each task.

Estimates can be developed using a variety of techniques. Some are listed below:

- **Analogous estimating** is using a similar project as the basis for developing estimates for the current project. It is used when little is known. Analogous estimating is often used to develop a rough order of magnitude (ROM) estimate, and is also known as “top-down” estimating. For example the business analyst, from all that is known, thinks that the business analysis activities and time frames are similar to those of a prior project and uses those. This is usually done at the beginning of the project or project phase and more detailed estimates follow as more is known.
- **Parametric estimating** is the use of parameters, multiplied by the number of hours. For parametric estimating to be useable, enough history has to be available. With this type of estimating, the business analyst has done enough work to determine which parameters can be used and how many there will be.
- For example, the business analyst has determined that there will be ten use cases developed. The BA also has history that indicates for each use case the *total* hours that will be spent, in this case will be 20 hours. Using this technique, the BA can multiply 10 x 20 to get a total, or 200 hours.
- **Bottom-up.** Using this technique the BA has collected the deliverables, activities, tasks, and estimates from all the involved stakeholders and rolls them up to get a total for all the business analysis activities and tasks.

- **Rolling wave.** This is a technique involving refinement of estimates. The BA can estimate the details for the business analysis activities for the current iteration or increment and provide an analogous estimate for the entire scope of work for business analysis activities. As the end of the iteration approaches, the BA can complete estimates for the next iteration and refine the initial estimate for all the business analysis activities for the project.
- **Three-point estimates** uses scenarios for:
 - The most optimistic estimate, or best-case scenario
 - The most pessimistic estimate, or worst-case scenario
 - The most likely estimate.
- **Vendor bid analysis.** After submitting a Request for Proposal from vendors, such as for commercial packages for software, the BA compares the returned bids for reasonableness, schedule, and cost estimates, and chooses a vendor based on known criteria.
- **Historic analysis** uses history as a basis for estimating. It is similar to analogous, but is used not only for the top-down estimate, but for the detailed tasks as well. Historic estimates require prior project records, whether maintained formally in a project repository or informally in individual project documentation. In either case, this technique works best in organizations where tracking actuals against estimates is an organizationally-accepted process.
- **Expert judgment** estimating relies on the expertise of those who have performed the work in the past. These experts can be internal or external to the project team or to the organization.
- **Delphi** uses a combination of expert judgment and history. There are several variations on this process, but they all include individual estimates, sharing the estimates with experts, and having several rounds until consensus is reached. An average of the three estimates is used. Sometimes the average is weighted by taking the optimistic, pessimistic and four times the most likely, dividing by six to get the average.

These and other techniques are further explained in PMI's PMBOK in the chapter on Time Management and Cost Management.

2.4.5 *Techniques*

- Decomposition
- Estimating techniques,
 - Analogous

- Parametric
- Bottom up
- Rolling wave
- Three-point estimates
- Vendor bid analysis
- Historic analysis
- Delphi
- Expert judgment

2.4.6 Stakeholders

- Business Analyst
- Domain Subject Matter Expert (SME)
- End User
- Implementation Subject Matter Expert (SME)
- Operational Support
- Project Manager
- Quality Assurance.
- Sponsor

2.4.7 Output

The business analysis plan is a subsidiary plan to the project management plan. Elements of the business analysis plan can include:

- Description of the scope of work
- Deliverable Work Breakdown Structure
- Activity List
- Estimate for each activity and task

The Business analysis plan should be developed after considering all these knowledge areas:

- Enterprise Analysis

- Business Analysis Planning and Monitoring
- Elicitation
- Requirements Analysis
- Solution Assessment and Validation
- Requirements Management and Communication

2.5 Task: Plan Business Analysis Communication

2.5.1 Purpose

A requirements communications plan documents the intentions of communications about the result of business analysis activities. The BA documents and organizes the coordination of the requirements communication activities, resulting in a communications plan, which is developed to provide a basis for setting expectations for business analysis work, meetings and other communications. The activities for planning communications include but are not limited to:

- Determine how best to receive, distribute, access, update, and escalate business analysis information from project stakeholders
- Determine the medium or media for communicating with each stakeholder who will be involved with business analysis activities

In addition, requirements can be presented in various formats. This task describes the work required to decide which format(s) are appropriate for a particular project and its stakeholders. Requirements should be presented in formats that are understandable for the reviewer; they must be clear, concise, accurate, and at the appropriate level of detail.

2.5.2 Description

Planning the business analysis communications involves determining what information the various stakeholders need regarding the results of business analysis and the forms it should take (verbal, written, etc.). It includes considerations for, as well as constraints, impacts, durability and tradeoffs of different communications media. It also addresses appropriate media and associated constraints and impacts for global projects.

To develop the business analysis communications plan the BA should think about:

- What needs to be communicated and what is the appropriate delivery method
- Who is the appropriate audience
- When the communication should occur

Additionally, the BA should be aware of the stakeholder needs and constraints for each communication in terms of:

- Physical location/time zone of the stakeholders
- Communication approach for the stakeholder
- What types of communications will be required (e.g. status, anomalies, issues and their resolution, risks, meeting results, action items, etc.).
- What types of requirements will be elicited (business vs. functional, high level vs. detailed) and how best to elicit them (see KA – Requirements Elicitation for options)
- How best to communicate requirements conclusions/packages, including authority level (signoff authority, veto authority, or review only)
- Time and resource availability constraints

2.5.3 ***Input***

- Stakeholder list
- Stakeholder roles and responsibilities designation
- Business Analysis Plan(s)

2.5.4 ***Elements***

.1 Identify each stakeholder's communications needs & preferences

Each stakeholder who reviews the planned communications may have different communication needs. The Business Analyst must determine what level of detail, language, and formatting is appropriate for each type of stakeholder and devise the best way to effectively convey information. The following are some sample considerations:

- Stakeholder preferences on the requirements. For example:
 - Executive sponsors and management often want summaries and high level requirements. Their primary goal is often to understand that the solution meets the return on investment expectations in accordance with their business plan.
 - Business SMEs need requirements that are written in business language, and simple to understand and review. They must fully understand each requirement in detail, since it is this group that will be most affected by the solution implemented. In addition, implementers of requirements will need very detailed descriptions of what success criteria for the new procedures and processes must be met.
 - Technical partners will need to understand all the business requirements, but will need very detailed information on the functional, user interface and technical requirements in order to build the solution.

- Quality assurance analysts will need to understand the requirements so that they can develop a detailed testing strategy to ensure that the solution is built to meet the requirements.
 - External software and/or process vendors need detailed requirements so that they can build software to meet them.
 - External hardware suppliers will need detailed technical interface requirements to order to construct the proper network and security protocols in accordance with corporate policies.
 - Verbiage is best for specifying textual information, such as the business problem, and requirements descriptions. Diagrams and models are useful for showing relationships between requirements components.
- Geographic differences. The communications needed for a team that is collocated might well be different from communications required for a project with global stakeholders. For example, it is more difficult to have short, daily team meetings, when the participants live in vastly different time zones, when technology is not readily accessible, and where multiple, complex deliverables with complex interfaces are developed simultaneously in different locations. In addition, different techniques and media may be used to facilitate geographically dispersed teams than those that are collocated. When planning the communications, these must be taken into account.
 - Cultural considerations. Handling culturally diverse team members should also be taken into account when planning communications. These cultural considerations are important regardless of where the team members are located. In addition to the obvious language barriers, there may be more subtle differences that should be planned, including:
 - Relationship to time. Some cultures view time as fixed (we spend, waste, and save time), others as fluid.
 - Relationship to task completion. Some cultures complete tasks because they have committed to the planned activities. Others complete tasks primarily when trust and the human relationship have been built.
 - Relationship to contracts. Some cultures believe in the letter of the law, others in the spirit of the contract. This difference might surface when creating Requests for Proposal, for example.
 - Models, such as business process models, can help overcome language barriers by eliminating the need for many textual descriptions.

.2 Assess format options for each stakeholder

When planning which stakeholders will review the business analysis work, it is important to consider which format option is the most appropriate communication

vehicle for them. In order to present each requirement in an effective format, the business analyst considers each stakeholder's communication preferences.

For example, when documenting requirements, the business analyst needs to understand that some models may not be appropriate for a non-technical audience because the requirement may be documented in a diagram that is unfamiliar to the stakeholder, and therefore, difficult to understand. The communications activities help ensure that needs of the stakeholder audience are taken into account. It may necessitate creation of multiple formats in order to convey the same requirement to varied stakeholders.

Business analysts can use various formats to document the results of business analysis. During the Plan Communications task they need to determine which will be the most effective for the project, taking into account the type of communication (status, issue escalation, requirements package, etc.), the audience, the distance of the stakeholders, the attitude towards documentation, and the organizational process assets (methodology, requirements process, and templates). The Business analyst will work within these guidelines and select the format that best conveys the information effectively, often using a combination of formats. Some examples of ways to document the requirements are:

- Formal meeting minutes with decisions and action items vs. informal notes
- Approval forms for formal signoff
- Consistent status reporting forms
- Models, such as diagrams - process workflows, entity relationship and process decomposition diagrams, use cases, prototypes
- Text and textual templates
- See the Knowledge Area Requirements Analysis for a list of requirements documentation formats.

.3 Determine appropriate content for each stakeholder

In addition, the Business Analyst should keep in mind that while there are advantages to constructing different formats to accommodate the unique needs of each stakeholder, there are also disadvantages that result in maintaining multiple requirements packages, status reports, and meeting documentation. The Business Analyst should develop a plan that will help determine what communication vehicle to use and content that needs to be included. The primary goal of the communications plan is to help ensure that information is conveyed clearly and in an understandable fashion to the audience. To help communications needs, the analyst should ask the following types of questions:

- What information is important to communicate? What is the appropriate level of detail to include?
- Is the information coming from or going to each stakeholder?

- What will the particular stakeholder understand based on the type of constituency they represent and on that stakeholder's preferred style of communication or learning?
- How does the business analysis work support the previous and subsequent phases (i.e. testing, implementation) or project activities and deliverables to facilitate traceability?

.4 Determine frequency required for each stakeholder for each communication type

For each type of communication, the Business Analyst determines the frequency required by various stakeholders. For example, when reporting the status of the business analysis work, the BA determines how often a status report is sent. The frequency can vary from stakeholder to stakeholder. For example, the frequency of reporting business analysis status can be biweekly for the sponsor, weekly for the business SMEs, biweekly for the technical partners, etc.

.5 Assess the formality of communications

Planning communications requires taking into consideration the level of formality that is needed for each business analysis effort. There is a spectrum of the formality that may be required, which could vary from stakeholder to stakeholder, project phase to project phase, work within a project phase, and requirements presentation, in which requirements may be documented and presented.

Communications tends to be more formal under the following circumstances:

- The project is very large and may be delivered in phases. The larger the project, the more formal the requirements should be. This is because more stakeholders are typically involved and more communication is required.
- The business area(s) involved are very complex
- The technology employed, if any, is new
- The project is considered to be mission critical
- The executive sponsor and/or key stakeholders requires formality
- The requirements are likely to be subject to regulatory review
- The requirements will be presented to an outside organization and an RFQ/RFP will be issued

In developing the communications plan, it may be helpful to distinguish between a "work product" and a "deliverable." Both are important to highlight in a communications plan. A "work product" is a document or collection of notes or diagrams that is used by the Business Analyst to organize and analyze the requirements. The work product may or may not become a deliverable, although during different phases of the requirements eliciting process, the Business Analyst may need to share this information with stakeholders in order to clarify requirements or drive down to more detail. Examples of work products might be:

- Meeting agendas and minutes
- Interview questions and notes
- Facilitation session agendas and notes
- Issues log
- Work plan, status reports
- Presentation slides used during the project
- Traceability matrices

A “deliverable” is a document that shows the work that has been completed on the project. Specific deliverables may be required by the project methodology. A requirement deliverable is used in subsequent phases of the project to implement the solution. Not every note and document that a Business Analyst creates is necessary to be included in a formal requirements package for review and signoff. However, planning who will receive meeting minutes in what format will most likely aid in information distribution during business analysis.

Presenting requirements for review. Before completing the communications plan, thought needs to be given to how requirements will be presented to various stakeholders. The Plan should reflect that requirements may be presented very formally or very informally. A formal presentation example would be use of a written business requirements specification. Other examples include a formal presentation to various levels of stakeholders, with executive summaries as well as a structured model like an entity relationship diagram, including all of the associated diagrams, supporting text, detailed attributes, and revision information. A requirement may be presented informally in an e-mail message, a note, or even verbally. The Business Analyst should assess the project requirements, audience, and organizational process assets to determine the level of formality appropriate for the business analysis. Generally:

- The more formal the communications, the more time that will be required to prepare for meetings, for reviews, for the presentation or requirements package, etc..
- The less formal the business analysis work, the more risk that it will be misunderstood and/or misinterpreted.

When presenting the requirements for review and approval, there needs to be just enough formality to support the project methodology and ensure that the stakeholders will review, understand, and approve them. Working within the framework of these guidelines, the Business Analyst decides not only the most appropriate communication vehicle and level of formality to employ for each stakeholder but also who will review the requirements.

The Business Analyst when planning the appropriate presentation format for an audience must also make sure that there is differentiation between what is a “work product” versus what is considered to be the final “deliverable”. Not every document that the Business Analyst produces is appropriate to communicate to the stakeholders.

2.5.5 **Techniques**

- Communications requirements analysis
- Communications media analysis

2.5.6 **Stakeholders**

The Business Analyst must clearly understand the varying needs of the audiences that will review the requirements, and realize that different audiences often require different requirements presentation formats.

For example, the following are potential audience/stakeholders that the Business Analyst will need to consider:

- Business Analyst
- Customer
- Domain Subject Matter Expert (SME)
- End User
- Implementation Subject Matter Expert (SME)
- Operational Support
- Project Manager
- Quality Assurance.
- Regulator:
- Sponsor

2.5.7 **Output**

Business Analysis Communication Plan. The business analysis communication plan is a subsidiary of the Project Communications Plan, which itself is a subsidiary plan of the project management plan (see PMBOK p. 227). The business analysis communication plan describes how and when the BA will work with project stakeholders. On small projects it may be very brief and may not be formally documented. On large and complex projects; and projects with many stakeholders, it may be included as part of the project initiation documentation and is essential as part of the overall project communications plan. Components can include:

- The stakeholder communications requirements for business analysis activities
- Format, content, medium, level of detail
- Responsibility for collecting, distributing, accessing, and updating information

2.6 Task: Plan Requirements Management Process

2.6.1 Purpose

The purpose of Plan Requirements Management Process is to choose or follow a process for planning and monitoring the requirements work throughout the project or project phase, and to help ensure that the process chosen to complete the business analysis effort is appropriate for the given project or project phase. Larger, more complex efforts will require more rigor, while smaller projects or phases will likely require less.

2.6.2 Description

This task describes how the business analyst determines the appropriate requirements process for a particular initiative. It describes how the BA determines what is currently in place, and how to create the process if it doesn't exist. It includes determining whether and how requirements are changed, which stakeholders need to approve (instead of the actual approval of requirements), as well as who will be consulted on, or informed of changes, etc. It also includes the approach to requirements traceability and determining which requirements attributes we will capture. These processes apply to all Knowledge Areas.]

Overall project planning is the responsibility of the Project Manager. The Business Analyst must work out a requirements planning approach in agreement with the project manager. For more detailed information on overall project planning, please refer to the Project Management Institute's (PMI) Project Management Body of Knowledge (PMBOK).

The business analysts must be familiar with and knowledgeable about their organization's approach to requirements definition, as it will greatly influence the process steps, tasks and deliverables required or expected during the requirements planning and monitoring phases of the project. These approaches are discussed in the Introduction to the BABOK (or Fundamentals or both).

2.6.3 Input

- Organizational Standards and Process Assets
- Business Analysis Plan(s)

2.6.4 Elements

.1 Choosing or creating the appropriate requirements process

Some organizations have a formal requirements process as part of their organizational assets. Others have inconsistent processes, and those performing business analysis work handle requirements in the manner they think best. Yet others have no process at all, and requirements are often either ignored or folded into other phases.

In some organizations it is easy to determine what, if any, requirements process exists. For example, each business analyst, whether internal or external, is trained on the

requirements process and associated tools and templates. Or there may be few resources performing business analysis work, so the process or lack of a process is well understood.

Organizations that have documented processes for requirements may have different processes for different requirements approaches. That is, there may be a process for gathering requirements for an agile project and another when doing projects with a waterfall approach. The methodology may allow for multiple requirements processes on any given project. For example, there may be one process for gathering enough requirements in order to determine which requirements need to go into subsequent project phases, and another process for defining the detailed requirements for each phase. Templates and tools are often available in these organizations.

In organizations where no formal process exists, it may necessary to create a process. Factors to consider include but are not limited to:

- *Organizational culture.* In organizations where the culture does not support formality, but where informality jeopardizes the end product, it will be necessary to work with the stakeholders to negotiate an appropriate process.
- *Stakeholder preferences.* Some stakeholder may require more or less formality. A sponsor may, for example, want formal approval but may not want a documented process for eliciting requirements. As above, it will be necessary to recommend the most appropriate approach to handling requirements, pointing out risks and impacts as needed.
- *Complexity of project, project phase, or product (product, service, or result) being delivered.* For projects that have many interfaces and business and/or system impacts, a variety of functional areas, and for products that are built with many components and subcomponents, have complex interfaces, will be used by a variety and number of stakeholders, or have other complexities, it will probably be necessary to have a more formal requirements process with a greater number of and more frequent requirements workshops, reviews/ inspections, and approvals. Formal processes for configuration management and change management will be more important for these projects.
- *Organizational maturity.* Immature organizations are less likely to want to spend time or money creating a requirements process, and there may be outright resistance to the idea of having a process to define requirements.
- *Availability of resources,* either internal or external to the performing organization that can assist with the effort of creating such a process. Groups, such as a PMO or professional services for business analysis, or external vendors can provide assistance.

Any combination of the above.

.2 Planning requirements traceability

About requirements traceability. Requirements traceability identifies and documents the lineage of each requirement, including its derivation (backward traceability), its allocation (forward traceability), as well as its relationship to other requirements.

The purpose of traceability is to help ensure product or solution quality and to assist in scope and change management, risk management, time management, cost management, and communication management.

Requirements traceability supports the ability to trace a requirement through the project life cycle. The ability to track the requirements is an important technique used to detect missing functionality or to identify if implemented functionality is not supported by a specific requirement.

Requirements traceability has the following project benefits:

Traceability aids scope management, since requirements and subsequent work products can be traced to ensure that they are relevant to solving the business need for which the project has been undertaken.

Traceability aids change impact analysis:

Requirements: Indicates which requirements are interrelated. Used to determine which additional portions of the solution may be indirectly affected by a proposed change. Changes to higher-level requirement are traced to determine what may be impacted. An advantage is that proposed changes can be more thoroughly estimated by understanding all impacts.

Design or Test: Indicates which elements of the solution implement or test a requirement. Used by the Business Analyst and the Project Manager to determine what work must be done to implement a change.

Interfaces: Indicates where requirements affect an external interface to another system. Used by the Business Analyst to determine where changes may impact external systems.

Traceability aids risk based testing:

A high priority requirement must have a test condition/case

A low priority requirement traced to a large number of test cases may be over-tested

Traceability supports the following project goals:

- Links downstream work products to the purpose for which they were created
- Provides a process to confirm that the Requirements Elicitation process is complete

- Provides a process to aid in work authorization
- Increases the chance of improved quality on all projects sizes and types
- Facilitates the requirements change control process
- May facilitate communication to appropriate stakeholders on risk, impacts, missing functionality, etc..

There are also many a dimension of traceability in a project. It will be necessary to determine and communicate which of the following aspects of traceability will be performed during the project or project phase. The following is not an exhaustive list.

- Requirements to business problem, business objectives, project objectives
- Scope to requirements
- Requirements to design work
- Requirements to quality assurance activities
- Requirement to resource plan
- Design work to quality assurance activities
- Requirements to requirements

.3 Structure Requirements Traceability

There are also many ways to structure requirement traceability. It is necessary to determine and communicate how traceability will be executed throughout the project or project phase. The highest level of the traceability attribute is relation(forward or backward). Other type attributes includes:

- Peer to Peer
- Subset
- Blanket
- Bi-directional
- Business value
- Estimated resource requirement
- Estimated cost

There are many automated tools to manage the requirements traceability. These tools, while useful, are not obligatory. Unless the planning and structuring of traceability

happens early in the project or project phase, the benefits of traceability stated above will not be attained.

.4 Determine Requirements Attributes

Requirements attributes provide information about the requirement, such as the source of the requirement, the importance of the requirement, and other metadata. Attributes aid in the ongoing management of the requirements throughout the project lifecycle. They should be planned, along with the requirement themselves, but are not in themselves part of the solution definition.

The information documented by the attributes helps the team efficiently and effectively make tradeoffs between requirements, identifying stakeholders affected by potential changes, and understanding the impact of a proposed change. Therefore, planning which attributes to document helps in managing scope during the project.

Attributes are facts that are attached to each individual requirement. Attributes allow the requirements team to associate information with individual or related groups of requirements and facilitate the requirements analysis process by expressing such things as which requirements may add project risk or require additional analysis.

Some common requirements attributes include:

- **Absolute reference** is a unique numeric (preferred) or textual identifier. The reference is not to be altered or re-used if the requirement is moved, changed or deleted.
- **Acceptance criteria** describe the test that would demonstrate that the requirement has been met to the satisfaction of customers, end users, and stakeholders.
- **Author** of the requirement. If the requirement is later found to be ambiguous the author may be consulted for clarification.
- **Complexity** indicates how hard the requirements will be to implement.
- **Ownership** indicates the individual or group that needs the requirement or will be the business owner after the project is released into the target environment.
- **Priority** indicates which requirements need to be implemented first. See below for further discussion on prioritizing and managing requirements.
- **Source of the requirement.** Every requirement should originate from a source that has the authority to specify requirements. The source must be consulted if the requirement changes, or if more information regarding the requirement or the need that drove the requirement has to be gathered.
- **Rationale** indicates the business goal that the requirement is intended to satisfy.

- **Stability** is used to indicate how mature the requirement is. This is used to determine whether the requirement is firm enough to start work on.
- **Status** of the requirement, indicating such things as whether it is proposed, accepted, verified, postponed, cancelled, or implemented.
- **Urgency** indicates how soon the requirement is needed. It is usually only necessary to specify this separately from the Priority when a deadline exists for implementation.
- **Additional** attributes may include information such as cost, resource assignment, and revision number, traced-from and traced-to.

.5 Plan the requirements prioritization process

There is a business value associated with each business problem we solve. The delivery of value at the right time and with the right cost is often the goal of the business. Requirements do not all contribute equally to the realization of the business value. Timelines, dependencies, resource constraints, and other factors influence how requirements are prioritized.

Planning the requirement prioritization process helps ensure that stakeholders determine and understand how requirements will be prioritized throughout and at the end of the business analysis effort.

Formality. The formality and rigor of the requirements prioritization process is determined partly by the methodology chosen, and by the characteristics of the project itself. Regardless of the formality and rigor dictated by these elements, the steps described in the following sections are used: the differences will lie in the level of detail, the amount of formal structure in the prioritization process (i.e. formal meetings versus informal conversations) and the amount of documentation needed to support the prioritization process.

Establishing the process and technique. The process to plan how requirements prioritization will occur needs to include which prioritization technique (s) will be used. The techniques can range from more formal to less formal.

Help plan the participation. The BA in conjunction with the PM and sponsor can determine the participants needed for the prioritization process.

Who to invite and who does the inviting depends on organizational norms and best practices. Since sponsors are ultimately accountable for the business solution and major project decisions, they need to be invited to participate in the discussion, even if they delegate the participation to business SMEs. Another key stakeholder is the project manager, whose total project management plan is dependent on which requirements are released and when. The invitees depend on methodologies, organizational norms, and the engagement of the sponsor.

- In some organizations technical SMEs are invited to the prioritization meeting, to discuss technical impacts and costs of the requirements. In others technical

SMEs are not invited, with the discussion focused only on the business requirements and impacts.

- In some organizations sponsors actively participate in the prioritization process; in others they do not.

When there are multiple limiting factors, invite participants accordingly.

2.6.5 *Plan the process for handling changes*

Some considerations when planning for handling changes:

- **Determine the process for requesting changes.** This process can be formal and documented, or informal and undocumented. The process can, but does not have to set authorization levels for approving changes. For example only, if a change is estimated to take less than a certain number of hours or dollars, the requester and project manager can approve the change. If larger, the sponsor has to approve it. Again, this is an example of an authorization process.
- **Determine who will authorize changes.** The planning activity needs to include a designation of who can approve changes after requirements have been baselined. On larger projects there might be a formal Change Control Board (CCB) or Change Authority, which considers the requested change, and provides initial judgment on the merits of that request. The CCB can consist of any number of people in any number of positions. It may or may not include the sponsor and/or the designate, the project manager, the business analyst, SMEs, or other interested parties. On smaller projects the CCB may be informal and consist of the members of the team, such as a SCRUM team.
- **Tailoring.** Determine the amount of formality that will be required to document changes. Note that in projects involving agile methodologies, the amount of documentation and formality may be significantly reduced to ensure speed. Part of the planning process is to decide the appropriate level of documentation needed so that a consistent set of team rules is followed. Minimal practice suggests that a log of changes and issues be maintained so that they can be communicated at daily meetings.
- **Impact Analysis.** Specify who will perform the analysis of such impacts as business processes, information requirements, system and hardware interfaces, other software products, other requirements, test strategies and plans, to name a few.
- **Plan the wording of the request.** It is important to set the expectation at the beginning of the business analysis activities that although the amount of documentation required to request changes is project and methodology dependent, the wording of the request must be clear. The requested change must be expressed in unambiguous terms. Therefore, it will be necessary to discuss the nature of the request with the requestor and other interested stakeholders.

The requirements process should spell out the nature of the components on the request for change, which might include:

- Cost and time estimates of change
 - For each item, work product, or technical product affected, a brief assessment of the expected cost of change is to be estimated. As a matter of good practice, reusability will yield improvements to the change process by limiting the extent and scope of changes to other components. The goal should be to ensure responsiveness to change, not raising unlimited objections and impediments to the change process.
 - The estimate will provide an integrated view of the impact, in terms of costs, resources needed, how many hours and days for implementation, and any dependencies.
- Benefits and risks of the change
- How the change aligns with the project and business objectives to help ensure all changes add business value
- Since there are often unintended consequences to what seems like a favorable change, the request should include a well-structured change analysis form (written or verbal), statements of the expected risks, including both negative and positive influence on project objectives. Benefits considered may include not only financial benefits, but also the technical aspects of product features, influences on project scope, time, cost, quality, resources, and the business interests expressed in the business case, if one has been created.
- Recommended course of action for change
 - The course of action for the change needs to be explained with the understanding of benefits and risks in the previous section. Several alternate courses can be considered, including those recommended by the requestor, and by other stakeholders. By weighing the relative benefits, risks, and other criteria for each option, the decision-maker, designated by the approval process, can make a choice that will best serve the needs of the project.
 - The various options considered and the reasoning for the option finally selected should be recorded.
 - The recommended course of action needs to be complete enough to permit clear coordination of the parties affected by the change. For larger changes, this course of action might be a subproject within the context of the overall project, including elements that need to be put into the overall project management plan.

- Updates to the communications plan and the method for communication of the change to affected stakeholders.
- Configuration management and traceability disciplines should establish product baselines and version control practices that will clearly identify which baseline is affected by the change.

While the project manager usually assumes the primary responsibility for managing change, the business analyst is responsible for advocating in favor of the interests of the business clients, as well as to advocate for positive control over the requirements baseline.

Coordinate prioritization of change. The priority of the proposed change must be established relative to other competing interests within the current project phase. The requestor should provide a priority as described in the section above. Project decision makers will need to consider the priority as well any potential risk of deferring implementation until a later time.

2.6.6 Techniques

- Change control system (process for changing the requirements baseline, authorization levels for approval, tracking process to recognize the changes and make decision to approve change—criteria used)
- Configuration management system to establish how changes to the product deliverables and versions will be controlled, changed, approved and documented.
- Traceability system including:
 - Process for tracing requirements
 - Numbering structure
 - Hierarchy structure
 - Requirements for traceability linkages
 - Guidelines for level of granularity
 - How to find orphan elements and inconsistencies
 - Complexity analysis
 - Templates
 - Who, when and how traceability will be maintained

2.6.7 Stakeholders

- Business Analyst

- Domain Subject Matter Expert (SME)
- End User
- Implementation Subject Matter Expert (SME)
- Operational Support
- Project Manager
- Quality Assurance.
- Sponsor

2.6.8 **Output**

Requirements Management Plan. The Requirements Management Plan is a formal document or an informal summary of the business analysis activities to determine the:

- Approach to be taken to structure traceability
- Process required to determine and document which requirements attributes will be used
- Requirements prioritization process
- Requirements change process, including how changes will be requested, analyzed, approved, and implemented
- Organizational Performance Standards. Business analysis work involves determining which, if any, performance standards exist within the organization, division, operating company, or business units. In some organizations metrics or suggested metrics exist as part of the organizational process assets. Where none exist, it is necessary to work with appropriate stakeholders to decide which metrics will be used during business analysis.

The formality of the Plan will be based on:

- Requirements approach, such as waterfall, incremental, or agile. Different approaches might dictate the amount of rigor required for this plan.
- Organizational process assets, or methodology, templates, and processes of the organization where business analysis activities are performed. Some organizations have these assets, while others do not. Those with formal methodologies, templates, and process will likely dictate the amount of rigor that is necessary to support business analysis activities.
- Stakeholder attitude towards formality and rigor.

2.7 Task: Plan, Monitor, and Report on Business Analysis Performance

2.7.1 Purpose

The purpose of this task is to plan for and then monitor the health of business analysis work throughout the project or project phase. The Business Analyst must work closely with the Project Manager in completing this task.

This task will help enable identification and documentation of the necessary metrics, which are quantitative measures of a process or product. In order to make effective decisions about the business analysis activities and the requirements, accurate, meaningful data is required. It is important that all key stakeholders involved understand and agree on the metrics to be used.

During this task the Business Analyst works closely with the Project Manager not only to develop metrics, but to determine the most effect way to monitor and report on the work.

2.7.2 Description

This task covers determining which metrics will be used to measure the work performed by the business analysts. It includes how we track, assess, and report on the quality of the work performed by business analysts and take steps to correct any problems that may crop up. If problems are identified, determine appropriate corrective action (which may feed into the development of future plans on this or other projects). These metrics should be included in the formal plans if such plans are created.

Business analysis activities during this task include but are not limited to:

- Determine which metrics will be used during the planning activities. The process of metrics collection and analysis must be regularly monitored and measured. The results should be reviewed on a scheduled basis, and must also allow for exception alarms on an emergency basis when needed. The actual schedule of metrics collection and reporting will be determined by the business analyst in conjunction with other key stakeholders based on the size, complexity, risk and other relevant project factors.
- Help ensure that a process exists for tracking, monitoring, and reporting on the business analysis work. This includes conducting on-going collection and analysis of the data based on criteria established in planning. Managing the changes as described elsewhere in the chapter.
- The focus of the business analyst within the context of monitoring business analysis work is to assist the project manager in answering questions about progress and quality. This focus expands very appropriately to any measurements related to the quality and completeness of the end product from the business perspective. The metric should be logically linked to a performance

or quality objective, at a point in the process that allows time for appropriate intervention.

- Identify and report on risks that result from the monitoring process. Although the project manager is responsible for managing risk, the business analyst, with the other team members, should identify any risks within their domain. Monitoring business analysis activities could well uncover risks and issues that were not previously apparent.
- Make routine and ad hoc reports on the status of business analysis work. Reporting on the health of the project occurs as a result of collecting and analyzing information, based on the planned metrics. The Communications Plan should outline the stakeholders receiving the status information and the medium for receiving it. This reporting may be routine (e.g. weekly, biweekly, or monthly) or on a per request basis. The process for escalating issues and for ad hoc reporting should be detailed in the requirements process plan(s).
- Recommend corrective and preventive action as needed. Both corrective and preventive actions are a result of the monitoring process. Corrective action brings the activities in line with the plan. It occurs when it is clear that the actual work is veering from the plan and details what needs to be done to stay on course. Preventive action describes the activities that need to be taken to prevent the effort from straying from the plan. See the PMBOK for more information on corrective and preventive actions.
- Replan as needed. A common result of the tracking and monitoring process is the need to replan. If formal requirements plans have been developed, they need to be examined to see whether or not they have to be updated.

Different organizations may have metrics standards and processes used on their projects. The metrics that are discussed in this section may be critical to some organizations; while in others or on other projects metrics may not be used at all. The Business Analyst should take any of their organization's existing standards and processes into account when planning which metrics will be used and for monitoring work.

2.7.3 **Input**

- Organizational Performance Standards, described above.
- Actual Performance Metrics. Actual performance measures are captured, analyzed, and become the basis for taking corrective or preventive action described above. Capturing actuals is a process that occurs through the business analysis effort.
- Business Analysis Plan(s). the business analysis plans, described earlier in the chapter, these plans, describe deliverables, activities, tasks, estimates for all business analysis work.
- Requirements Management Plan, described in the task above.

2.7.4 *Elements*

This section deals with three types of tasks for both product and project-related metrics – the Identification, Collection and Reporting of these key measurements.

A suggested sequence of steps during business analysis work includes the following:

- Determine relevant metrics for the business analysis activities and work products, including the requirements themselves.
- Determine how the metrics will be collected, analyzed, documented, and communicated.
- Execute the following steps on a continuing scheduled and/or ad hoc basis:
 - Collect
 - Analyze
 - Store
 - Report and distribute the metric results

.1 Determine Metrics

Determining effective product metrics will demand a detailed and disciplined process as good metrics usually depend on both the product's goals and any assumptions that may have been made. Business analysis includes eliciting and identifying these during this task.

Some of the metrics discussed below, as well as others that may be defined within an organization, may or may not be used on any particular project. Some of the metrics may also be collected and reported at specific points of the project, while others may be in existence throughout the entire project.

The Business Analyst will use any formal or informal list of requirements to identify any specific quality measurements that will be used to judge the product i.e. to answer the question of whether the product will meet the requirements. Specific reports content and formats may also be determined at this point but typically will be done in a later task.

An example of a useful metric might be the rate at which the development team is finding and fixing product defects. This would have to be clearly defined regarding how to measure this and what the target for being able to ship the product might be.

.2 Collect Metrics

The purpose of this subtask is to collect the specific project metrics identified above for all requirements related activities. This task enables the Business Analyst to collect the identified and agreed to product metrics. In turn, this will enable all relevant metrics to be accurately collected for analysis and reporting. This task is an ongoing one that will be executed as long as there are business activities being executed.

This subtask describes the activities of the business analyst in quantitatively monitoring progress and attributes of the business analysis work. General trends in management, whether describing concerns of the business, finances, quality or performance at all levels, call for the appropriate use of data in order to make factual forecasts and decisions.

- Appropriate volume of data – too much information will be expensive to collect, analyze and report. It will also distract project members from other responsibilities. On agile projects, this will be particularly relevant.
- Appropriate use of automation – large amounts of data can be better collected and analyzed if the business or technical process generates and collects them automatically without human intervention. Greater human involvement increases expense, higher likelihood of error, and raises the likelihood of falsification.
- Timeliness of collection, analysis and reporting – a bureaucratic metrics program fails from collecting too much data and not generating useful reports that will allow timely responsive action. Those charged with collecting metric data must be given feedback to understand how their actions are affecting the quality of the project results.
- Logical connection to preventive and corrective action – the metric must ultimately provide value by adjusting the current or future course to assure the desired outcome.

The business analyst provides a valuable contribution by keeping metrics activities focused on effective collection, analysis, reporting, and where needed, either preventive or corrective action.

.3 Report on business analysis progress

The purpose of this subtask is to report on the metrics that have been collected for all requirements related tasks identified above. Product metrics must be reported to the appropriate stakeholders. The Communications Plan should address the appropriate stakeholders to receive the various product metric reports that may be available.

This subtask describes the business analyst role in ad hoc and periodic reporting on the status and progress of requirements management activities. Using reporting mechanisms and formats established by the Requirements Plan and other project tools such as the Communications Plan, the business analyst will keep all stakeholders advised on matters related to the requirements baseline.

The Business Analyst will submit periodic reports as defined by the requirements management plan or similar documents. Such reports will also be made on an ad hoc basis. Reports can be in written format to provide for archival and tracking, or they can be informal and verbal, per the team's decision. Some reports will also be made formally and orally as presentations to various levels of stakeholders and management. On larger projects with more traditional methods, the forms of reporting are likely to be more formal, relying on written reports and formal meetings. For more agile approaches, the reporting may be very flexible and fluid.

.4 Take preventive and/or corrective action

This element provides guidance on the business analyst role responding to events on the project and taking corrective action. In response to events on the project, it may become necessary to modify the Requirements Plan, in entirety or in sections, as appropriate.

The corrective action may or may not involve modifying the Requirements Plan. If changes are required, the business analyst role owns those modifications. Any perceived need to improve, update, or change it will be accomplished by the approved change management process.

2.7.5 *Techniques*

- Variance analysis, including Time and cost reporting systems (to capture the actuals)
- Performance information gathering, compilation, and presentation
- Replanning
- Configuration management system
- Process analysis

2.7.6 *Stakeholders*

- Business Analyst
- Domain Subject Matter Expert (SME)
- End User
- Implementation Subject Matter Expert (SME)
- Operational Support
- Project Manager
- Quality Assurance.
- Sponsor

2.7.7 *Output*

- BA Performance Assessment. This output, completed formally or informally, is the end result of comparing planned vs. actual performance, determining variances,
- Lessons learned documentation includes the results of the lessons learned sessions. The documentation can but does not have to include:

- Project successes, failures, and opportunities (see description of the lessons learned process technique below)
 - Recommendations for improved performance of future projects or project phases
 - Planned vs. actual deliverables, activities, estimates
 - Updated project records
 - Updated lessons learned repositories
 - Updated project history
- Process improvement recommendations. When the analysis of the performance of the business analysis work yields less than satisfactory results, it is helpful to review not only the results themselves, but also the process that produced those results. This process analysis, described as a technique below, often results in recommendations for improvement. In this case the improvements are to the business analysis process.

2.8 Technique: Expert Judgment

2.8.1 Purpose

The purpose of using Expert Judgment is to coordinate the appropriate resources in order to get the best available input into the Business Analysis Approach Plan.

2.8.2 Description

Expert judgment is often used to assess the inputs needed to develop the Business Analysis Approach Plan. Such judgment and expertise are applied to any technical and management details during this process and expertise is provided by any group or individual with specialized knowledge or training based on input from many sources including:

- Stakeholders, including business analysts, project managers, sponsors, domain SMEs
- Project Management Office representative(s)
- Consultants
- Professional and technical associations
- Industry groups

For more information on expert judgment, please see the third edition of the PMBOK, p. 86.

2.9 Technique: Stakeholder Analysis

2.9.1 Purpose

The purpose of stakeholder analysis is to help ensure required project roles are identified, filled, and that the interests of project stakeholders are identified and prioritized. The result of this analysis becomes input into their needs, wants, and expectations.

2.9.2 Description

Stakeholder analysis is the technique of assisting in:

- Identifying which roles are needed on the project
- Helping the project manager to identify which stakeholders can fill those needs,
- Categorizing stakeholders
- Getting agreement on general levels of authority for the entire project
- Determining the impact of the project on stakeholders
- Determining how the stakeholders view this impact, how they might react to the project and its impact on them, and what influence these stakeholders have over the success of the project

Projects can affect stakeholders' interests either positively or negatively. Knowing both can help to:

- Address the negative concerns, thereby increasing the chances for a positive project outcome
- Develop strategies that can leverage positive attitudes and high influence to mitigate negative attitudes.

2.9.3 Elements

Most elements are covered within the task *Conduct Stakeholder Analysis*.

2.9.4 Usage Considerations

.1 Advantages

- Role analysis is important for all projects
- Categorization of stakeholders can be helpful on larger efforts
- Influence analysis is essential for projects that have:
- A variety of cross-functional stakeholders

- Conflicting or competing needs, wants, and expectations
- Weak or no sponsorship

.2 Disadvantages

- Time-consuming
- Can be hard to implement, since attitude and influence are not readily assessable

2.10 Technique: Communications Requirements Analysis

2.10.1 Purpose

The purpose of this technique is to analyze stakeholder needs for communication, thus helping to ensure that all the required communication, but only the required communication is distributed to project stakeholders, adhering to their communications preferences.

2.10.2 Description

Since communication is critical to project success, planning project communications before information is distributed can prevent minor mishaps and total derailment. Communications has to be completed enough, but not overwhelming. Analyzing stakeholder communications requirements can include determining such things as the:

- Communication complexity, which can be expressed in communications channels
- Preferred level of detail to ensure that stakeholders receive just enough communications
- Preferred format
- Preferred media
- Logistics of communicating to and from multiple locations
- Internal communications flow. How communications will flow within the organization, between and within departments.
- External communications. How communications external to the organization will flow. A few examples of external communications might include communicating with:
 - Software, hardware, contractors, training vendors
 - Compliance/regulatory agencies
 - Parent companies

- The media

2.10.3 Elements

Many of the elements have been explained in the Plan Business Analysis Communications task.

2.10.4 Usage Considerations

.1 Advantages

Essential for projects that have:

- A variety of cross-functional stakeholders wanting different levels of detail, formats, and media preferences
- Conflicting or competing communications needs
- Geographically-dispersed or virtual teams

.2 Disadvantages

- Time-consuming
- Not as necessary for single-function projects

2.11 Technique: Variance Analysis

2.11.1 Purpose

The purpose of this technique is to analyze discrepancies between planned and actual performance, determine the magnitude of those discrepancies, and recommend corrective and preventive action as required. Variances can be related to planned vs. actual estimates, cost, scope, product expectations, or any measures that have been established during the planning activities.

2.11.2 Description

The business analysis performance measures described in the task Plan, Monitor, and Report on Business Analysis Performance are used to assess the work completed, and when variances between the actual work and the plan are found, variance analysis measures the magnitude of the variation. Variance analysis also includes studying the causes of the variance to determine if corrective or preventive actions are required to bring the business analysis work in line with the business analysis plans.

2.12 Technique: Replanning

2.12.1 Purpose

The purpose of replanning is to update the appropriate business analysis plans when changes affecting to the requirements baseline have been approved.

2.12.2 Description

Change requests may result in the need to modify deliverables, activities, and/or estimates that have already been approved in the business analysis plans. Replanning accommodates the need to review the impacts of approved changes and revise the business analysis plans as required.

2.13 Technique: Change control system (includes time and reporting system)

2.13.1 Purpose

The purpose of a change control system is to define how the requirements baseline, as well as how updates to the business analysis plans will occur. Much of this technique has been described in the task Plan Requirements Management Process.

2.13.2 Description

Change control system, described in the task Plan Requirements Management Process, can include:

- Process for changing the requirements baseline, including the forms, templates, and other organizational process assets.
- Authorization levels for approval
- Tracking process to recognize changes. This process describes how to capture actuals vs. planned deliverables, activities, and estimates. The process includes such things as:
 - How often to capture actuals
 - How to analyze variances (ex. estimates to and at completion, earned value)
 - How often to report actuals(status and progress) as well as forecasts and to whom
 - How to identify when corrective and/or preventive action is needed
 - Criteria that will be used to approve the change

2.14 Technique: Lessons Learned Process

2.14.1 Purpose

The purpose of a lessons learned session is to compile and document what went well (successes), opportunities for improvement, failures, and recommendations for improving the performance of future projects or project phases.

2.14.2 *Description*

Lessons learned sessions can include any format or venue that works for the key stakeholders identified as participants in these sessions. They can include a review of:

- Business analysis activities
- Business analysis deliverables
- The final product
- The business analysis process
- Automation and technology used or not used
- Managerial concerns or issues
- How organizational process assets helped or hindered the business analysis and requirements processes
- Performance against plan
- Variances
 - Root causes for the variances
 - Whether the variances were routine or anomalies
 - Corrective and/or preventive action recommended, approved or rejected, and taken

Lessons learned may take place in formal, facilitated meetings with set agendas and meeting roles, formal or informal working sessions, informal get-togethers, which may or may not include a celebration.

Chapter 3: Requirements Management and Communication

3.1 Introduction

3.1.1 *Knowledge Area Definition and Scope*

The Requirements Management and Communication Knowledge Area is the collection of activities and considerations for managing and expressing the output of the requirements analysis to a broad and diverse audience. Requirements management and communication is an ongoing, iterative activity that is done in parallel with Business Analysis Planning, Enterprise Analysis, and Requirements Analysis. It includes packaging, tracing, managing and communicating requirements for the stakeholders and implementers of the project.

The rationale for including this knowledge area is that as requirements are elicited, analyzed and documented, they must be managed and communicated to the interested stakeholders. An effective business analyst must be able to clearly present the requirements in a format and structure that is appropriate for its intended audience.

Communicating requirements is an important aspect of business analysis because the BA is working to bring the stakeholders to a common understanding of the requirements. Because the stakeholders represent people from different backgrounds and knowledge areas, this communication is essential. For example a business person from the payroll processing department and a developer from the IT group must have the same understanding of how employee pay amounts are to be calculated and distributed. To facilitate this communication the BA must consider when and where communications need to take place, what communication approach is appropriate in each situation, and how each communication should be presented.

Managing requirements involves change control, requirements storage, tracing related requirements and maintaining them for re-use.

3.1.2 *Input*

- Stakeholder list
- Stakeholder roles and responsibilities designation
- Stakeholder analysis
- Business analysis communications plan
- Requirements
- Requirements management plan
- Requirements format/presentation options

- Other solution components
- Test cases and procedures
- Implemented requirements

3.1.3 ***Tasks***

7.2 Manage solution and requirement scope

7.3 Manage requirements traceability

7.4 Maintain requirements for re-use

7.5 Prepare requirements package

7.6 Communicate requirements

3.1.4 ***Techniques***

- Baselineing
- Change control system
- Configuration management/repository system
- Manage requirements conflicts
- Obtain requirements signoff
- Traceability system
- RFI, RFQ, RFP
- Conducting a requirements presentation
- Conducting a requirements review

3.1.5 ***Output***

- Approved requirements
- Decisions made
- Modified requirements
- Approved change to solution/requirements scope
- Traced requirements
- Incomplete requirements

- Maintained/reusable requirements
- Requirements presentation/package
- Communicated requirements

3.2 Task: Manage Solution Requirements Scope

3.2.1 Purpose

Baseline and manage changes to business case, solution scope and requirements.

3.2.2 Description

As requirements are elicited and analyzed they must be recorded and stored for reference. They also must be checked against the solution scope to make sure they are within the agreed upon project boundaries.

In addition, requirements must be approved by stakeholders as specified in the project and/or requirements plan. Requirements are often baselined, meaning the collection of requirements that support the scope of the project are saved as approved. Any changes to requirements after baselining involves use of a change control process and subsequent approval.

As requirements are refined or changed with new information, the changes may be tracked. Conflicts around requirements are managed using an issues list where final decisions are recorded.

3.2.3 Input

- Stakeholder list
- Stakeholder roles and responsibilities designation
- Requirements
- Requirements management plan

3.2.4 Elements

One of the most important tasks of business analysis is managing requirements. Requirements may be stored in any number of repositories (i.e. paper or electronic files, flip charts, in requirements management tools). The system for adding, changing and deleting requirements should be consistent and clearly understood by the team. File or component naming standards will assist with categorizing and maintaining requirements.

The business case, solution or product scope and all requirements must be reviewed and approved by the sponsor(s) according to the approval authority stated in the Requirements Management Plan.

As requirements are developed and reviewed, conflicts often arise. A conflict with a requirement may result from stakeholders in different areas viewing the requirements from different perspectives. It may also result from conflicting priorities. As conflicts are identified, the business analysis process includes conflict resolution techniques to manage and resolve the conflict.

In the event that any identified stakeholder declines to sign off, the business analyst will notify the project manager (or follow the project escalation procedure) of the absence of approval which may be deemed sufficient cause to delay subsequent tasks or to reduce project scope.

Once requirements are approved, they may be baselined. When a requirement is baseline it is saved as approved and subsequent changes to the requirement must follow the change control process.

As changes are approved, the business analysis plan may require that the baselined version of the requirement to be maintained in addition to the changed requirement. Additional information is often maintained such as description of the change, person who made the change, reason for the change.

3.2.5 *Techniques*

- Baselining
- Change control system
- Configuration management/repository
- Manage requirements conflicts
- Obtain requirements signoff

3.2.6 *Stakeholders*

- Sponsor
- Project manager
- Business domain subject matter experts

3.2.7 *Output*

- Approved requirements
- Decisions made
- Modified requirements
- Approved change to solution/requirements scope

3.3 Task: Manage Requirements Traceability

3.3.1 Purpose

Create and maintain relationships between requirements and other solution components.

3.3.2 Description

Requirements are related to other requirements. “Tracing” a requirement refers to the ability to look at a requirement and the others to which it is related. Business analysis involves identifying these relationships and documenting them as is useful.

There are several reasons for creating these relationships.

1. To perform impact analysis. When a requirement is changed the analyst can easily review all of the related requirements, and software components to see the “impact” of the change.
2. A second important use of traceability is double checking to make sure that requirements or solution components have not been missed. Example: When business objectives are traced to detailed requirements such as business rules, data elements, and Use Cases it is clear how they will be accomplished. Each business objective can be reviewed to make sure that it will be addressed by the appropriate solution components. If a business objective is not tied to anything, it has not been analyzed and included in the solution.
3. Finally traceability supports the allocation of requirements to solution components (see *Solution Assessment and Validation*).

Example: A business requirement like *Increase Sales 5%* is related to a business process SELL PRODUCT.

The relationship between these two requirements may be named.

Example: The objective *Increase sales 5%* is implemented in SELL PRODUCT.

Requirements can also be related to software components (i.e. modules, database tables) and to test cases and test procedures.

Traceability may be maintained by the business analyst or other team members as specified in the Requirements management plan (See Business Analysis Planning and Monitoring KA).

3.3.3 Input

- Requirements
- Other solution components
- Test cases and procedures

3.3.4 Elements

Relationships between components or traceability can be documented in a matrix.

Examples:

	Business Process	
Business Requirement	SELL PRODUCT	BILL CUSTOMER
Increase sales 5%	X	X
Decrease billing costs 3%		X

	Business Rule	
Business Requirement	BR1 – Orders over \$100 receive free shipping	BR2 – Orders under \$1000 must be paid via credit card
Increase sales 5%	X	X
Decrease billing costs 3%		X

	Test Case	
Use Case	Test case 1	Test case 2
BUY PRODUCT	X	X
RETURN PRODUCT		X

Many requirements management tools support traceability.

Impact analysis is performed to assess or evaluate the impact of a change. Traceability is a useful tool for performing impact analysis. When a business need changes, its relationships to other requirements or system components can be reviewed. Each related requirement or component may also require a change to support the new business need. These components can also be *traced* to their related components and those components reviewed for needed changes. And so on. This ability to look at one component and identify all of its related components is a very powerful tool. The BA can quickly assess the relative size of a business change on its related software support and business procedures. Knowing the impact of a change helps business decision makers evaluate their options with facts rather than guesses.

3.3.5 *Techniques*

Traceability system

3.3.6 *Stakeholders*

- Business analyst
- Quality assurance
- Implementation SME

3.3.7 *Output*

- Traced requirements
- Incomplete requirements

3.4 Task: Maintain Requirements for Re-use

3.4.1 *Purpose*

Increase efficiency of development and implementation of software and solution enhancements after deployment by re-using existing requirements.

3.4.2 *Description*

Once a requirement has been satisfied it should be considered for its re-usability on future projects. Even though a requirement has been satisfied, it is still a requirement as long as the business stakeholders need it. Maintaining these “implemented” requirements helps with product enhancements and future system changes. Often the business wants more functionality on top of the existing system. Existing requirements may also be re-used on related business projects.

To re-use requirements they must be clearly named and defined and easily available to other analysts. These requirements may be stored in a repository (i.e. directory of files, requirements management tool) administered by a custodian or librarian (who may be the BA). When an existing requirement is needed on a sub-sequent project it can be “checked out” of the repository for re-use.

When a system enhancement is created existing requirements provide knowledge about the original system. These original requirements are often still needed with the enhancement built around new requirements. The analysts, technical team and QA team will use the original requirements as the basis for regression testing the system when the enhancement has been added.

Business models are important to maintain for future strategic and tactical planning.

3.4.3 *Input*

- Implemented requirements

3.4.4 Elements

- Select which implemented requirements will be maintained after solution implementation.
- Name the responsible party who will maintain the requirements (i.e. custodian, librarian)
- Facilitate ongoing use of requirements for impact analysis and solution maintenance
- Facilitate re-use of requirements on related projects to encourage enterprise consistency of business models.

3.4.5 Techniques

Configuration management/repository system

3.4.6 Stakeholders

Business analyst

3.4.7 Output

Maintained/reusable requirements

3.5 Task: Prepare Requirements Package

3.5.1 Purpose

This section covers the considerations that must be addressed when devising a plan for successfully creating a requirements package.

Requirements can be presented in various formats. This task describes the work required to decide which format(s) are appropriate for a particular project and its stakeholders. Requirements should be presented in formats that are understandable for the reviewer; they must be clear, concise, accurate, and at the appropriate level of detail. The overriding principle for business analysis is only to produce requirements documentation to the extent needed to assure the clear understanding by the team.

Presenting requirements in the appropriate format is primarily the responsibility of the analyst. This is a critical business analysis task in order to obtain stakeholder understanding and approval of the requirements.

In some iterative/agile methodologies, requirements deliverables and/or a requirements package is not created. Team members on these projects discuss requirements, use white boards and wall charts, and rely on informal notes to drive software development. Requirements on these projects are documented as recommended by the methodology and in informal work products.

3.5.2 *Description*

Business analysis work results in many deliverables. The deliverables must be “packaged” into a requirements document for presentation to the stakeholders. Documenting requirements is a complex process, and communicating the requirements correctly to stakeholders is a key success factor which can be facilitated by packaging the requirements effectively.

Misunderstanding of requirements will have a negative impact downstream on project implementation. It leads to re-work and cost overruns, particularly if deficiencies are uncovered late in the process during the development or user acceptance testing phases of the project.

There are various points in requirements development (elicitation, analysis, documentation) where a requirements package may be created and presented, not just at phase end.

Each requirement that has been gathered, analyzed, and documented must be presented to one or more project stakeholders for review, revision, and approval. A requirements deliverable may include one or many requirements. To make the review process as efficient and effective as possible, the business analyst should present each requirement in an effective format to facilitate communication. This requires that the business analyst thoroughly understand each requirement and present it in accordance with each stakeholder’s communication preference.

Technical requirement formats may not be appropriate for a non-technical audience because the requirement may be either too technical, or may be documented in a diagram that is unfamiliar to the stakeholder, and therefore, difficult to understand. The business analyst should be able to ascertain the needs of the stakeholder audience and choose a presentation format that is appropriate to the audience. This may necessitate creation of multiple formats in order to convey the same requirement to varied stakeholders.

3.5.3 *Input*

- Stakeholder analysis (from Business Analysis Planning and Monitoring KA)
- Requirements
- Requirements Techniques (from Requirements Analysis KA)

3.5.4 *Elements*

.1 Identify Formatting Option Based on Analysis Technique

The business analyst will employ various techniques to document requirements and make decisions on the most effective way of communicating the requirements. Depending on the type of requirement, the presentation technique may vary. Often, the project methodology will specify which techniques will be used for documentation. The business analyst will work within these guidelines and select the best technique that will convey the requirement effectively. There will likely be a combination of many

formats in one requirements document. Some examples of techniques employed are the following:

- Diagrams - Process Workflows, Entity Relationship and Process Decomposition, Use Case
- Text - Textual templates, use case descriptions, process descriptions
- Prototypes
- User stories

In addition to requirements, BAs sometimes need to communicate in formats that are not requirements or that don't flow directly into project documentation. Some examples of these are:

- User manuals
- Presentation slides
- Issues log

The ultimate goal is to gain consensus with stakeholders about all solution components.

See the Knowledge Area *Requirements Analysis* for a list of requirements techniques.

The best format choice is the one that best communicates the specific content of the requirement. Each organization may have standards that the Business Analyst will be required to follow, and the project team will utilize the techniques appropriate for their project. Usually, each organization also has an approved suite of tools that are used for documentation. MS Word, for example, is normally a standard employed for documenting text, and organizations may already have templates available in a library that the analyst can utilize. To create diagrams, such as an Entity Relationship diagram, organizations may have standard tools, such as Erwin or MS Visio. The Business Analyst should keep in mind that the tool used will drive the look and feel of the requirement, and this will affect how clearly the requirement is understood by each stakeholder.

The documents contained in a requirements package will vary, depending on the project and the type of requirements that were gathered.

Requirements may be “packaged” at any point in a project. Whenever requirements are being presented to stakeholders, packaging them into a cohesive package will make them easier to review.

If the package is created with the intention of making it a baseline for purposes of change control, the requirements documentation must be complete in order to prepare the requirements package. The requirements package is used in the review of the requirements, which will result in the sign off of the requirements.

If the package is being created at some other point during requirements development, subsets of the requirements may be all that is required.

.2 Identify Each Stakeholder's Presentation Requirements & Preferences

Each stakeholder who will review the requirements may have different communication needs. The Business Analyst must determine what the level of detail, language, and formality is appropriate for each type of stakeholder and devise the best way to effectively convey information. The following are some sample considerations:

- Executive sponsors and management often want summaries and high level requirements. Their primary goal is to understand that the solution will meet the return on investment expectations in accordance with their business plan.
- Stakeholders in the customer/business area need requirements that are written in business language, and simple to understand and review. They must fully understand each requirement in detail, since it is this group that will be most affected by the solution implemented.
- Implementers of requirements will need very detailed descriptions of what success criteria for the new procedures and processes must be met.
- Technical designers and developers will need very detailed information on the functional, user interface and technical requirements in order to build the solution.
- Quality assurance analysts will need to understand what business benefits the solution must produce so that they can develop a detailed testing strategy to ensure that the system is not just built right, but that the right solution is built to meet the expectations of the end business user.
- External suppliers will need detailed technical interface requirements to order to construct the proper network and security protocols in accordance with corporate policies.
- Geographic and cultural differences should also be considered.

.3 Determine appropriate content for each stakeholder

In addition, the business analyst should keep in mind that while there are advantages to constructing different presentation formats depending on the unique needs of each stakeholder, there are also disadvantages that result with maintaining multiple requirements packages. The business analyst should develop a check list that will help determine what communication vehicle to use and content that needs to be included. The analyst should always keep in mind that the primary goal of the requirements document is to convey information clearly and in an understandable fashion to the audience that must review the content. To help decide how to present requirements, the analyst should ask the following types of questions:

- How detailed do the requirements need to be?

- What information is important to communicate? What is the appropriate level of detail to include?
- What will the particular stakeholder understand based on the type of audience they represent and on that stakeholder's preferred style of communication or learning (e.g., technical vs. business owner, executive sponsor)
- Is each requirement a true business requirement, or is it an implementation/technology constraint? Is the requirement appropriate for the type of audience that needs to review it?
- How does the requirement support the previous and subsequent phases (i.e. testing, implementation) or project activities and deliverables to facilitate traceability?

Although there is no right answer to each of these questions, business analysis professionals use their judgment and experience to make these decisions, and should develop a list of questions to help guide these decisions.

In addition, when developing multiple presentation formats, the analyst must carefully consider the downside of providing different requirements packages to different audiences, and be prepared to maintain versions that ensure the information is conveyed consistently. Managing various formats requires work, and the analyst must be flexible and organized in order to support this as a viable solution. If the analyst cannot keep multiple versions synchronized, or if the requirements are conveyed inconsistently or conflict in the various presentation packages, this may result in the following issues:

- The message will be perceived differently by different audiences, and perhaps, incorrectly.
- This may mislead the stakeholders.
- This will confuse the stakeholders.
- Ambiguity can result in the wrong solution being built.

.4 Determine the formality of requirements

There is a spectrum of the formality in which requirements may be documented and presented. A requirement may be presented very formally or very informally. A formal presentation example would be the use of a standard, structured model like an entity relationship diagram, including all of the associated diagrams, supporting text, detailed attributes, and revision information. A requirement may be presented informally in an e-mail message, a note, or even verbally. The Business Analyst should assess the project requirements and determine the level of formality appropriate for each requirement. Generally:

The larger the project, the more formal the requirements should be. This is because more stakeholders are typically involved and more communication is required.

- The more formal the requirement, the more time that will be required to prepare the presentation.
- The less formal the requirement, the more risk that it will be misunderstood and/or misinterpreted.
- When assessing the stakeholders that will need to review the requirements, the business analyst will consider which format option is the most appropriate communication vehicle for the group. This assessment will take into consideration the level of formality that is needed.

Requirements documentation will be more formal under the following circumstances:

- The project is very large and may be delivered in phases
- The business area(s) involved are very complex
- The technology employed is new
- The project is considered to be mission critical
- The executive sponsor requires formality
- The requirements are likely to be subject to regulatory review
- The requirements will be presented to an outside organization and/or an RFQ/RFP will be issued

On a small or agile style project, requirements may be informal.

The Business Analyst must present requirements in a format that supports the project methodology and ensure that the stakeholders will review, understand, and approve them. Working within the framework of these guidelines, the business analyst will decide the appropriate communication vehicle and level of formality to employ for each stakeholder that will review the requirements.

.5 Select appropriate presentation format for each audience

The business analyst when selecting the appropriate presentation format for an audience should consider that there is a difference between a “work product” and what is considered to be the final “deliverable”. Not every document that the Business Analyst produces is appropriate to communicate to the stakeholders.

A “work product” is a document or collection of notes or diagrams that is used by the business analyst to organize and analyze the requirements. Work products help with business analysis work by allowing the analyst to think thorough raw information and use it to develop a deliverable. The work product may or may not become a deliverable, although during different phases of the requirements eliciting process, the business analyst may need to share this information with stakeholders in order to clarify requirements or drive down to more detail. Examples of work products might be:

- Meeting agendas and minutes
- Interview questions and notes
- Facilitation session agendas and notes
- Issues log
- Work plan, status reports
- Presentation slides used during the project
- Traceability matrices

A “deliverable” is a document that is recommended by the project methodology showing the work that has been completed on the project. A requirement deliverable is used in subsequent phases of the project to implement the solution. Not every note and document that a business analyst creates is necessary to be included in a requirements package for review and signoff. The business analyst must understand the difference between these two concepts and use the “deliverables” as communication mechanisms. The business analyst will assess the needs of the audience, determine the level of detail that needs to be communicated, and ascertain which deliverables to include in each presentation package.

Deliverables are agreed upon at the beginning of the project (see Business Analysis Planning and Monitoring KA) and are used by the project manager to assess progress on the project. The deliverable acts as a “contract” for the project defining the agreed upon work. The deliverable becomes a project asset because it represents a project output.

Creating a requirements package should encompass the following activities:

Determine which components of the overall comprehensive requirements document should be grouped together

The business analyst will consider the best way to combine and present the materials, so that they convey a cohesive, effective message to one or more audiences that will participate in the requirements review process. This may result in more than one requirements package being created for the same project.

Evaluate the documentation required based on the type of project

There are many factors about a specific project that will determine what components are included in a requirements package. Samples of variables to be considered are:

- The size and scope of the project
- Whether requirements are for an internal project or for an external vendor
- The type of project (i.e. application development vs. software version upgrade)

Each project may necessitate a different format or style of requirements package and there are numerous methods to categorize and document the requirements effectively [See the Knowledge Area Requirements Analysis] A good requirements package will include all or a portion of the overall project requirements, such as project scope, as well as business, functional, non-functional and technical requirements. It may contain text, diagrams and graphics, or combinations of different formats.

Overall, the business analyst must become adept in building an effective requirements package in order to ensure that the requirements are complete, understandable, and can be clearly conveyed to the intended audience.

Package the requirements for presentation

Each requirements package may have a Table of Contents outlining what is included in the package. Grouping of the requirements into categories should be clearly identified in the Table of Contents for ease of navigation.

The business analyst should give careful consideration must be given to what types of information should be included in a requirements package, and that the content may vary among different projects. Some key factors to help guide the analyst's decision will be the type of project, and also the individual needs of the audience that will have review and sign off responsibility for the project.

The business analyst should consider:

(1) The size and scope of the project.

Different projects will necessitate different deliverables, and the extent of documentation that is needed in the final package will vary depending on the project. Some examples are:

- **A new, customized in-house software development project.** In this scenario, all requirements may need to be included.
- **Upgrading the technology or infrastructure of a current system.** In this scenario, only the technical requirements may need to be included in the package.
- **Change in a business process or new data for an existing application.** In this scenario, the process and data requirements, business rules, functional and technical requirements will be needed.
- **Purchase of a software package.** This type of project will likely require a Request For Proposal, and the package will need to include the business requirements, technical requirements, limited functional requirements and other vendor specifications.
- **Short, focused, agile style iterations of software development.** These projects may not specify any formal requirements documentation. Whiteboard, flip charts, user stories cards may suffice.

(2) The varied interests of the audience.

The audience must clearly understand the requirements that the business analyst has documented, and it is the responsibility of the analyst to ensure that the requirements are conveyed correctly by bundling them effectively for presentation. The business analyst must adequately understand the communication needs of the audience, since it is often how the message is conveyed and not the message itself that results in miscommunication and comprehension failure. Even though the requirements may be thoroughly documented, the inability to convey them accurately to the audience will put the overall project implementation at risk.

The following factors should be considered:

- Assessing the needs of the audience and realizing that different stakeholders may require different communication strategies. The business analyst should try where possible to minimize creating and maintaining multiple versions of a requirements document that may be difficult to synchronize going forward. Creation of multiple versions may be unavoidable, but the business analyst should try to identify which components of the overall documentation should be the focus for each recipient of the information, and then determine how to present the right level of detail to that audience so that the message is accurately conveyed.
- Categorizing the audience into groups. The following typical group classifications should be considered, but the needs of each project will differ depending on the participants:
 - **Executive Business Sponsors.** This group will require an executive summary level of detail. The project scope may suffice, including the ROI (Return on Investment) assessment, business benefits, project cost and target implementation date(s). Requirements sign off may be provided at this level.
 - **Subject Matter Experts.** This group will be primarily concerned how operational processes are affected by the implementation of the project, and will be interested in ensuring that the requirements they provided to the business analyst during the requirements elicitation are achieved. The subject matter experts will need to understand the user interface requirements, the workflows, and the data and quality requirements.
 - **Quality Assurance Analysts.** This group will focus on understanding the critical success factors of the project based on the needs of the business users, and they must obtain a thorough understanding of the functional requirements and systems Use Cases in order to build an effective testing strategy. This group is concerned that the quality expectations of the business users are met.

- **Outside customers/suppliers.** This group will be concerned with the technical requirements, primarily the interfaces, security requirements and any documented technical constraints.
- **Security, legal and audit representatives.** This group will ensure that the corporate standards are met regarding security, legal and audit requirements.
- **Technical solution providers.** This is the technical group that will build the system. They will need to obtain an understanding of the overall requirements for the project, and will focus on the functional specifications and technical requirements, based on which they will design the solution.
- **External Vendors.** Depending on the project and the vendor, the business analyst may participate in, or be responsible for, the RFI (Request For Information), the RFQ (Request for Quote) or the RFP (Request for Proposal)

The above are only examples of disparate audience considerations that the Business Analyst must address when determining how to package requirements effectively for review and sign off. To create an effective requirements package, the analyst needs to understand the primary concerns of each group, and then determine what message must be conveyed to them. The Business Analyst can employ different strategies, such as creating a presentation that highlights the primary area of concern for each group, and couple this presentation with the requirements package. The presentation can help focus attention on the area that the stakeholder is primarily concerned with understanding, and help ensure that the stakeholder is fully focused on the requirements that will bring them the return on investment they are expecting to achieve.

3.5.5 *Techniques*

None.

3.5.6 *Stakeholders*

- Sponsor(s) of the project
- Business representative of each affected business area specifically involved during requirements elicitation
- Technical team
- Quality assurance
- Security personnel
- Governing agencies/bodies
- Outside customers/suppliers

3.5.7 Output

- Requirements package
- Each requirement deliverable in the appropriate format(s) for presenting requirements to relevant stakeholders.

The result of this task is a requirements presentation (document) or package of requirements ready to be reviewed by stakeholders. A package may contain all of the project requirements or may be broken into several sub-packages. A package should also contain a table of contents for ease of use and a revision log to document changes along with any supporting associated documentation. A package of requirements will be reviewed, revised, and approved by project stakeholders.

3.6 Task: Communicate Requirements

3.6.1 Purpose

Communicating requirements is an important aspect of business analysis is working to bring the stakeholders to a common understanding of the requirements. Because the stakeholders represent people from different backgrounds and knowledge areas, this communication is essential.

3.6.2 Description

Communicating requirements includes an infinite number of conversations, notes, documents, presentations, and discussions. Concise, appropriate, effective communication requires the analyst possess a significant set of skills, both soft (communication) and technical (i.e. requirements).

Communication skills are required for every other task in the BA BOK. Oral/verbal communications are frequently used during elicitation. Written communications are used for documenting requirements and presenting solution options. Facilitation, negotiation and consensus building are used to work with groups of stakeholders.

Requirements may be in conflict with other requirements. Communication and facilitation skills are required to articulate and resolve conflicts.

3.6.3 Input

- Requirements
- Business analysis communication plan

3.6.4 Elements

Interaction with all stakeholders before, during and after projects with respect to requirements, product/solution scope, and business case. This includes interaction with technical partners and other business subject matter experts to assure that requirements are correctly understood and implemented. Requirements communication is performed continuously and in conjunction with most of the tasks in the other knowledge areas.

- *Business Analysis Planning and Monitoring* – plans for business analysis work are made through communication with all stakeholders. Business analysis work is monitored through status reporting both verbally and in writing.
- *Enterprise Analysis* – business case and product/solution scoping information is communicated.
- *Elicitation* – Each elicitation technique requires specific communication skills.
- *Requirements Analysis* – requirements are refined, modified, clarified and finalized using communication.
- *Solution Assessment and Validation* – Work with technical partners, QA, and other stakeholders working on the implementation and rollout of the solution are in constant communication with business analysis professionals.

3.6.5 Techniques

- RFI, RFQ, RFP (see KA Solution Assessment and Validation)
- Conducting a requirements presentation
- Conducting a requirements review
- Manage requirements conflicts

3.6.6 Stakeholders

All.

3.6.7 Output

- Communicated requirements
- List of agreed upon amendments to requirements
- List of actions for the business analyst
- Outstanding issues (i.e. requirements needing clarification)
- Technical team action items (i.e. clarify feasibility of delivering a particular requirement)
- Approved requirements

3.7 Technique: Manage Requirements Conflicts

3.7.1 Purpose

To acknowledge, address and resolve any disagreements or conflicts that stakeholders may have about requirements.

3.7.2 *Description*

When requirements must serve more than one stakeholder's need, there may be conflict in the expectations of each stakeholder from the requirements. Requirements may be in conflict with other requirements. Inconsistent requirements cannot be satisfied by the same solution.

The business analyst's responsibility lies in ensuring the requirements meet the overall business needs for the project. If there is conflict, the BA may gather all parties together to resolve the conflict, or they may leave the resolution to the involved parties. Conflicts can be addressed by face to face meetings, interviews with other parties, or business analysis research. When the parties in conflict cannot meet in person, the BA may use distance communication techniques (i.e. teleconferencing) to resolve the conflict.

It is important that all issues and conflicts about requirements are documented in a Requirements Issues log so that all impacted parties are able to see the same information.

3.7.3 *Elements*

When a conflict arises between stakeholders on one or more documented requirements, record the conflict in the Requirements Issues Log. This log can be a simple table to contain pertinent information, or it can be a more comprehensive document, depending on the organization and its' policies. The log allows the team to have a history of requirements agreements. Other conflicts resolved by the BA may be logged if the resolution is significant to the project solution. Conflicts that are resolved between stakeholders without changes to requirements or solution components may not be logged (i.e. minor personal conflicts).

Once the issue has been documented, the business analyst will facilitate communication between the stakeholders that are in conflict over the requirement to resolve the issue. Often, the business analyst can resolve the conflict through research or other communication without facilitating a formal stakeholder session.

Requirements conflicts must have an audit trail of the decision or resolution. The business analyst will coordinate the resolution of the conflict by organizing the meetings, documenting and distributing the results, and obtaining sign off for the resolution.

3.7.4 *Usage Considerations*

.1 Advantages

Resulting requirements are agreed upon by team

.2 Disadvantages

Researching, discussing and resolving conflicts can take a significant amount of time. The business analyst must keep the project manager informed of progress.

3.8 Technique: Requirements Presentation

3.8.1 *Purpose*

The business analyst may conduct one or more presentations throughout the project. Before making any presentations of requirements to an audience the business analyst must first understand the objective of the presentation and the intended audience.

The objective of the presentation may be:

- to review, prioritize or to communicate status
- to ensure quality or enhance clarity
- to obtain stakeholder buy-in and sign off

3.8.2 *Description*

Presentations may be informal or formal. The business analyst should consult with the project manager to ensure that the reason for the presentation is clearly understood.

These are some examples of requirements deliverables that may be the subject of a presentation.

- Business requirements
- Functional requirements
- Data and behavior models
- Process/ flow models
- Other 'diagrammatic model'
- Prototypes
- User stories

3.8.3 *Elements*

The business analysis communication plan should outline formal and informal presentation needs. (See the Knowledge Area Business Analysis Planning and Monitoring.) The business analyst may plan presentations at the beginning of a project or may determine ad-hoc needs throughout the project. Alternatively, the project manager or stakeholders may request presentations to facilitate communication or consensus.

The business analyst must determine an appropriate format of the presentation. The formality of the presentation is driven by the objective of the communication and the audience needs. For example the business analyst may be required to present key points using a formal presentation (i.e. presentation slides.) This may be necessary to present

to senior business users who are not actively involved in the detail of the project but need to understand requirements at a higher level.

A presentation may be used:

- to ensure that internal project quality standards have been adhered to
- to ensure cross-functional fit with other business process areas within the same project
- to obtain business acceptance and sign-off
- to obtain delivery team sign-off
- to obtain testing team sign-off
- as a precursor to delivery i.e. to start to examine solution options with a delivery team
- to prioritize a set of requirements before proceeding to next project stage
- as a de-scoping/project review exercise

.1 Formal presentation

A formal presentation is given by a BA when requested by a project stakeholder or is a common practice in the organization's analysis process. Formal presentations typically disseminate information by presenting it in a well organized, structured format. Audience members may be given supporting materials before or during the presentation. Audience participation/questions may be encouraged.

.2 Informal presentation

An informal presentation may be used:

- as informal status check of requirements (e.g. completeness, correctness, impact on other areas)
- to communicate requirements to the delivery team or testing team to ensure there is no ambiguity
- to communicate requirements to affected business areas (those not having sign-off authority but where knowledge of changes is required)
- to communicate requirements to other project teams e.g. training, communication.
- as a facilitation exercise to enhance requirement clarity (e.g. by bringing business users and technical teams together, a common understanding can be reached on the relevance/importance of individual requirements as well as the feasibility of delivering individual requirements).

Where the objective of the presentation is a review or inspection of requirements, further information is detailed in section X.9 “Conduct a requirements review”.

Whether formal or informal, the business analyst should ensure that the presentation has a structure consisting of the following:

- Introduction of parties attending presentation
- Statement of presentation objectives
- Project background
- Presentation/review of deliverable
- Agreement of actions/changes required
- Review of deliverable status (e.g. signed off, not signed off, etc.)

The objectives of the presentation should be stated and agreed at the start of the presentation.

The outputs from the presentation are likely to include the following (depending on the purpose of the presentation):

List of agreed amendments (possibly containing de-scoped requirements)

- List of actions for Business Analyst
- Actions for business users requiring clarification
- Delivery team actions (e.g. clarify feasibility of delivering a particular requirement)
- Agreement as to whether the objectives of the presentation were met (and could be one of the following)
- Requirements approval
- Requirements approval with minor amendments
- Requirements not accepted/ not approved
- List of unresolved issues with associated assumptions

3.8.4 Usage Considerations

.1 Advantages

Clearly communicated requirements.

.2 Disadvantages

Requires BA have strong presentation skills (see Fundamentals for more information)

3.9 Technique: Requirements Review

3.9.1 Purpose

The purpose of a requirements review is to have project stakeholders verify the accuracy of the requirements. A requirements review may be conducted at any time during the project. Typically reviews are an iterative activity beginning with business analyst peer reviews during requirements development and becoming more formal over time. The audience for the reviews expands to include project stakeholders and ultimately the review process will lead to approval of the requirements by all of the stakeholders.

The purpose of the review should be clearly stated and may encompass any of the following:

- completeness of requirements (all requirements have been captured)
- removal of superfluous requirements
- clarity of requirements (removal of ambiguity)
- correctness of requirements (the requirement reflects the business need or business rule)
- scope (the requirement fits within the stated scope of the project)
- conformance to project/organizational quality standards
- feasibility of requirements
- prioritization of requirements

3.9.2 Description

A requirements review is a working group session where invited participants meet after reviewing the requirements on their own. During the working session, the requirements are reviewed and discussed by the group, each participant expressing his or her questions, comments and suggestions. As this feedback is discussed the group may also notice other issues with the clarity or completeness of the document. All questions, comments, concerns, and suggestions are recorded. If the group can agree on a particular change, that change is recorded. After the session the author of the document performs additional requirements elicitation, analysis and documentation and makes the appropriate changes. Significant changes often necessitate a second review.

Reviews are also referred to by other names such as walkthroughs or inspections.

3.9.3 *Elements*

To conduct a requirements review the business analyst must have:

- A complete requirements document
- A list of appropriate reviewers
- A meeting vehicle
- Facilitation skills

A complete requirements document: At least one of the technique specific requirements models (or deliverables) described in the Knowledge Area Requirements Analysis must be complete to schedule a review. The review may cover only one requirement document, several related documents, or an entire requirements package.

A list of appropriate reviewers: Reviewers may be project stakeholders, other business analysts, or other resources with specific expertise in the type of requirement being reviewed. Appropriate reviewers will include:

- Knowledgeable representatives of stakeholders who contributed to the requirements
- Knowledgeable representatives of stakeholders who will use the requirements in development of the solution
- Reviewers representing the project's customers must be approved by the customer's management and be authorized to make decisions as the customer's representative.

A meeting vehicle: A review may be held in a conference room with all participants present or it may be held using a technical facility allowing participants in remote locations to participate (i.e. collaboration tool, videoconference, internet meeting ware).

Facilitation skills: See *Underlying Competencies* for a description of facilitation skills.

A requirements review involves a very structured process and has key elements (roles).

The process of conducting a requirements review consists of the following steps:

- Prepare the document(s) to be reviewed
- Organize and schedule the review
- Determine participants
- Secure a location/facility
- Deliver document(s) to participants

- Conduct the review
- Compile notes and results of the review
- Re-review if necessary.

.1 Prepare the document(s) to be reviewed

The requirements document should be complete and presented with any appropriate legend and supporting documentation so that reviewers can perform a thorough review.

It is also helpful to give review participants a checklist of items for which the reviewer should be looking. Examples of specific items to be discussed during the review are requirements that are out of scope, requirements that describe how the requirement will be implemented instead of the true business need, or the accuracy of the description of the current business process.

.2 Organize and Schedule Review

The business analyst must ensure that sufficient notice is given prior to the review. This will be determined by the deliverable under review and should be agreed with the project manager.

The document to be reviewed should be issued to all review parties prior to the review meeting to allow sufficient time for each reviewer to familiarize themselves with the document. The attendees of the review should be agreed by the project manager and as a minimum will include the stated signatories for the deliverable.

The business analyst must understand the structured and nature of a requirements review session.

- Determine appropriate reviewers
- Tell reviewers what they should be looking for
- Schedule review time
- Conduct review
- Record changes/suggestions
- Update requirements

Reviewers should understand that the purpose of the review is to find and remove unclear, inconsistent and incorrect requirements.

.3 Conduct the Review

The business analyst should ensure that the review has a structure consisting of the following:

- Introduction of parties attending presentation
- Statement of purpose of the reviewed deliverable
- Statement of review objectives
- Project background (if required for external parties)
- Formal walkthrough/review of deliverable
- Agreement of actions/changes required
- Review of deliverable status (e.g. signed-off, not signed off, etc.)

.4 Compile notes and results of the review

The BA is responsible for making sure that all participant comments are recorded and considered for revisions to the requirements document.

At the end of the review, it should be agreed whether:

- There are quality improvements that can be made to the requirements document
- The requirements document is not acceptable in its current form
- Additional reviewers are required to comment on or approve the requirements document

.5 Re-review if necessary

A decision will also be made as to whether another review/inspection is required if the deliverable has not been accepted.

.6 Roles involved in a requirements review

The following roles are often involved in a requirements review.

Role name	Played by	Description
Author	Author of the requirements document, typically the BA. This role is mandatory. A review should not be conducted without the presence of the author.	Answers questions about the document, listens to suggestions, comments. Incorporates changes into the document after the review session.
Recorder	This role may be played by any project team member who is familiar with the project. This role may be played by the author.	Person who documents all suggestions, comments, issues, concerns, outstanding questions that are raised during the review.
Moderator	A neutral facilitator. Often is played by a BA or a QA analyst. This role is mandatory. It is best if the author of the document is not the moderator although resource constraints often necessitate this situation.	Facilitates the working session, keeping participants focused each section of the requirements document as it is discussed. Verifies that all participants have reviewed the document before the session begins. Ensures that all participants are participating in the review.
Peer of the author	This is another BA who has experience preparing similar requirements documents.	The peer reviews the document for its adherence to good requirements documentation standards.
Other reviewers	Any person with interest in the project. See stakeholders section below.	Reviews the document prior to the working session. Presents questions, comments, suggested changes and discusses them with the group.

.7 Rules to be followed during the review

There are several rules that should be followed when conducting a requirements review. The moderator is responsible for making sure that all participants adhere to the rules.

- Supervisors or managers (especially of the author) should not attend the review
- Reviewers must review and comment on the content, not on the author
- Participants must review the document before the session

The business analyst must determine the appropriate project stakeholders to participate in a requirements review.

A few **examples** are provided below:

Stakeholder	Requirement being reviewed	Rationale for participation
Data architect or DBA or database designer	Logical data model (presented in an Entity relationship diagram)	The technical architect will be using the logical business requirements to build a solution data structure and as such must understand the business needs for the data. He or she will also be able to ask key questions about the data structure and help to find any missing pieces.
Executive Sponsor	Project statement of purpose and objectives	The executive sponsor is responsible for funding the project and as such must approve of the project purpose and objectives. He or she will have questions about the stated purpose to assure that his or her needs will be met.
Business area manager (SME)	Process decomposition diagram	A business area manager understands the business area from a high level and is able to review process descriptions and hierarchy to verify that the business analyst has accurately captured the business processes.
Business area worker (SME)	Workflow diagram Use Case description	A business area worker understands the detailed processes of the business and can review a detailed requirements document that represents the business work.
IT developer	Use case description	A developer will use the use case description to develop a feature of the application and as such can assess the quality of the requirement and its usefulness of the requirements.
QA analyst	Any document	QA analysts are excellent reviewers of any requirements document because they are trained to look for inconsistencies and inaccuracies.
Project manager	Project scope (presented in a context level data flow diagram)	The project manager is responsible for project change control and as such must agree on the boundaries of the business area for which requirements will be gathered.

The deliverable of a requirements review is a list of questions, comments, concerns, and suggestions that are compiled during the working session..

3.9.4 *Usage Considerations*

- .1 Advantages
Better quality requirements
- .2 Disadvantages
Takes time and resources

3.10 Technique: Formal Requirements Approval

3.10.1 *Purpose*

Requirements signoff formalizes agreement by project stakeholders that the content and presentation of the requirements, as documented, are accurate and complete. Formal agreement reduces the risk that, during or subsequent to implementation, a stakeholder will introduce a new (previously undiscovered) requirement.

3.10.2 *Description*

Obtaining requirements signoff typically involves a face-to-face final review of requirements, as documented, with each project stakeholder. At the end each review, the stakeholder is asked to formally approve the reviewed requirements document. This approval may be recorded either physically or electronically. In some organizations, verbal approval is acceptable.

3.10.3 *Elements*

Obtaining requirements signoff is typically the final task within Requirements Management and Communication. The Business Analyst will require the output from the Requirements Review(s), including accommodation of any comments or objections which were raised during the review process.

On an ideal project, all stakeholders will review and sign off on all requirements. Comprehensive signoff by each stakeholder tends to promote more detailed review, resulting in greater consistency of stakeholder understanding and expectation.

However, in projects where many requirements apply to only a subset of stakeholders, it may be more practical to ask each stakeholder to sign off only on those requirements which are directly pertinent. In such case, a specific list of the requirements specifications the stakeholder is approving, and a complementary list of the requirements specifications which the stakeholder is not approving (but to which the stakeholder explicitly has no objection) should be prepared. Under such circumstances, it is incumbent upon the Business Analyst to assure that each individual requirements specification is explicitly approved by at least one appropriate project stakeholder.

The technique is complete when all project stakeholders have signed off. Completion of requirements signoff should be announced to the project team, and may constitute a project milestone.

The complete set of stakeholder signatures/approvals should be filed in the project archives.

3.10.4 *Usage Considerations*

.1 Advantages

Secure approval of requirements and continue project.

.2 Disadvantages

May delay project.

3.11 Technique: Baselineing

3.11.1 *Purpose*

To set an agreed upon base of understanding. Once a baseline has been set, changes to the agreed upon baseline must be assessed and approved.

3.11.2 *Description*

The technique of baselining can be used on many objects. Project plans are often baselined once they have been approved to make sure that the project stays on the plan. In business analysis requirements are baselined for the same reason. Baselining requirements is important because business stakeholders and the technical team will see opportunities for more requirements as the project progresses. The baselined requirements serve as a reminder for the entire team of the original requirements scope and boundaries. It forces the team to consider the ramifications of changes or additions to the requirements.

In agile/iterative style projects once a group of requirements are selected for an iteration, the requirements are not changed. This is effectively the baseline. Additional requirements are considered for future iterations.

3.11.3 *Elements*

To be supplied

3.11.4 *Usage Considerations*

.1 Advantages

Baselining provides a clear point of agreement and sets a clear boundary for scope going forward.

.2 Disadvantages

Changes to the original baseline require a formal change control process which may slow down the project.

Chapter 4: Enterprise Analysis

4.1 Introduction

4.1.1 *Knowledge Area Definition and Scope*

The Enterprise Analysis Knowledge Area consists of the collection of tasks for analyzing the business situation to fully understand business problems and opportunities, and assessing the current and future views of the enterprise to understand the change needed to meet business needs and achieve strategic goals. Enterprise analysis outputs provide context to requirements elicitation, analysis, documentation and validation, and to solution identification for a given initiative and/or for long-term planning.

Enterprise analysis is often the starting point for initiating a new project and is continued as changes occur and more information becomes available. To initiate large change initiatives, this analysis work is often treated as an investigative feasibility study and/or business architecture endeavor and may be managed as a stand-alone project or formal project phase. For smaller change efforts, these activities are typically performed in a less formal manner. It is through enterprise analysis activities that the business requirements are identified and documented. Business requirements are defined as high-level statements of the goals, objectives or needs of the enterprise. They describe such things as the reasons why a project is initiated, the business outcomes that the project is expected to achieve, and the metrics that will be used to measure success.

Specifically, Enterprise Analysis is the Knowledge Area describes the business analysis activities that take place for organizations to: (1) identify business problems to be solved and opportunities to pursue to meet business needs and achieve strategic goals, (2) determine the most feasible business solution option, (3) define the solution scope and develop the business case for the proposed new project to implement the business solution, (4) continue to assess, refine and validate the business need and solution during the project, and (5) evaluate the business benefits brought about by the deployed solution. These activities are performed before a project starts and may be repeated if the business need changes, if a change request alters the solution scope, or are often conducted repeatedly when performing continuous improvement. A new/changed business solution may include implementation of business and/or technical components, e.g., new or changed business units, processes, functions, locations, roles, desktop tools, training, application systems and technical infrastructure. A project is defined as a temporary endeavor undertaken to create a unique product, service, or result.¹ An enterprise is an organization or collection of organizations that share a set of common goals and has been created for the purpose of providing products or services to customers. An enterprise can be a government agency, a whole corporation, a division of a corporation, a single department, or a chain of geographically distant organizations linked together by common ownership.²

¹ Project Management Institute. *A Guide to the Project Management Body of Knowledge, Third Edition (PMBOK® Guide)*. Newtown Square, Pennsylvania: Project Management Institute. 2004

² The Open Group Architecture Framework, *Frequently Asked Questions*, Retrieved from the Internet on 05 September 2007. <http://www.opengroup.org/architecture/togaf8-doc/arch/toc.html>

As business analysis matures into a critical management discipline, organizations tend to realize that it has two dimensions: (1) analysis to ensure an enterprise is investing in the most valuable business solutions, and (2) eliciting, analyzing, documenting, communicating and validating requirements to deliver the forecasted business benefits from the project outcomes. In order to ensure they are investing in the most valuable projects, management needs accurate, consistent and useful information about initiatives that are currently funded, as well as proposed new ventures. Enterprise analysis tasks:

(1) Begin after the executive team of the enterprise develops strategic plans, goals, and measures or when a business problem or a new business opportunity has been identified;

(2) Continue until enough information is gathered to propose new programs and supporting projects;

(3) Continue during the project as the business analysis professional updates the enterprise information as more is learned to ensure the business need is fully understood, to validate that the solution is optimal, and to verify that the forecasted costs versus benefits remain positive and therefore, continued investment in the project is warranted; and

(4) End after the value of the deployed solution is evaluated to determine if the forecasted business benefits have been attained and business goals have been met. Note that benefit realization may not be possible until long after deployment of the new business solution. The business benefit management or realization assessment is continually performed by the business analysis professional for the life of the new business solution. (Solution evaluation and benefits management is covered in more detail in the Solution Assessment and Validation Knowledge Area.)

4.1.2 **Input**

Inputs needed to accomplish enterprise analysis tasks include the following information that is relevant to the area of the enterprise under analysis:

- Business goals and objectives
- Enterprise architecture
- Business analysis plans for enterprise analysis activities (see Requirements Planning and Management Knowledge Area)

4.1.3 **Tasks**

It is important to note that the enterprise analysis activities are scalable. The business analysis professional makes key decisions about how much analysis is needed and what expertise is required to conduct enterprise analysis activities. For significant, strategic changes to the business, it may be prudent to assemble a team of subject matter experts who will collaboratively work on the tasks. Typical expertise that is needed includes: project management, financial analysis, knowledge of how technology supports the business, and business domain knowledge. It is important that the team of experts invest just enough time and resources to identify the recommended business solution and create the business case. For smaller, more tactical change initiatives, the business analysis professional may conduct the enterprise analysis tasks with little or no assistance. In that

case, a simple project request form summarizing the elements listed below may be sufficient.

Tasks that are essential pieces of work performed as part of enterprise analysis include those listed below and explained in detail in this chapter.

- Define the business need
- Determine gap in capabilities to meet the business need
- Determine the solution approach
- Define the solution scope
- Develop the business case

4.1.4 Techniques

Methods of performing the enterprise analysis tasks include an array of techniques that are designed to bring the new business opportunity and solution into view. The techniques are described briefly here, and are elaborated in more detail at the end of this chapter.

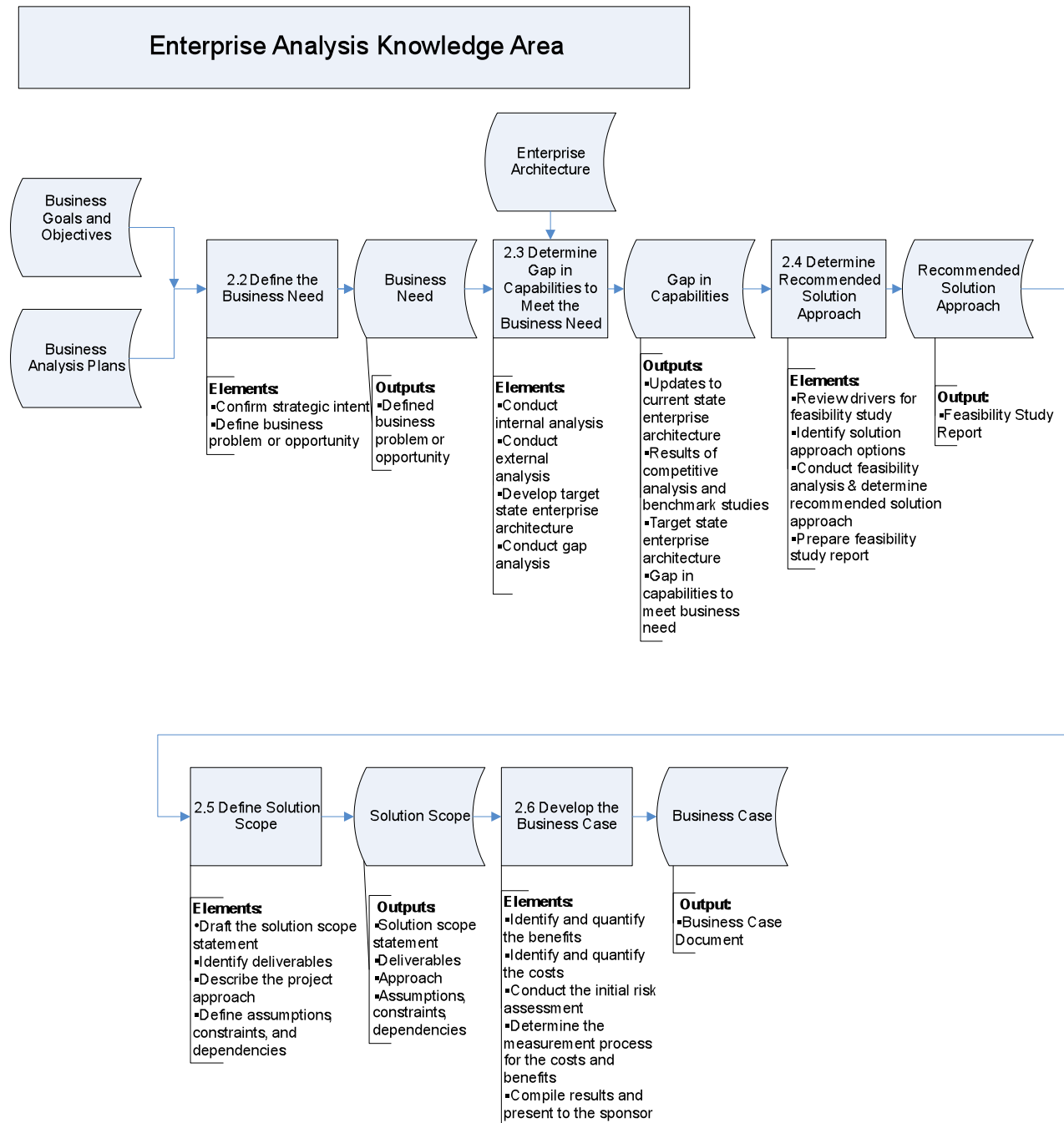
- Brainstorming to identify new business opportunities and potential solution options
- Competitive analysis and benchmark studies to examine the external environment
- Decision analysis to determine the most valuable opportunity or solution option
- Decomposition techniques to understand the scope of the effort to deploy the new solution
- Document analysis to assess the current state of the enterprise
- Economic models and benefit analysis to estimate the value of the proposed business solution
- Enterprise architecture development to define current and target (future) states of the business
- Estimating techniques to forecast the size of the investment to deploy and operate the proposed solution
- Feasibility analysis to determine the most viable opportunity or solution option
- Gap analysis to determine the necessary changes to meet the business need and achieve business goals
- Goal analysis to elaborate a strategic goal into objectives and measures
- Interface identification and analysis to depict of the scope of work required to integrate the new solution into the business and technical environments

- Interviews to gather information about the current and future states of the enterprise
- Opportunity analysis to determine the potential benefits of the new venture
- Problem analysis to determine the underlying source of a business problem
- Scope Models to forecast the level effort to deploy the new solution
- Strengths, weaknesses, opportunities and threats (SWOT) analysis to demonstrate how the solution will help the organization maximize strengths and minimize weaknesses

4.1.5 Output

Outputs resulting from enterprise analysis tasks include:

- Business need
- Gap in capabilities to meet the business need
- Recommended solution approach
- Solution scope
- Business case



4.2 Task: Define the Business Need

4.2.1 Purpose

To identify business needs to solve business problems and/or take advantage of new business opportunities to achieve the goals and objectives of the enterprise.

4.2.2 Description

Define a business problem or new business opportunity in enough detail to determine the recommended solution. New business needs can be generated in several different ways:

- From the top down, i.e., the need to achieve a strategic goal
- From the bottom up, i.e., a problem with the current state of a process, function or system
- From middle management, i.e., a manager needs additional information to make sound decisions or must perform additional functions to meet business objectives
- From external drivers, i.e., driven by customer demand or business competition in the marketplace

4.2.3 Input

Inputs needed to define the business need include the following information that is relevant to the area of the enterprise under analysis:

- Business goals and objectives
- Business analysis plans for enterprise analysis activities (see Requirements Planning and Management Knowledge Area)

4.2.4 Elements

For small, straightforward efforts, this task might simply involve interviews with end users to document the issue at hand. For more strategic problems and/or opportunities, more rigorous analysis is likely needed. Elements include:

- .1 Confirm strategic intent
- .2 Define the business problem or opportunity

.1 Confirm Strategic Intent

To ensure that the enterprise analysis activities and recommended new solution approach are strategically aligned, goal analysis and decomposition is performed to convert strategic goals into the business objectives that are driving the business need.

.2 Define the Business Problem or Opportunity

To define a business problem, document the problem in as much detail as possible. Determine any adverse impacts the problem is causing within the organization and quantify those impacts (e.g., potential lost revenue, inefficiencies, dissatisfied customers, low employee morale). Determine how quickly the problem could potentially be resolved, and the cost of doing nothing. Conduct analysis to determine the underlying source of the problem. Determine the potential areas of investment required to address the problem to guide the internal and external assessments (e.g., business process reengineering, acquisition of an existing business, new, improved technology). Draft a requirements statement describing the business need. Link problem resolution to strategic goals and objectives to ensure strategic alignment.

For potential new business opportunities, define the opportunity in as much detail as possible including the events that led up to the discovery of the opportunity, and the business benefits expected if the opportunity is pursued. Quantify the expected benefits (e.g., increased revenue, reduced costs, increased market share). Determine how quickly the business opportunity could be exploited and the cost of doing nothing. Determine the potential areas of investment required to address the situation to guide the internal and external assessments (e.g., business process reengineering, acquisition of an existing business, new improved technology). Draft a requirements statement describing the business need. Link the opportunity to strategic goals and objectives to ensure strategic alignment.

4.2.5 **Techniques**

Typical techniques employed by the business analysis professional to define the business need include those listed below.

- Goal analysis and decomposition techniques to convert business goals into achievable objectives and measures
- Opportunity analysis to determine the potential benefits of the new venture
- Problem analysis to determine the underlying source of a problem

4.2.6 **Stakeholders**

The analysis activities required to define the business need focuses on the process, competencies, capabilities and functional aspects of the enterprise or a portion of the enterprise. It addresses the concerns of all stakeholders of the business area undergoing change, including:

- Executive who is the sponsor of the enterprise analysis activities
- Executive and middle managers who are attempting to align the business and technical operations with organizational strategies
- Individual contributors who execute the business operations and are end users of the application technology supporting their business processes
- Project and operational team members who are striving to implement valuable new business solutions

- Shareholders who are concerned with business governance processes
- Customers and suppliers who interact with the business solutions
- Government and regulatory bodies who are concerned with compliance to regulations

4.2.7 Output

The output of this task is the defined business need.

4.3 Task: Determine the Gap in Capabilities to Meet the Business Need

4.3.1 Purpose

To identify the areas of the enterprise that need to be changed to meet the business need.

4.3.2 Description

To determine the amount of change that is required to achieve the business goals and objectives, it is necessary to understand the business problem or opportunity in the context of the specific business area(s) undergoing change, as well as the overall enterprise. Change may be needed to any component of the enterprise, including (but not limited to): business processes, functions, lines of business, organization structures, staff competencies, knowledge and skills, training, facilities, desktop tools, organization locations, data and information, application systems and/or technology infrastructure.

4.3.3 Input

Inputs needed to determine the gap in capabilities include the following information that is relevant to the area of the enterprise under analysis:

- Business need
- Enterprise architecture (see techniques section at the end of this chapter for a definition of enterprise architecture)

4.3.4 Elements

For small, straightforward efforts, this task might simply involve interviews with end users to document the issue at hand. For more strategic problems and/or opportunities, more rigorous analysis is likely needed. Elements include:

- .1 Conduct internal analysis
- .2 Conduct external analysis
- .3 Develop target state enterprise architecture
- .4 Conduct gap analysis

.1 Conduct Internal Analysis

Determine the business drivers that have contributed to the need for the change. Gather as much enterprise architecture information as is available about the current state of area of the enterprise undergoing change. Depending on the scope of the enterprise under analysis, the relevant information includes current state enterprise architecture artifacts e.g.:

- Documentation that describes the business goals and objectives
- The business environment through a process or functional view
- The information required to operate the business
- Lines of business offering product and services
- The external environment in which the business operates, from suppliers, through the business operations, to the customers
- Business units, organizational structures and locations, staff competencies
- Relevant stakeholders, such as the government, regulatory agencies, customers, suppliers, and employees
- The technology that supports the business including software and hardware, local and wide area networks, people, operations and projects with the organization's overall strategy.

The goal is to understand the organization's business and how technology is supporting those processes. If adequate information is not available, develop the models and other descriptive information about the area of the enterprise that is under review.

.2 Conduct External Analysis

The external analysis consists of external research activities designed to uncover general information about the area of the enterprise under review, including the industry, the competitive environment, best practices, risks and results of actual similar approaches that have been implemented by others. To conduct an analysis of the external environment, review the results of any studies that might have been conducted in the recent past. If current information is not available, conduct a formal or informal competitive analysis to fully understand the state of the industry, and/or a benchmark study to determine best practices in place at competitor enterprises.

.3 Develop Target State Enterprise Architecture

Develop the models and other descriptive information about the target state to be able to determine the gap in capabilities needed to achieve the business objectives. Validate, refine (or determine if they do not exist) and document the target state business vision, strategy, goals, and objectives. In addition, document the relevant components of the target state enterprise architecture.

.4 Conduct Gap Analysis

Compare the current and target state enterprise architectures to Identify gaps in the organizational capabilities that need to be filled to support the target state business vision, strategy, goals and objectives.

4.3.5 *Techniques*

Typical techniques employed by the business analysis professional to define the business need include those listed below.

- Competitive analysis and benchmark studies to examine the external environment
- Document analysis to assess the current state of the enterprise
- Enterprise architecture development to define current and target state of the business
- Gap analysis to determine the changes required to meet the business need and achieve business goals

4.3.6 *Stakeholders*

The analysis activities required to define the business need focuses on the process, competencies, capabilities and functional aspects of the enterprise or a portion of the enterprise. It addresses the concerns of all stakeholders of the business area undergoing change, including:

- Executive who is the sponsor of the enterprise analysis activities
- Executive and middle managers who are attempting to align the business and technical operations with organizational strategies
- Individual contributors who execute the business operations and are end users of the application technology supporting their business processes
- Project and operational team members who are striving to implement valuable new business solutions
- Shareholders who are concerned with business governance processes
- Customers and suppliers who interact with the business solutions
- Government and regulatory bodies who are concerned with compliance to regulations

4.3.7 *Output*

The output of this task is the gap in capabilities to meet the business need, including:

- Updates to current state enterprise architecture (if needed)
- Results of competitive analysis and benchmark studies

- Target state enterprise architecture

4.4 Task: Determine the Recommended Solution Approach

4.4.1 Purpose

To determine and define the most viable solution approach to met the business need in enough detail to define the solution scope and prepare the business case.

4.4.2 Description

For small, relatively straightforward efforts, the solution approach can likely be determined by the business analysis professional alone or with a small team of experts examining the manual and automated options in an informal working session. For larger change initiatives requiring significant investment, it is prudent to conduct a more formal feasibility study to determine the most viable solution option. A feasibility study is a preliminary analysis of solution alternatives or options to determine whether and how each option can provide an expected business benefit to meet the business need. A feasibility study may address either a business problem to be resolved or a business opportunity to be exploited.

4.4.3 Input

Input to this task is the business need defined in the previous task, including:

- Business need
- Gap in capabilities to achieve target state

4.4.4 Elements

Typical activities that are conducted to complete a feasibility analysis to determine the recommended solution include the following:

- Review and validate the business drivers for the feasibility analysis
- Identify all potential solution approach options
- Conduct a feasibility analysis for each solution option and determine the recommended solution approach to meet the business need
- Prepare feasibility study report

.1 Review and Validate the Business Drivers for the Feasibility Study

To initiate the feasibility study effort, the team of experts convened by the business analysis professional reviews all existing information about the proposed initiative that was produced during task 2.2, with particular emphasis on the gap analysis, to understand the business drivers for the effort. The team then establishes specific, measurable objectives that the recommended solution must meet based on the business need. These objectives provide the basis for formulating solution options for consideration. In addition, the team develops business benefit criteria upon which alternative solutions will be evaluated. Business benefit criteria, in the form of both quantitative and qualitative measurements, represent the factors by which to judge the feasibility of each solution option.

The team defines the scope of activities to be performed during the study and determines the format for the final feasibility study report. The business analysis professional often reviews the information captured about the feasibility analysis effort with the executive who will be the project sponsor if the project is funded, to validate requirements and scope and to ensure the study will satisfy the business drivers.

.2 Identify all Potential Solution Approach Options

Identify as many potential options as possible to meet the business objectives and fill identified gaps in capabilities. The list of possible alternatives should include the option of doing nothing. This is the most creative part of the effort. Conduct a creative idea generating session, and encourage original, ground-breaking thinking, so that the most innovative ideas surface.

.3 Conduct a Feasibility Analysis for each Solution Approach Option and Determine the Recommended Solution Approach to Meet the Business Need

Describe each solution option in as much detail as possible and assess the feasibility of each option, analyzing: The operational, economic, technical, schedule, organizational, cultural, legal and marketing feasibility. Capture consistent information for each option and review results to ensure accuracy and completeness.

From the analysis data, determine the most viable option to meet the business need. Test option hypothesis if risks are sufficiently high through prototyping, reviewing available COTS (commercial-off-the-shelf) solutions in the marketplace, and/or comparing options to external benchmarks.

.4 Prepare Feasibility Study Report

Prepare a report describing the approach, the results of the feasibility analysis for each identified solution option, the recommended solution option, and the rationale for the recommended option. Share the results with the executive sponsor of the study and secure approval to proceed to build the business case for the recommended option.

4.4.5 Techniques

Typical feasibility analysis methods include:

Brainstorming techniques to identify potential solution options including idea generation and idea selection

Feasibility and decision analysis to determine the most viable and valuable solution

4.4.6 Stakeholders

Stakeholders who are involved in or impacted by feasibility analysis include the following:

- Executive who is the sponsor of the enterprise analysis activities
- Executive management who are making project investment decisions
- Business process owners who will benefit from improvements in their business operations

- Business unit managers who manage resources operating the business processes and systems

4.4.7 Output

The output of this task is the recommended solution approach.

The recommended solution approach is typically documented in a feasibility study report. A sample table of contents for a feasibility study document includes:

1. Executive Summary
2. Business problem or Opportunity
 - a. Current State of the Enterprise
 - b. Competitive Environment
 - c. Business Situation
3. Feasibility Study Process
 - a. Study Team Members
 - b. Solution Evaluation Criteria
 - c. Feasibility Study Methods
4. Solution Options
5. Alternative Feasibility Assessment
 - a. Option 1 – (Solution Option Name)
 - b. Description
 - c. Feasibility Analysis
 - i. Benefits
 - ii. Costs
 - iii. Risks
 - iv. Issues
 - v. Assumptions and Constraints
 - vi. Economic Feasibility
 - vii. Time-to-Market Feasibility
 - viii. Cultural Feasibility

- ix. Operational Feasibility
 - x. Legal Feasibility
 - xi. Technical Feasibility
 - xii. Marketing Feasibility
- 6. Summary and Recommendations
 - a. Option Rankings
 - b. Option Recommended
 - 7. Implementation Approach
 - 8. Attachments

4.5 Task: Define the Solution Scope

4.5.1 Purpose

The purpose of this task is to conceptualize the recommended solution in enough detail to define the scope of work and prepare a business. The solution scope statement provides a documented basis for building the business case. The solution scope statement includes:

- Description of the business environment in enough detail to provide context to the new project
- Description of the business requirements in enough detail to understand the business needs
- Definition of the scope of the work that must be performed to deliver the solution including major deliverables, project objectives, project assumptions, constraints and a statement of the work³

4.5.2 Description

The business analysis professional develops the high level scoping information that is needed to build a business case for the proposed initiative. When conducting enterprise analysis to prepare a business case, it is likely that a project manager has not yet been assigned, since the project has not yet been approved. Since project scoping and defining is typically a project management competency, enlist the assistance of an experienced project management subject matter expert to help establish the boundaries of the business problem and solution and define the scope. Also enlist the help of business and technical experts to help scope the effort. It is useful if members of the team that defined the business need and conducted the feasibility analysis also scope the effort and create the business case.

³ Project Management Institute. *A Guide to the Project Management Body of Knowledge, Third Edition (PMBOK® Guide)*. Newtown Square, Pennsylvania: Project Management Institute. 2004

4.5.3 **Input**

Inputs to this task include the following analysis outputs produced from the previous tasks:

- Business Need
- Updates to current state enterprise architecture (if needed)
- Results of competitive analysis and benchmark studies
- Target state architecture
- Gap in capabilities to achieve target state
- Recommended Solution Approach / Feasibility Study Report

4.5.4 **Elements**

Typical activities that are conducted to complete the scoping effort include the following:

- Draft the solution scope statement
- Identify deliverables
- Describe the project approach
- Define assumptions, constraints, and dependencies

.1 Draft the Solution Scope Statement

The team of experts describes the new solution in terms of the major features and functions that are to be included. They clearly state in-scope and out-of-scope components of the solution. In addition, they include a list of key stakeholders who will be involved in or impacted by deployment of the new solution. Finally, they depict project boundaries in terms of business units that will be impacted, business processes improved or redesigned, process owners, and IT systems and technology that will likely be impacted.

.2 Identify Deliverables

It is important to identify both project and product (the new solution) deliverables to understand the work effort and forecast the full costs of the project in the business case. Project scope is defined as the work that must be performed to deliver a product, service, or result with the specified features and functions; whereas, product scope is defined as the features and functions that characterize a product, service or result.⁴ Determining the scope of the deliverables involves identifying major project and solution (product) deliverables and decomposing the work that must be performed into lower-level deliverables. This deliverables decomposition is used to further define the scope and for project cost and schedule estimating.

⁴ Project Management Institute. *A Guide to the Project Management Body of Knowledge, Third Edition (PMBOK® Guide)*. Newtown Square, Pennsylvania: Project Management Institute. 2004

.3 Describe the Project Approach

Describe the initial project approach and structure, including the development methodology to be used, and initial thoughts on an implementation approach, (e.g., partitioning the proposed project into releases that will deliver useful subsets of functionality to the business, outsourcing development of the entire solution, purchasing an existing system and integrating the solution into current business processes and technology).

.4 Define Assumptions, Constraints, and Dependencies

Capture any assumptions made and constraints identified during the scoping effort. In addition, define major business and technical dependencies that will impose constraints to the effort to deploy the solution. Include any schedule or funding limitations and significant standards, policies, regulations to be followed and supporting data required.

4.5.5 **Techniques**

Typical scope analysis methods include the following.

- Decomposition techniques to understand the scope of work
- Scope Models to forecast the work that must be performed to deliver the new business solution. There are many types of scope diagrams. Refer to **Table X-X** for an overview of models for the various scope dimensions:⁵

Scope Dimension	Potential Scope Models
Who	Stakeholder List; Stakeholder Categories, Organisational diagrams
What	Context Diagram, Glossary, Relationship Map, work breakdown structure, product breakdown structure
When	Event-Response Table, Transition State diagrams
Why	Business Policies, Business Rules matrix, Market trends and patterns
How	Process Maps, Use Case Diagrams, Process Architecture

System interface analysis to depict of the scope of work required to integrate the new solution into the business and technical environments.

4.5.6 **Stakeholders**

Key stakeholders who are involved in or impacted by the proposed business solution scoping activities include:

- Executive who is the sponsor of the enterprise analysis activities
- Business process owner(s) and business process subject matter experts for the business area to be changed. The business process experts will assist in defining the project objectives, business area constraints and the process boundaries of the project

⁵ Gottesdiener, Ellen. *The Software Requirements Memory Jogger*. Salem, NH: GOAL/QPC. 2005 p. 114.

- IT managers who are supporting the business area. The IT manager will help to scope the components of the business process that will be supported with technology
- The project investment governance group

4.5.7 Output

The output from this effort is the solution scope.

- This scope information is typically comprised of the following elements:
- Scope statement to deploy the recommended solution approach including boundaries often portrayed in a scope diagram to provide a visual model of the scope of the project and major deliverables
- Major deliverables to be produced to deploy the recommended solution
- Initial project approach including resource requirements, methodology, tools, and training requirements and implementation strategy
- Assumptions and constraints, including any schedule or funding limitations and significant standards, policies, regulations to be followed, and major dependencies, including downstream systems, interfaces, and supporting data required

4.6 Task: Develop the Business Case

4.6.1 Purpose

The purpose of the business case is to inform management about the proposed new project; it serves as a basis for management to determine whether investment in the new or changed business solution is warranted. The information collected during enterprise analysis activities is used to develop the business case.

4.6.2 Description

The business case describes the justification for the project in terms of the value to be added to the business as a result of the deployed solution, as compared to the cost to develop and operate the solution. The business case usually includes information about the opportunity in terms of the market trends, competitive environment and expected market penetration if studies are not available to provide this context information. The business case also includes qualitative and quantitative benefits, estimates of cost and time to breakeven, profit expectations, and follow-on opportunities. The business case may present expected cash flow consequences of the action over time, and the methods and rationale that were used for quantifying benefits and costs. This provides a framework to demonstrate how the initiative is expected to achieve business objectives.

The business case also discusses the impact of the proposed change initiative on the business and technology operations and infrastructure. In addition, the business case lists the constraints associated with the proposed project, along with the estimated budget, and alignment with strategies established by the business.

For smaller projects, a formal business case may not be warranted, although it would be prudent to at least provide a rationale for proceeding with a change, and hence the investment of funds.

4.6.3 **Input**

The information gathered from the preceding enterprise analysis activities serves as critical input to business case development, including:

- Business Need
- Updates to current state enterprise architecture (if needed)
- Results of competitive analysis and benchmark studies
- Target state architecture
- Gap in capabilities to achieve target state
- Recommended Solution Approach / Feasibility Study
- Solution Scope

4.6.4 **Elements**

To develop the Business Case, the following activities are involved:

- .1 Identify and Quantify the Benefits
- .2 Identify and Quantify the Costs
- .3 Conduct the Initial Risk Assessment
- .4 Determine the Measurement Process for the Costs and Benefits
- .5 Compile Results and Present to the Project Sponsor

.1 Identify and Quantify the Benefits

Measure the benefits of the recommended solution in terms of both qualitative and quantitative gains to the enterprise. Where possible, benefits should be quantified; however, benefits of a non-financial nature are also important and should be included. Ideally, benefit estimates should relate back to strategic goals and elements of the enterprise performance scorecard, if one exists.

.2 Identify and Quantify the Costs

Estimate the total net cost of the solution. This requires estimates to be made of capital expenditures for the new investment, costs of developing and implementing the change, opportunity costs of not investing in other options, costs related to changing the work and practices of the organization, total cost of ownership to support the new solution and consequential costs borne by others.

.3 Conduct the Initial Risk Assessment to Identify Risks to the Solution

The purpose of the initial risk assessment is to determine if the proposed initiative carries more risk than the organization is willing to bear. Project risk is an uncertain event or condition that, if it occurs, has a positive or negative effect on at least one project objective, such as time, cost, scope, or quality.⁶ Project risk management includes the processes concerned with conducting risk management planning, identification, analysis, responses, and monitoring and control on a project.

This initial risk assessment focuses mainly on solution feasibility risks, and is revisited throughout the project. Since this is a project management practice, the business analysis professional typically enlists the leadership of a senior project manager to help perform this early solution risk assessment. While risk assessment is a project management competency, the business analysis professional clearly has areas of influence and hence accountability to ensure that the appropriate solution risks are assessed correctly, both initially and ongoing throughout the project.

.4 Determine the Measurement Process for the Projected Costs and Benefits

Underlying many of the problems associated with both the development and the realization of business case projections is an immature measurement culture within the organizations today. The business case should articulate not just the costs and benefits that are projected to be realized, but how those costs and benefits will be assessed and evaluated. The business case also includes a plan for benefit management, measurement and reporting, including where realignment of internal measures or systems is needed to ensure that the behaviors we are seeking can be seen, evaluated, and realized.

As more sophisticated measurement systems are created, management defines assumptions regarding how benefits will be apportioned, particularly in situations (increased revenue being the most common) where a change in what is being measured cannot always be fully attributed to one solution alone. The resulting measurement approach is accepted as part of the business case approval along with the actual cost and benefit projections.

.5 Compile Results and Present to the Project Sponsor

Compile all of the information gathered during enterprise analysis activities included or referenced in the business case. In addition, the business case identifies and justifies the next steps in the overall process to continue with the proposed new project opportunity, including approval of funding for the implementation project and appointing a project manager, business analysis professional and core project team to proceed with project initiation, planning and requirements development.

4.6.5 **Techniques**

Many techniques are used to develop a business case, including both qualitative business benefit analysis and quantitative financial profit/profitability models. Several of these techniques are described below.

⁶ Project Management Institute. *A Guide to the Project Management Body of Knowledge, Third Edition (PMBOK® Guide)*. Newtown Square, Pennsylvania: Project Management Institute. 2004

- Cost-benefit analysis to compare the costs of implementing a solution against the benefits gained from it
- Economic models and financial analysis, which include the use of financial models that estimate the market value of an organizational asset
- Estimating techniques to forecast the size of the investment to deploy and operate the proposed solution
- Strengths, weaknesses, opportunities and threats (SWOT) analysis to demonstrate how the solution will help the organization maximize strengths and minimize weaknesses

4.6.6 Stakeholders

Key stakeholders who are involved in or impacted by the business case include:

- Executive who is the sponsor of the enterprise analysis activities
- The project investment governance group for a decision to further invest in the project
- Business process owner(s) and business process subject matter experts for the business area to be changed. The business process experts likely assist in estimating business benefits expected from the new initiative
- IT manager who is supporting the business area. The IT representative likely established cost projections for the technology needed to support the new solution
- Senior project managers (PM). The PM assists the business analysis professional in establishing initial cost and time estimates
- The project investment governance group. This committee comprised of senior executives reviews the business case information and determine whether to invest in the proposed new initiative

4.6.7 Output

The deliverable from this effort is the business case document.

The business case will incorporate a summary of the findings of the analysis and reference other documents, models and charts that have been produced to date relevant to the opportunity. Organizational standards typically dictate the contents and format of the business case document. Ultimately, the business case presents the information necessary to support a go/no go decision to invest and move forward with a proposed project. A typical business case is comprised of the following information, all of which is collected during enterprise analysis activities:

1. Executive Summary
2. Introduction and Summary
 - a. Project Rationale For Preferred Option

- b. Current Business Process
 - c. Description Of The Problem
 - d. Opportunity
 - e. Project Objectives
 - f. Scope
 - g. Business Benefits
 - h. Costs
 - i. Assumptions and Constraints
 - j. Potential Business And Staff Impact Analysis
 - k. Potential Technology Impact Analysis
 - l. Other Issues
 - m. Implementation Plan
3. Approach
- a. Solution Implementation Plan
 - b. Financial Metrics
 - c. Privacy Impact Assessment
 - d. Alternative Evaluation Criterion
4. Key Selection Criterion
- a. Weighting
 - b. Constraints And Limitations
5. Solution Options and Preferred Alternative
- a. Description of Each Option Considered
 - b. Business Benefits
 - c. Alternative Costs
 - d. Assumptions
 - e. Potential Business And Staff Impact Analysis
 - f. Other Issues

6. Initial Solution Risk Assessment
 - a. Risk Assessment
 - b. Risk Response
 - c. Conclusions and Recommendations

4.7 Technique: Competitive Analysis and Benchmark Studies

4.7.1 Purpose

Competitive analysis and benchmark studies are performed to compare the strengths and weaknesses of an organization against its competitors.

4.7.2 Description

Competitive analysis is defined as a structured process which captures the key characteristics of an industry to predict the long-term profitability prospects and to determine the practices of the most significant competitors. Sources of competitive information include groups such as the SEC (Security Exchange Commission), companies themselves, articles in the press or trade journals, analysts in the market, credit reports, clients and vendors, trade associations, and the government.

Benchmark studies are conducted to compare organizational practices against the best-in-class practices that exist within competitor enterprises in government or industry. The objective of benchmark studies is to determine how companies achieve their superior performance levels and use that information to design projects to improve operations of the enterprise. Benchmarking is usually focused on strategies, operations and processes.

4.7.3 Elements

Elements of a competitive analysis typically include:

- Identify current and potential competition
- Examine your competitors' strengths, weaknesses, threats and opportunities (see SWOT analysis technique)
- Identify the reasons for success and difficulty experienced by competitors in your domain
- Determine prime customer motivators and most substantial costs
- Determine which functions or processes that may need to be benchmarked – those that are most critical to achieving strategic goals
- Determine key performance measures to be collected and analysed
- Select the leading organizations to be used as a basis of comparison
- Compare the performance of the leading competitors to the performance of your organization

- Identify changes required to meet or exceed the performance of the competition

Elements of benchmarking typically involve:

- Identifying area to be studied
- Identify organizations that are leaders in the sector
- Conduct a survey of companies to understand their practices
- Arrange for visits to best-in-class companies
- Develop a project proposal to implement the best practices

4.7.4 Usage Considerations

.1 Advantages

Benchmarking and competitive analysis are powerful management tools to provide organizations with information about new and different methods, ideas, and tools to improve organizational performance.

.2 Disadvantages

Benchmarking and competitive analysis is time consuming and organizations may not have the expertise to conduct the analysis and acquire useful competitive information.

4.8 Technique: Decision Analysis

4.8.1 Purpose

The purpose of decision analysis is to use a structured process to determine the most valuable option from among a number of opportunities.

4.8.2 Description

Decision analysis is an approach to decision making used under uncertain conditions that examines and models each alternative decision path. This technique is useful when there are a limited number of alternatives to achieve a single goal. For each decision alternative, the probability of success, cost and rewards are estimated to forecast the value of each option to the organization.

4.8.3 Elements

Elements of decision analysis include:

- Prepare a graphical representation of all possible decision paths
- Forecast probability of success, costs and rewards to the organization for each path
- Using economic forecasting, determine the expected monetary value of each alternative

4.8.4 Usage Considerations

.1 Advantages

Decision analysis provides an effective technique to determine the expected value of an alternative scenario to the organization

.2 Disadvantages

Decision analysis is difficult and requires specialized knowledge and skills

4.9 Technique: Decomposition

4.9.1 Purpose

To decompose the deliverables that are required to define requirements, design, acquire and/or build, and deploy the new business solution.

4.9.2 Description

Decomposition is planning technique that subdivides the scope and deliverables into smaller, more manageable components and depicts them graphically in a work breakdown structure (WBS). Deliverables are decomposed until the work associated with providing the new solution is defined in sufficient detail to support executing, monitoring, and controlling the work.

4.9.3 Elements

This technique usually involves a team of experts led by a facilitator. Steps usually include:

- Review strategic vision, goals, objectives, measures, business requirements and recommended solution
- Develop a deliverable-oriented hierarchical representation of the work that needs to be completed to accomplish the goals and objectives and deploy the new business solution, referred to as a work breakdown structure (WBS)
- Continue to progressively elaborate the decomposition diagram until the lowest level deliverable can be assigned to resources, scheduled and budgeted

4.9.4 Usage Considerations

.1 Advantages

- Subdivides deliverables into smaller, manageable components that allow for top-down time and cost estimates
- Creates a conceptual model of the work that needs to be completed to deliver the new business solution
- Provides all stakeholders with a consistent view of the scope of the effort

.2 Disadvantages

- Can be difficult to accomplish without a WBS from a previous project

4.10 Technique: Economic Models and Benefit Analysis

4.10.1 Purpose

Economic models are designed to help determine the economic feasibility of a proposed new project. Other terms for approaches used in a business case to justify a new business solution include; Return on investment, financial justification and cost of ownership analysis.

4.10.2 Description

Many techniques are used to develop a business case for proposed new business solution, including both qualitative business benefit analysis and quantitative financial profit/profitability models. Financial models estimate the market value of an organizational asset, e.g., estimating the value of a new business solution or acquisition. Typical models used to determine the value of assets include relative value models, absolute value models and option pricing models.

4.10.3 Elements

Commonly used financial valuation techniques include:

- Discounted Cash Flow – future value on a specific data
- Net Present Value – future view of costs and benefits converted to today's value
- Internal Rate of Return – the interest rate (or discount) when the net present value is equal to zero
- Average Rate of Return – estimate of rate of return on an investment
- Pay Back Period – the amount of time it takes for an investment to pay for itself
- Cost-Benefit Analysis – quantification of costs and benefits for a proposed new solution

4.10.4 Usage Considerations

.1 Advantages

Using consistent financial justification techniques in all business cases for significant investments to deploy proposed new solutions provides decision-makers with quantitative measures upon which to make project investment decisions

.2 Disadvantages

The disadvantage of using financial valuation models is that the cost and benefits tend to be considered to be fixed as opposed to a forecast that should be updated and reviewed at key point in the project

4.11 Technique: Enterprise Architecture

4.11.1 Purpose

The purpose of enterprise architecture development is to document the current and future states of the enterprise to make the enterprise visible and easy to understand. The enterprise architecture artifacts are then available to support and integrate business and IT planning, estimating, what-if business scenarios, and feasibility analysis. The enterprise architecture artifacts provide a business-driven context for project scoping and prioritization.

4.11.2 Description

To understand the internal environment, it is becoming a widespread practice to focus on the development and maintenance of the business architecture. The business architecture is a set of documentation that defines an organization's current and future states. The business architecture describes the businesses strategy, its long term goals and objectives, the business environment through a process or functional view, and the external environment in which the business operates. The business architecture also defines the relevant stakeholders, such as the government, regulatory agencies, customers, suppliers, and employees. The business architecture is considered a strategic asset used to understand both the current state as well as plans for the future state of the enterprise, and as such, provides a unified structure and context that helps guide selection and management of programs and projects.

The physical elements of the business architecture may consist of an interrelated set of documents, models, and diagrams, organized to present information about the business in terms of business vision, mission, strategy, functions, rules, policies, procedures, functions, processes, organizations, competencies and locations, that together comprise the business as a system for delivery of value. Through the creation of the current and future state business architecture, a common understanding of changes that the business must make to achieve its goals comes into view.

Using the business architecture as a guide when we change the business helps to ensure that business operations and their supporting IT systems are aligned. Through architectural work, we capture and portray the business and then the technical information needed in a way that makes the two sets of information easy to interrelate, thus driving consistency between business operations and IT services. Therefore, the business architecture becomes one element within the larger view, the enterprise architecture.

Enterprise architecture is a comprehensive framework used to manage and align an organization's business processes, IT software and hardware, local and wide area networks, people, operations and projects with the organization's overall strategy. An effective enterprise architecture process helps to understand the organization's business processes and how technology is supporting those processes. While several frameworks exist, the enterprise architecture typically consists of five architectures which in total comprise the enterprise architecture:

- Business Architecture
- Information Architecture

- Application Architecture
- Technology Architecture
- Security Architecture

4.11.3 **Elements**

Elements of the enterprise architecture include both business and technical components as listed below.

.1 Business architecture

Business vision, goals, objectives, measures, functions, workflow, process models – the business as an enterprise that flows value from the organization to the customer

Business unit organization charts – the organizational entities that operate the business processes, including the management teams, staff positions, roles, competencies, knowledge and skills

Geographical maps of business locations – the location of the business units and other organizational entities, e.g., call centers, distribution centers, etc.

.2 Technical architecture

Information and data models – the data and information that is the “currency” of the organization, flowing through the processes to accomplish the business functions

Software applications and tools models – the information technology (IT) applications that enable the business processes to operate efficiently and provide decision-support information to the management team

Hardware configuration models – the enabling technology that supports the operation of the processes and applications

4.11.4 **Usage Considerations**

.1 Advantages

The key advantage of enterprise architecture views is that they provide all stakeholders with a common understanding of the enterprise and the complexity of business processes and operations.

.2 Disadvantages

The disadvantages of enterprise architecture development are that it is a costly and time consuming endeavor that requires specialized knowledge and skills to develop and maintain.

4.12 **Technique: Estimating Techniques**

4.12.1 **Purpose**

Estimating techniques are designed to forecast the cost of a proposed new business solution.

4.12.2 **Description**

Estimating is the process of estimating the costs of a project, including the anticipated cost of labor, and materials. Cost estimates used by organizations range from formal, rigorous methods to quick and intuitive.

4.12.3 **Elements**

Typical cost estimating techniques include:

- Top-down estimates – calculated using broad, high-level deliverables list; involves generating estimates for large units of work
- Bottom-up estimates – calculated using complete, detailed work breakdown structure; involves generating estimates for small units of work
- Function point estimates – estimates logical business views of components of the solution, e.g., for each function: inputs, outputs, tables, queries, and interfaces
- Work distribution estimates – estimates effort by major project phase
- Comparison estimates – comparing effort with completed similar project(s) and adjusting for dissimilarities

4.12.4 **Usage Considerations**

.1 Advantages

Estimates are essential to preparing the business case.

.2 Disadvantages

Estimates at early stages of the project tend to be highly inaccurate.

4.13 **Technique: Feasibility Analysis**

4.13.1 **Purpose**

The purpose of feasibility analysis is to use a structured process to determine the most viable business solution to solve a business problem or seize a new business opportunity.

4.13.2 **Description**

Feasibility analysis is essentially research efforts designed to help organizations understand the competitive environment, enabling them to make informed decisions for investments in the future of their business. Formal feasibility studies use reliable data and apply proven methods of statistics and market research to ensure complete and accurate information is produced.

A feasibility study is conducted to determine the viability of an idea for a new business opportunity by identifying and analyzing potential solution options. Depending on the size, complexity and criticality of the study, it may be consider its own stand-alone project or pre-project phase. Feasibility studies are most often used during pre-project enterprise

analysis activities; however, they can be used to provide information in other situations as listed below.

- When executives are developing strategic goals and objectives to drive toward strategy execution
- During the requirements analysis and solution design activities to help conduct trade-off analysis among solution alternatives

The feasibility analysis is an integral part of formulating a major business transformation project, e.g., reengineering a core business process and supporting technology, establishing a new line of business, increasing market share through acquisition, or developing a new product or service. Abbreviated studies may also be conducted for change initiatives requiring lower investments. Although feasibility studies may be conducted prior to, during or after the completion of a business case, it is usually undertaken as part of the overall analysis process to create the business case.

4.13.3 Elements

- Decision analysis, a structured way of determining a decision to take action and how it would lead to a business result
- Prototyping to mitigate highest risk areas, understand the complexity and seek buy-in.
- Market surveys to ensure there is a demand for the solution and it will be economically feasible
- Technology capability assessments for new unproven technologies
- Business and IT staff interviews to determine operational feasibility
- Environmental impact analysis to determine environmental feasibility
- Early cost versus benefit analysis to determine economic viability

4.13.4 Usage Considerations

.1 Advantages

Feasibility and decision analysis provide effective techniques to ensure sufficient analysis has taken place prior to proposing investment in a major new business solution

.2 Disadvantages

Feasibility and decision analysis activities are time consuming and require specialized knowledge and skills. Many organizations do not have budget mechanisms in place to fund extensive feasibility studies.

4.14 Technique: Gap Analysis

4.14.1 Purpose

A technique for identifying the changes needed to the enterprise in order to achieve a strategic goal.

4.14.2 Description

A formal study of the current state of the business, its vision for the future, and the changes required to meet the business need and achieve strategic goals. Changes could be required to any component of the business.

4.14.3 Elements

Elements include:

- Assessment of existing business architecture information describing the business, e.g., goals, objectives, functions, business units, processes, technology and applications
- Comparing the current and target business architectures to identify the changes that will be needed
- Identifying and documenting the gaps in capabilities from a number of aspects, e.g., process steps, new data, new rules or functionality

4.14.4 Usage Considerations

.1 Advantages

Gap analysis is a valuable technique to use to fully understand the changes required to implement a target vision and strategy

.2 Disadvantages

Without a complete and up-to-date enterprise architecture, it is difficult to ensure a complete understanding of the complete scope of changes needed to implement a target vision and strategy

4.15 Technique: Goal Analysis

4.15.1 Purpose

The purpose of goal analysis is to decompose strategic goals into achievable objectives and measures of success.

4.15.2 Description

Strategic goals are analysed and converted into more descriptive strategic themes and strategic objectives, and linked to enterprise performance measures.

4.15.3 Elements

Goal analysis can be accomplished using a number of different approaches as listed below:

Decomposing strategic goals into SMART objectives, where:

- Specific – describing something that has an observable outcome
- Measurable – tracking and measuring the outcome
- Achievable – testing the feasibility of the effort
- Relevant – in alignment with the organization’s key vision, mission, goals
- Timely – timeframe that is aligned with the business need

Strategic themes break down the general strategy into distinct focus areas that may lead to desired results, such as increased customer satisfaction, operational excellence, business growth, etc. Usually described in brief statements, (e.g., a strategic goal may be to increase high-revenue customers; whereas, a strategic theme may then be extrapolated into this: “increase high-revenue customers through mergers and acquisitions”).

Strategy maps, a diagram depicting how an organization creates value by linking strategic objectives to four perspectives: financial, customer, internal, learning and growth.⁷

Corporate scorecards describe and track enterprise performance measures or metrics that are designed to gauge performance toward achievement of strategic goals.

4.15.4 Usage Considerations

.1 Advantages

Goal analysis and decomposition provides lower level objectives, themes and measures to help guide the enterprise analysis tasks

.2 Disadvantages

Many organizations have not developed the knowledge, skills and competencies to conduct comprehensive goal analysis

4.16 Technique: Opportunity Analysis

4.16.1 Purpose

To identify new business opportunities that are designed to improve organizational performance and achieve strategic goals.

4.16.2 Description

The process of examining new business opportunities to improve organizational performance, e.g., increasing revenue, eliminating waste from business processes, pursuing new market ventures or other desirable objectives.

⁷ Kaplan, Robert S. and Norton, David P. *The Strategy-Focused Organization*, Harvard Business School Publishing Corporation, 2001

4.16.3 *Elements*

This technique usually involves a team of experts led by a facilitator. Steps include:

- Review strategic vision, goals, objectives and measures
- Conduct a brainstorming idea generating session to determine all possible approaches to achieve the strategic goal under review
- Examine the feasibility of each approach to achieving the goal
- Based on the results of the feasibility analysis, select the most viable opportunity path

4.16.4 *Usage Considerations*

.1 Advantages

- Ensures all possible approaches to achieving a goal are examined
- Depending on the expertise of the participants, many perspectives are considered

.2 Disadvantages

- Time consuming
- Difficult to get all perspectives represented

4.17 *Technique: Problem Analysis*

4.17.1 *Purpose*

The purpose of problem analysis is to determine the underlying source of a business problem.

4.17.2 *Description*

Problem analysis is a structured examination of the aspects of a situation to establish the root causes and resulting effects of the problem. Problem analysis is used extensively in the quality assurance, process improvement and six sigma disciplines. A critical element of problem analysis is to ensure that the current business thinking and processes are challenged, i.e., do they still make sense or provide good business value?

4.17.3 *Elements*

Typical elements of problem analysis include:

- Defining the problem
- Gathering as much information about the problem as possible
- Identifying elements that contribute to the problem
- Determining root causes

- Developing solution recommendations
- Implementing solution recommendations
- Observing the recommended solutions to ensure effectiveness

Two commonly used problem analysis methods include The Fishbone Diagram and The Five Whys:

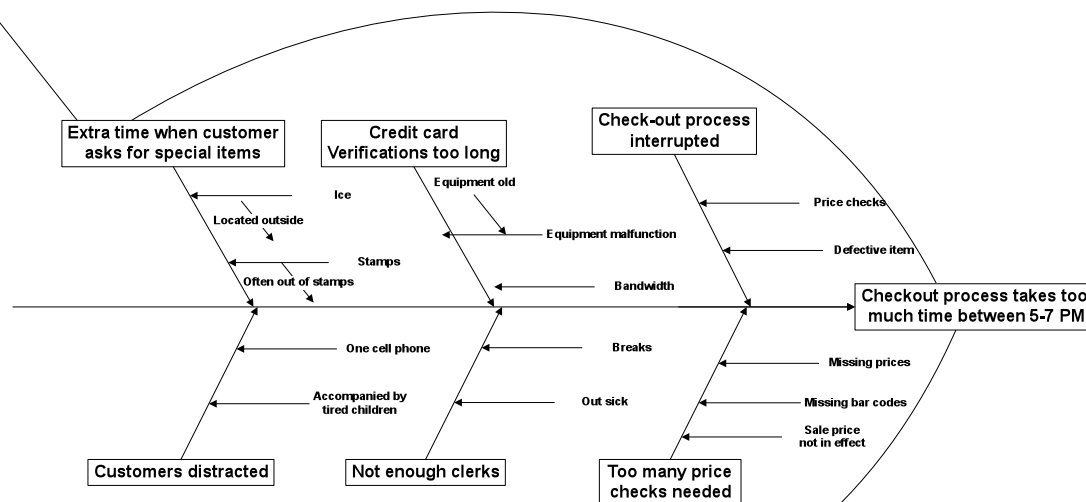
.1 The Fishbone Diagram

The fishbone diagram approach uses a structured process to identify a problem, gather information, identify and chart root causes, generate recommendations, and develop an action plan to take corrective action.

When utilizing a team approach to problem solving, it is helpful to capture the team's brainstorming on root causes visually. A cause-and-effect diagram is used to identify and organize the possible causes of a problem. This tool helps the group to focus on the cause of the problem versus the solution. The technique organizes ideas for further analysis. The diagram serves as a map depicting possible cause-and-effect relationships; refer to Figure 4-4 for an example of a cause and effect diagram. Steps to develop a cause-and-effect diagram include:

1. Capture the issue or problem under discussion in a box at the top of the diagram
2. Draw a line from the box across the paper or white board (forming the spine of the fishbone)
3. Draw diagonal lines from the spine to represent categories of potential causes of the problem. The categories may include people, process, tools, and policies
4. Draw smaller lines to represent deeper causes
5. Brainstorm categories and potential causes of the problem and capture them under the appropriate category
6. Analyze the results. Remember that the group has identified only potential causes of the problem. Further analysis is needed to validate the actual cause, ideally with data
7. Brainstorm potential solutions once the actual cause has been identified

Long Lines at Checkout Between 5 – 7 PM



Cause and Effect (Fishbone) Diagram

.2 Five Whys

The 5 Whys is a question-asking process to explore the nature and cause of a problem. The 5-Whys approach repeatedly asks questions in an attempt to get to the root cause of the problem. This is one of the simplest facilitation tools to use when problems have a human interaction component. To use this technique:

1. Write the problem on a flip chart or white board.
2. Ask: "Why do you think this problem occurs?" and capture the idea below the problem
3. Ask: "Why?" again and capture that idea below the first idea
4. Continue with step 3 until you are convinced the actual root cause has been identified. This may take more or less than five questions

The 5 Whys can be used alone, or as part of the fishbone diagram technique. Once all ideas are captured in the diagram, use the 5 Whys approach to drill down to the root causes.

.3 Problem Statement

The problem of	Describe the problem.
Affects	The stakeholders affected by the problem.
The impact of which is	What is the impact of the problem – on each stakeholder.
A successful solution would	List some key benefits of a successful solution.

4.17.4 Usage Considerations

.1 Advantages

Problem analysis provides a structured method to identify the root causes of identified problems, thus ensuring a complete understanding of the problem under review

.2 Disadvantages

Problem analysis works best when a team of experts is facilitated by a professional

4.18 Technique: SWOT Analysis**4.18.1 Purpose**

A SWOT analysis is a valuable tool to quickly analyze various aspects of the current state of the business process undergoing change.

4.18.2 Description

SWOT is an acronym for Strengths, Weaknesses, Opportunities, and Threats. SWOT analysis is a good framework for strategic planning, opportunity analysis, competitive analysis, business and product development.

4.18.3 Elements

The steps to conduct a SWOT analysis are as follows:

1. Draw a grid similar to the one in Figure X-X
2. Describe the issue or problem under discussion at the top of the grid
3. Conduct a brainstorming session (described in detail later in this chapter) to complete each section in the grid

4. Facilitate a discussion to analyze the results. Remember that the group has identified only potential characteristics of the problem. Further analysis is needed to validate the actual characteristics, ideally confirmed with data
5. Once the characteristics of the issue or problem have been validated, the group brainstorms potential solutions to solve the problem.

Problem Statement	
Strengths	Weaknesses
Opportunities	Threats

Figure X-X: SWOT Chart

4.18.4 Usage Considerations

.1 Advantages

The SWOT analysis helps quickly analyze various aspects of the current state of the business process undergoing change prior to identifying potential solution options

.2 Disadvantages

The SWOT analysis is a very high-level view; more detailed analysis is almost always needed.

Chapter 5: Elicitation

5.1 Introduction

5.1.1 *Knowledge Area Definition and Scope*

Eliciting requirements is a key task in business analysis. Because the requirements serve as the foundation for the solution to the business needs it is essential that the requirements be complete, clear, correct, and consistent. Leveraging proven means to elicit requirements will help meet these quality goals.

The word elicit is defined⁸:

1. to draw forth or bring out (something latent or potential)
2. to call forth or draw out (as information or a response)

These definitions highlight the need to actively engage the stakeholders in defining requirements.

This chapter includes details for eliciting requirements for a target system. The system in question may be a business system, an automated system, or both. The scope may be a new system, an enhancement to an existing system, or the procurement of a package.

The business analyst professional should understand the commonly used techniques to elicit requirements, should be able to select appropriate technique(s) for a given situation, and be knowledgeable of the tasks to prepare, execute and complete each technique.

Eliciting requirements is not an isolated, compartmentalized activity. Typically, requirements are identified throughout the elicitation, analysis, and review activities. For example: requirements may be elicited in interviews and/or facilitated meetings. Later, when those requirements are used to build and verify model(s) gaps in the requirements may be discovered. This will then require eliciting details of those newly identified requirements, using techniques outlined in this chapter.

5.1.2 *Input*

The Business Analysis Planning and Monitoring KA activities identify and describe:

- Stakeholder list
- Stakeholder roles and responsibilities designation
- Business Analysis Plans for Elicitation

⁸ Merriam Webster

- Requirements Management Plan.

Input to *eliciting Enterprise Analysis requirements*: A variety of means may be used to elicit business requirements and are dependent on the type of study, e.g. creating a Business Architecture, identifying Business Opportunity.

Input to *eliciting user requirements*: In the situation where Enterprise Analysis has been completed and the project is ready to elicit user requirements the Enterprise Analysis output is used to help determine the boundaries for the Elicitation activities. Enterprise Analysis information may include:

- Defined Business Problem/Opportunity and business objectives
- Solution Scope and
- Business Case

5.1.3 Tasks

The tasks defined as part of the Elicitation KA include:

- Prepare for elicitation
- Conduct elicitation activity
- Document the results of elicitation activity
- Confirm elicitation results

5.1.4 Elicitation Techniques

The business analyst professional is responsible for coordinating the activities and employing the appropriate techniques used to elicit requirements.

To fully examine and define the requirements a combination of complementary elicitation techniques is typically used. The Requirements Planning and Management KA activities include evaluating and selecting the appropriate elicitation techniques. A number of factors (the business domain, the corporate culture and environment, the skills of the analyst and the requirements deliverables that will be created) guide which techniques will be used.

The following elicitation approaches are defined in this chapter:

Elicitation Technique	Synonym(s)
Brainstorming	
Document Analysis	Review existing documentation
Focus Group	
Interface Identification	External Interface Analysis
Interview	
Observation	Job Shadowing
Prototyping	Storyboarding, Navigation Flow

Elicitation Technique	Synonym(s)
Requirements Workshop	Elicitation Workshop Facilitated Workshop Joint Application Design (JAD)
Reverse Engineering	
Survey	Questionnaire

Table 4-1 Commonly used Elicitation Techniques

5.1.5 **Output**

The Elicitation KA's deliverables depend on the elicitation techniques used, e.g., Interview notes, Survey responses. Additional output may be glossary entries. Scheduled resources

- Supporting materials
- Elicitation activity results
- Assumptions, constraints, risks, issues
- Documentation based on technique
- Stated requirements
- Validated, stated requirements

It is expected that at some point during elicitation sufficient material has been elicited from the business experts to enable analysis and documentation to begin. The combined results of all the elicitation techniques used will serve as input to building the selected analytical models. Missing, incomplete or incorrect requirements will ideally be exposed during the analysis activities thus requiring additional elicitation.

A number of techniques listed in this chapter are difficult to separate from the analysis tasks defined in the Requirements Analysis KA. For example, Requirements Workshops (which are described later in this chapter) start by eliciting requirements and often end with the creation of models such as activity diagrams, prototypes, or even data models. Such tightly coupled techniques are cross referenced in both Chapter 4 and Chapter 5.

5.2 **Task: Prepare for Elicitation**

5.2.1 **Purpose**

The purpose is to ensure all needed resources are organized and scheduled for conducting the elicitation activities.

5.2.2 **Description**

The business analyst professional builds a detailed schedule for the elicitation technique defining the specific activities and the planned dates.

5.2.3 *Input*

The minimum requisite needed to frame and prepare for the elicitation activities are a definition of the solution's scope, identification of the participating stakeholders and the selected elicitation technique(s). See 4.1.2 for details on input to this task.

- Stakeholder list
- Stakeholder roles and responsibilities designation
- Business Analysis Plans for Elicitation
- Defined Business Problem/Opportunity
- Solution Scope and
- Business Case

5.2.4 *Elements*

- Clarify the specific scope for the selected elicitation technique and gathers any necessary supporting materials.
- Schedule all resources (people, facilities, equipment).
- Notify appropriate parties of the plan.

For event-based elicitation (brainstorming, focus group, interview, observation, prototyping, requirements workshop) ground rules must be established. Agreement is reached with the stakeholders as to the form and frequency of feedback during the elicitation process as well as the mechanism for verifying and signing off on the elicited results.

Refer to Elicitation Menu of Techniques for unique aspects of preparing for a particular technique.

5.2.5 *Stakeholders*

- Project Manager
- Business Analyst
- Business and technical representatives

5.2.6 *Output*

- Scheduled resources
- Supporting materials

5.3 Task: Conduct Elicitation Activity

5.3.1 Purpose

Meet with stakeholder(s) to elicit information regarding their needs.

5.3.2 Description

The elicitation event takes place (brainstorming, focus group, interview, observation, prototyping, requirements workshop), or elicitation is performed (document analysis, interface identification, reverse engineering) or distributed (survey).

5.3.3 Input

- Supporting materials
- Organizational standards
- Requirements Management Plan
- Defined Business Problem/Opportunity
- Solution Scope
- Business Case

5.3.4 Elements

Tracing requirements: While eliciting the requirements it is important to guard against “scope creep”. Tracing requirements back to the business goals/objectives helps to validate whether a requirement should be included.

Capturing requirement attributes: While eliciting the requirements documenting requirements attributes such as the requirement’s source, value and priority will aid in managing each requirement throughout its life cycle.

Use of glossary: A business glossary is an essential asset for all elicitation techniques. The glossary should contain key domain terms along with their business definitions.

Metrics: Tracking the elicitation participants and the actual time spent eliciting the requirements provides a basis for future planning.

For event-based elicitation techniques, eliciting requirements is highly dependent on the knowledge of the stakeholders, their willingness to participate in defining requirements, and the group’s ability to reach consensus. It is important that all defined stakeholders are ‘heard’ during elicitation of requirements. It may be necessary to further clarify and possibly restate the requirements to encompass all stakeholders’ perspectives.

Refer to each elicitation technique for unique elements of conducting that particular technique.

5.3.5 Stakeholders

- Participants
- Business Analyst
- Project Manager
- Technical representatives

5.3.6 Output

Output specific to the elicitation technique(s) such as:

- Elicitation activity results
- Assumptions, constraints, risks, issues
- Documentation based on technique (e.g. interview notes, workshop results, survey responses, etc.)

5.4 Task: Document Results of Elicitation Activity

5.4.1 Purpose

Record the information provided by stakeholders for use in analysis.

5.4.2 Description

For an elicitation event (brainstorming, focus group, interview, observation, prototyping, requirements workshop) a summary of the output from the event, including issues is produced. For elicitation done via document analysis, interface identification, or reverse engineering a report of the findings is produced. The results of a survey are collated and summarized. For the techniques of Prototyping and Requirements Workshops, documenting the results may be done as part of the Requirements Analysis work.

5.4.3 Input

- Elicitation activity results

5.4.4 Elements

Refer to Elicitation Menu of Techniques for unique aspects of documenting the results of a particular technique.

5.4.5 Stakeholders

Business Analyst

5.4.6 Output

- Stated requirements

5.5 Task: Confirm Elicitation Results

5.5.1 Purpose

Validate that the stated requirements expressed by the stakeholder's match the stakeholder's understanding and needs.

5.5.2 Description

This task is used for the Interview and Observation techniques to ensure the session notes are adequately documented.

5.5.3 Input

- Stated requirements

5.5.4 Elements

Refer to Elicitation Menu of Techniques for unique aspects of confirming the results of the Interview and Observation techniques.

5.5.5 Stakeholders

- Business Analyst
- Interviewee
- Observed person

5.5.6 Output

- Validated stated requirements

5.6 Technique: Brainstorming

5.6.1 Purpose

Brainstorming is an excellent way of eliciting many creative ideas for an area of interest. Structured brainstorming produces numerous creative ideas about any given "central question" or topic.

5.6.2 Description

In 1939, a team led by advertising executive Alex Osborn coined the term "brainstorm." According to Osborn, "Brainstorm means using the **brain** to **storm** a creative problem and to do so "in commando fashion, each *stormer* audaciously attacking the same objective."

Brainstorming is a technique that promotes diversion type of thinking. Diversion refers to those team activities that produce a broad or diverse set of options. Brainstorms help answer specific questions such as (but not limited to):

- What options are available to resolve the issue at hand?

- What factors are constraining the group from moving ahead with an approach or option?
- What could be causing a delay in activity 'A'?
- What can the group do to solve problem 'B'?

Brainstorming works by focusing on a topic or problem, and then coming up with many possible solutions to it. This technique is best applied in a group as it draws on the experience and creativity of all members of the group. In the absence of a group, one could brainstorm on one's own to spark new ideas.

5.6.3 Elements

.1 Prepare for Brainstorming:

- Develop a clear and concise definition of the area of interest.
- Determine a time limit for the group to generate ideas, the larger the group, the more time required.
- Decide who will be included in the session and their role – participant or facilitator. Aim for participants (ideally 6 to 8) who represent a range of background and experience with the topic.
- Set expectations with participants and get their buy-in to the process.
- Establish criteria for evaluating and rating the ideas.

.2 Conduct Brainstorming session:

- Share new ideas without any discussion, criticism or evaluation.
- Visibly record all ideas.
- Encourage participants to be creative, share exaggerated ideas, and build on the ideas of others.
- Don't limit the number of ideas as the goal is to elicit as many ideas as possible within the time period.

.3 Wrap-up the brainstorming:

- Once the time limit is reached, using the pre-determined evaluation criteria, discuss and evaluate the ideas.
- Create a condensed list of ideas, combine ideas where appropriate, and eliminate duplicates.
- Rate the ideas. There are many techniques that can be used to prioritize the ideas, e.g. multivoting.

- Distribute the final list of ideas to appropriate parties.

5.6.4 Usage Considerations

- .1 Advantages:
 - Able to elicit many ideas in a short time period.
 - Non-judgmental environment enables outside-the-box thinking.
- .2 Disadvantages:
 - Dependent on participants' creativity.

5.7 Technique: Document Analysis

5.7.1 Purpose

Document analysis is a means to elicit requirements of an existing system by studying available documentation and identifying relevant information.

Document analysis is used if the objective is to gather details of the “As Is” environment such as existing business rules, entities, and attributes that need to be included in a new system or need to be updated for the current system. This technique would also apply in situations where the subject matter experts for the existing systems are no longer with the organization, or are not going to be available throughout the duration of the elicitation process.

5.7.2 Description

Elicitation typically includes analysis of documents such as business plans, market studies, contracts, requests for proposals, statements of work, memos, existing guidelines, procedures, training guides, competing products literature, published comparative product reviews, problem reports, customer suggestion logs, and existing system specifications to list a few. Identifying and consulting all likely sources of requirements will result in improved requirements coverage assuming the documentation is up to date.

5.7.3 Elements

- .1 Prepare for Document Analysis:
 - Evaluate which existing system and business documentation are relevant, available and appropriate to be studied.
- .2 Analyze the documents:
 - Study the material and identify relevant business details.
 - Document business details as well as questions for follow-up with subject matter experts.

- .3 Post Document Analysis wrap-up:
 - Review and confirm the selected details with subject matter experts.
 - Organize information into requirements format.
 - Obtain answers to follow-up questions.

5.7.4 Usage Considerations

- .1 Advantages:
 - Not starting from a blank page.
 - Leveraging existing materials to discover and/or confirm requirements.
 - A means to cross-check requirements from other elicitation techniques such as interviews, job shadowing, surveys or focus groups.
- .2 Disadvantages:
 - Limited to “as-is” perspective.
 - Existing documentation may not be up-to-date or valid.
 - Can be a time-consuming and even tedious process to locate the relevant information.

5.8 Technique: Focus Group

5.8.1 Purpose

A focus group is a means to elicit ideas and attitudes about a specific product, service or opportunity in an interactive group environment. The participants share their impressions, preferences and needs, guided by a moderator.

5.8.2 Description

A focus group is composed of pre-qualified individuals whose purpose is to discuss and comment on a topic. This is an opportunity for individuals to share their own perspectives and discuss them in a group setting. This could lead participants to re-evaluate their own perspectives in the light of others' experiences. A trained moderator manages the administrative pre-work, facilitates the session and produces the report.

As this elicitation technique is considered a form of qualitative research, the session results are analyzed and reported as themes and perspectives, rather than numerical findings. The report may also include selected quotations to support the themes.

A traditional focus group gathers in the same physical room. An online focus group allows members to be located remotely while participating by a network connection. Each approach has pros and cons in terms of logistics and expenses.

A focus group can be utilized during any life-cycle state: exploratory, under development, ready to launch, or in production. If the group's topic is a product under development, the group's ideas are analyzed in relationship to the stated requirements. This may result in updating existing requirements or uncovering new requirements. If the topic is a completed product that is ready to be launched, the group's report could influence how to position the product in the market. If the topic is a product in production, the group's report may provide direction on the revisions to the next release of requirements. A focus group may also serve as a means to assess customer satisfaction with a product or service.

The work of a focus group may be similar to that done in a brainstorming session. One difference is that a focus group is typically more structured. Another difference is a brainstorming session's goal is to actively seek broad, creative, even exaggerated ideas.

5.8.3 *Elements*

.1 Prepare for the Focus Group

Recruit Participants

A focus group typically has 6-12 attendees. It may be necessary to invite twice as many individuals in order to allow for no-shows. If many people need to participate, it may be necessary to run more than one focus group.

The topic of the focus group will influence who should be recruited. If the topic is a new product, it is likely that existing users (experts and novices) should be included. There are pros and cons that should be considered when using homogeneous vs. heterogeneous composition.

- Homogeneous – individuals with similar characteristics. Caution: Differing perspectives will not be shared. Possible solution: conduct separate sessions for different homogeneous groups.
- Heterogeneous – individuals with diverse backgrounds, perspectives. Caution: Individuals may self-censor if not comfortable with others' background resulting in lower quality of data collected.

Assign the moderator and recorder

The moderator should be experienced in facilitating groups. Typical skills include: promote discussion; ask open questions; facilitate interactions between group members; engage all members; keep session focused; remain neutral; be adaptable and flexible.

Create discussion guide

The guide includes goals/objectives of the session and five to six open questions.

Reserve site and services

Select the location for the session. Arrange for technical support to transcribe the session and, if used, audio/video taping equipment.

.2 Run the focus group session

The moderator guides the group's discussion, follows a preplanned script of specific issues and ensures the objectives are met. However, the group discussion should appear free-flowing and relatively unstructured for the participants. A session is typically 1 to 2 hours in length. A recorder captures the group's comments.

.3 Produce Report

The moderator objectively analyzes and documents the participants' agreements and disagreements and synthesizes them into themes.

5.8.4 *Usage Considerations*

.1 Advantages:

- Ability to elicit data from a group of people in a single session saves time and costs as compared to conducting individual interviews with the same number of people.
- Effective for learning people's attitudes, experiences and desires.
- Active discussion and the ability to ask others questions creates an environment where participants can consider their personal view in relation to other perspectives.

.2 Disadvantages:

- In the group setting, participants may be concerned about issues of trust, or may be unwilling to discuss sensitive or personal topics.
- Data collected (what people say) may not be consistent with how people actually behave.
- If the group is too homogenous the group's responses may not represent the complete set of requirements.
- A skilled moderator is needed to manage the group interactions and discussions.
- It may be difficult to schedule the group for the same date and time.
- If the goal of the focus group is to elicit ideas on a new or changing product, a focus group is not an effective way to evaluate usability.

5.9 **Technique: Interface Identification**

5.9.1 *Purpose*

Identifying what interfaces are necessary to support a system sets the stage for eliciting a wide variety of requirements. Early identification of interfaces uncovers and confirms the interfacing stakeholders and provides a framework for subsequent analysis of the

detailed requirements for each interface. Interface identification is certainly necessary for a software solution but can also be useful for a non-software solution, e.g., defining a document that shall be provided by an external party.

5.9.2 *Description*

An interface is a connection between two components. Most systems require one or more interfaces. Interfaces types include:

- User interfaces - includes human user directly engaged with the system as well as reports provided to the user
- Interfaces to and from external systems
- Interfaces to and from external hardware devices

The users, external systems and systems that own the devices are considered stakeholders.

Interface identification helps to clarify the boundaries of the interfacing systems. It distinguishes which system provides specific functionality along with the input and output data needs. By clearly and carefully separating the requirements for each system while jointly defining the shared interface requirements, a basis for successful interoperability is established.

5.9.3 *Elements*

.1 Prepare for Interface Identification:

Review current documentation for any indications of interface requirements. For example, a Context Diagram provides an effective visualization of the interfaces to and from external parties. See Chapter 2, Enterprise Analysis, for details on the technique “Context/Business Domain Diagram”.

.2 Conduct Interface Identification:

For each stakeholder that interacts with the system, identify what interfaces are needed.

For each interface:

- Describe the purpose of the interface.
- Evaluate which type may be appropriate: user interface, system-to-system interface, external hardware device interface.
- Elicit high-level details about the interface, depending on its type:
 - For an interface where the user directly engages the system, see Chapter 4, Prototyping.

- For a system-to-system interface or an interface with an external hardware device, outline the content and name the related events.

5.9.4 *Usage Considerations*

.1 Advantages:

- Provides an early, high-level view of interoperability.
- Results are valuable input for project planning:
 - Impact on delivery date. Knowing what interfaces are needed, as well as their anticipated complexity and testing needs enables more accurate project planning and potential savings in time and cost.
 - Collaboration with other systems or projects. If the interface is to an existing system, product or device and the interface already exists, it may not be easily changed. If the interface is new, then the ownership, development and testing of the interface needs to be addressed and coordinated in both projects' plan. In case, eliciting and analyzing the interface requirements will require negotiation and cooperation between the owning systems.

.2 Disadvantages:

- Does not provide an understanding of the business processes since this technique only identifies the input and output interfaces at a high level.

5.10 *Technique: Interview*

5.10.1 *Purpose*

An interview is a systematic approach to elicit information from a person or group of people in an informal or formal setting by talking to the person - the interviewee, asking relevant questions and documenting the responses. (This section considers the business analysis professional in the role of interviewer.)

5.10.2 *Description*

In an interview, the interviewer formally or informally directs his/her questions to: a stakeholder / a subject-matter-expert / a potential user / a member of the solution team to obtain answers that finally take the shape of requirements. One-on-one interviews are typically most common. In a group interview (more than one interviewee in attendance) the interviewer must be careful to solicit responses from all attendees.

For the purpose of eliciting business requirements, interviews are of two basic types:

- Structured interview, where the interviewer has a pre-defined set of questions and is looking for answers.

- Unstructured interview, where, without any pre-defined questions, the interviewer and the interviewee discuss in an open-ended way what the business expects from the target system.

Successful interviewing depends on several factors such as, but not necessarily limited to:

- Level of understanding of the interviewer in that business domain.
- Experience of the interviewer in conducting interviews.
- Skill of the interviewer in documenting the discussions.
- Readiness of interviewee to provide the relevant information.
- Degree of clarity in interviewee's mind about what the business wants/expects from the target system.
- Rapport of the interviewer with the interviewee.

5.10.3 Elements

.1 Prepare for the interview

- Define the interview's focus or goal.
- Identify potential interviewees. The stakeholders identified in the Requirements Planning KA may be the primary interviewees and/or will designate appropriate persons who should be interviewed. The sponsor considers the following questions when identifying who should be interviewed:
 - Who holds the most authentic and the most current information on the subject of interest?
 - What is his/her stake in the project?
 - What is the relative importance of information held by one person vis-à-vis that held by another person? This information is helpful when analyzing conflicting comments across interviews.
- Design the interview. The interviewer may need to custom-design the interview for each identified interviewee. The interviewee's ability to participate and the desired outcome of an interview govern the design of an interview. In addition, these factors are also considered:
 - The format for the interview, structured vs. unstructured
 - If a structured interview, the type of questions:

- Closed-ended questions: Questions that are used to elicit a single response such as: yes, no, or a specific number. Example: How many hours does it take for the claim process to be completed?
- Open-ended questions: Questions that are used to elicit a dialog or series of steps and cannot be answered in a yes or no fashion but need explaining. Example: What does a claim processor do on receipt of a claim form?
- Organization of the questions: use a logical order or an order of priority/significance. Examples of order would be: general questions to specific questions; start to finish; detail to summary, etc. The actual organization is based on the interviewee's knowledge, the subject of the interview, etc. The goal is to follow a logical order rather than jump around when asking questions.
- Location of participants. An interview can be conducted in-person or electronically.
- The interview time and site are convenient to the interviewee.
- Determine if a scribe is needed and if so, include that person in the scheduling process. Determine if the interview needs to be recorded. If so, discuss the recording's purpose and usage with the interviewee.
- Contact potential interviewees. The interviewer contacts the selected interviewees and explains to them why their assistance is needed. The purpose is to explain the objective of the interview to the potential interviewee.

.2 Conduct the interview:

- *Opening the interview.* The interviewer gives an introduction, states the purpose of the interview, addresses any concerns raised by the interviewee, and explains that notes will be taken and shared with the interviewee after the interview.
- *During the interview:*
 - The interviewer maintains focus on the established goals and pre-defined questions.
 - All concerns raised by the interviewee are addressed during the interview or documented for follow-up after the interview or in a subsequent interview.
 - The interviewer practices active listening to confirm what he/she understood from the information offered at various times during the interview.
- *Closing the interview.* The interviewer asks the interviewee for areas which may have been overlooked in the session. Lastly, the interviewer summarizes the session, reminds the interviewee of the upcoming review process and thanks the interviewee for his/her time.

.3 Post interview follow-up and confirmation:

After the interview is complete, the interviewer organizes the information elicited and sends the notes to the interviewee for review. Documenting the discussion for review allows the interviewee to see all of the information in context. This review may point out items that are incorrect or missing because the interviewer (or scribe) missed documenting them, or because the interviewer (or scribe) documented them incorrectly, or because the interviewee missed discussing them. This review is not intended to address whether or not the requirements are valid nor whether they will ultimately be approved for inclusion into the deliverables but solely to determine if the interview has been adequately documented.

5.10.4 *Usage Considerations*

.1 Advantages

- Encourages participation and establishes rapport with the stakeholder.
- Simple, direct technique that can be used in varying situations.
- Allows the interviewer and participant to have full discussions and explanations of the questions and answers.
- Enables observations of non-verbal behavior.
- The interviewer can ask follow-up and probing questions to confirm own understanding.
- Maintain focus through the use of clear objectives for the interview that are agreed upon by all participants and can be met in the time allotted.

.2 Disadvantages

- Interviews are not an ideal means of reaching consensus across a group of stakeholders.
- Requires considerable commitment and involvement of the participants.
- Training is required to conduct good interviews. Unstructured interviews, especially, require special skills such as facilitation/virtual facilitation and active listening.
- Depth of follow-on questions may be dependent on the interviewer's knowledge of business domain.
- Transcription and analysis of interview data can be complex and expensive.
- Resulting documentation is subject to interviewer's interpretation.

5.11 Technique: Observation

5.11.1 Purpose

Observation is a means to elicit requirements by conducting an assessment of the subject matter expert's work environment. This technique is appropriate when documenting details about the current processes or if the project intends to enhance or change a current process.

5.11.2 Description

Observation relies on studying people performing their jobs, and is sometimes called "job shadowing" or "following people around." For instance, some people have their work routine down to such a habit that they have difficulty explaining what they do or why. The observer may need to watch them perform their work in order to understand the flow of work. In certain projects, it is important to understand the current processes to better assess the process modifications that may need to be made.

There are two basic approaches for the observation technique:

- **Passive / invisible.** In this approach, the observer observes the subject matter expert working through the business routine but does not ask questions. The observer writes notes about what he/she sees, but otherwise stays out of the way, as if he/she was invisible. The observer waits until the entire process has been completed before asking any questions. The observer should observe the business process multiple times to ensure he/she understands how the process works today and why it works the way it does.
- **Active / visible.** In this approach, while the observer observes the current process and takes notes he/she may dialog with the worker. When the observer has questions as to why something is being done as it is, he/she asks the questions right away, even if it breaks the routine of the person being observed. In this approach, the observer might even participate in the work to gain an immediate appreciation for how the current process works.

Variations of the observation technique:

- In some cases, the observer might participate in the actual work to get a hands-on feel for how the business process works today. Of necessity this would be limited to activity that is appropriate for a non-expert to perform and whose results would not negatively impact the business.
- The observer becomes a temporary apprentice.
- The observer watches a demonstration of how a specific process and/or task are performed.

5.11.3 *Elements*

- .1 Prepare for observation
 - Determine what sampling of users (e.g. experts and novices, just experts) to observe and which activities.
 - Prepare questions to ask during or after the shadowing.
- .2 Observe
 - Observer introduces himself to the person being observed and:
 - Reassures the user that their work is not being questioned but rather the observation of the work and resulting documentation will serve as input to requirements analysis. Informs the user that the observer is present only to study their processes and will refrain from discussing future solutions to any problems.
 - Explains to the user that they may stop the observation process at any time if they feel it is interfering with their work.
 - Suggests to the user that they may “think aloud” while they are working as a way to share their intentions, challenges, and concerns.
 - Conduct observation.
 - Take detailed notes.
 - If using the active observation approach, ask probing questions about why certain processes and tasks are being done.
- .3 Post Observation wrap-up – documentation and confirmation
 - Obtain answers to original questions, or new questions that surfaced during the observations.
 - Feedback a summary of notes to the shadowed worker, as soon as possible, for review and any clarification.
 - When observing many users, compile notes at regular intervals to identify commonalties and differences between users. Review findings with the entire shadowed group to ensure that the final details represent the entire group, not selected individuals.

5.11.4 *Usage Considerations*

- .1 Advantages:
 - Provides a realistic and practical insight into the business knowledge by getting a hands-on feel for how the business process works today.

- Elicits details of informal communication and ways people actually work around the system that may not be documented anywhere.
- .2 **Disadvantages**
- Only possible for existing processes.
 - Could be time-consuming.
 - May be disruptive to the person being shadowed.
 - Unusual exceptions and critical situations that happen infrequently may not occur during the observation.
 - May not well work if the current process involved a lot of intellectual work or other work that is not easily observable.

5.12 Technique: Prototyping

5.12.1 Purpose

Prototyping, when used as an elicitation technique, aims to discover and visualize high-level interface requirements. Prototyping when utilized during Requirements Analysis details the interface requirements and integrates them with other analysis requirements such as use cases, scenarios, data and business rules. In both uses, business experts often find prototyping to be a concrete means to identify, describe and validate their interface needs.

5.12.2 Description

Prototyping can be categorized in two ways:

The functional scope of the prototype:

- Horizontal prototype: Models a shallow, and possibly wide, view of the system's functionality. Typically does not have any business logic running behind the visualization.
- Vertical prototype: Models a deep, and usually narrow, slice of the entire system's functionality.

The use of the prototype throughout the system development lifecycle:

- 'Throw-away' Prototype: This exploratory approach seeks to quickly uncover and clarify interface requirements using simple tools, sometimes just paper and pencil. As the name suggests, 'Throw-away', such a prototype is usually discarded when the final system has been developed. The focus is on functionality that is not easily elicited by other techniques, has conflicting viewpoints, or is difficult to understand.

- **Evolutionary Prototype:** This rigorous approach extends the initial interface requirements into a fully functioning system and requires a specialized prototyping tool or language. This prototype produces “running” software. It emerges as the actual system downstream in the lifecycle.

5.12.3 *Elements*

.1 Prepare for prototyping

- Determine the prototyping approach: throw-away vs. evolutionary; vertical vs. horizontal.
- Identify the functionality to be modeled.

.2 Prototype

Building the prototype is an iterative process. The initial efforts outline the high-level views. Subsequent iterations add detail depending on the functional scope (horizontal vs. vertical),

When prototyping a report, the first iteration may produce a list of report specifications such as data attributes, selection criteria and derivation rules for totals. Further analysis may draft a detailed layout of the report.

When prototyping an interface that appears on a screen (whether on a computer screen or a device such as a cell phone, or a copy machine) a number of iterations may be useful. The initial focus is an end-to-end understanding of the interface flow. Add details as appropriate to the work.

- A Storyboard (a.k.a. Dialog Map, Dialog Hierarchy, and Navigation Flow) portrays the navigation paths across the interface components. This visual includes abstractions of each screen along with directional arrows that indicate the allowable navigation flows.
- Screen specifications list the data attributes, selection criteria and supporting business rules.
- A screen layout or mockup provides a graphical representation of the elements. At this detailed level, one would apply any organizational standards or style guides.

.3 Evaluate the prototype

For detailed prototypes, verify that the logical interface elements trace to user requirements such as processes, data and business rules.

Validate the prototype represents the user’s needs. Scenarios are useful to ‘test’ the interfaces.

5.12.4 *Usage Considerations*

.1 Advantages

- Supports users who are more comfortable and effective at articulating their needs by using pictures, as prototyping lets them “see” the future system’s interface.
- A prototype allows for early user interaction and feedback.
- A throw-away prototype is an inexpensive means to quickly uncover and confirm a variety of requirements that go beyond just the interface such as processes, data, business rules.
- A vertical prototype can demonstrate what is feasible with existing technology, and where there may be technical gaps.
- An evolutionary prototype provides a vehicle for designers and developers to learn about the users’ interface needs and to evolve system requirements.

.2 Disadvantages

- Depending on the complexity of the target system, using prototyping to elicit requirements can take considerable time if the process gets bogged down by the “how’s” rather than “what’s”.
- Assumptions about the underlying technology may need to be made in order to initiate prototyping.
- A prototype may lead users to set unrealistic expectations of the delivered system’s performance, completion date, reliability and usability characteristics.

5.13 **Technique: Requirements Workshop**

5.13.1 *Purpose*

A Requirements Workshop is a structured way to capture requirements. A workshop may be used to scope, discover, define, prioritize and reach closure on requirements for the target system.

Well-run workshops are considered one of the most effective ways to deliver high quality requirements quickly. They promote trust, mutual understanding, and strong communications among the project stakeholders and project team and produce deliverables that structure and guide future analysis.

5.13.2 *Description*

A requirements workshop, (also generically referred to as JAD, Joint Application Design), is not a traditional meeting. Instead, it is a highly productive focused event attended by carefully selected key stakeholders and subject matter experts for a short, intensive period (typically one or few days).

The workshop is facilitated by a team member or ideally, by an experienced, neutral facilitator. A Scribe (also known as a Recorder) documents the business requirements elicited as well as any outstanding issues. A business analyst professional may be the Facilitator or the Scribe in these workshops. In situations where the business analyst professional is a subject matter expert on the topic, he/she may serve as participant in the workshop.

A workshop may be used to generate ideas for new features or products, to reach consensus on a topic, or to review requirements. Other outcomes are often detailed requirements captured in models, such as the business domain model, data and behavior models, process/flow models and or usage models.

5.13.3 Elements

.1 Prepare for the Requirements Workshop

- Clarify the stakeholder's needs, and the purpose of the workshop.
- Identify critical stakeholders who should participate in the workshop.
- Define the workshop's agenda.
- Determine what means will be used to document the output of the workshop.
- Schedule the session(s).
- Arrange room logistics and equipment.
- Send materials in advance to prepare the attendees and increase productivity at the meeting.
- Conduct pre-workshop interviews with attendees.

.2 Conduct/Run the Requirements Workshop

- Elicit, analyze and document requirements.
- Obtain consensus on conflicting views.
- Maintain focus by frequently validating the session's activities with the workshop's stated objectives.

The Facilitator has the responsibility to:

- Establish a professional and objective tone for the meeting.
- Enforce discipline, structure and ground rules for the meeting.
- Introduce the goals and agenda for the meeting.
- Manage the meeting and keep the team on track.

- Facilitate a process of decision making and build consensus, but avoid participating in the content of the discussion.
- Ensure that all stakeholders participate and have their input heard.
- Ask the right questions; analyze the information being provided at the session by the stakeholders, and follow-up with probing questions, if necessary.

The Scribe's role is to document the business requirements in the format determined prior to the workshop.

.3 Post Requirements Workshop wrap-up done by Facilitator

- Follow up on any open action items that were recorded at the workshop.
- Complete the documentation and distribute it to the workshop attendees and the sponsor.

5.13.4 Usage Considerations

.1 Advantages:

- A workshop can be a means to elicit detailed requirements in a relatively short period of time.
- A workshop provides a means for stakeholders to collaborate, make decisions and gain a mutual understanding of the requirements.
- Workshop costs are often lower than the cost of performing multiple interviews. A requirements workshop enables the participants to work together to reach consensus which is typically a cheaper and faster approach than doing serial interviews as interviews may yield conflicting requirements and the effort needed to resolve those conflicts across all interviewees can be very costly.
- Feedback is immediate, e.g. facilitator's interpretation of requirements is fed back immediately to the stakeholders and confirmed.

.2 Disadvantages:

- Due to stakeholders availability it may be difficult to schedule the workshop.
- The success of the workshop is highly dependent on the expertise of the facilitator and knowledge of the participants.
- Requirements workshops that involve too many participants can slow down the workshop process thus negatively impacting the schedule. Conversely, collecting input from too few participants can lead to overlooking requirements that are important to users, or to specifying requirements that don't represent the needs of majority of the users.

5.14 Technique: Reverse Engineering

5.14.1 Purpose

In situations where the software for an existing system has little or outdated documentation and it is necessary to understand what the system actually does, reverse engineering is an elicitation technique that can extract implemented requirements from the software code.

5.14.2 Description

Forward engineering is the traditional process of moving from high level abstractions to physical implementation. Reverse engineering is a process of analyzing a subject system/product to identify underlying business processes, data and rules. Based on the identification work, representations of the system/product may be created at a higher level of abstraction.

There are two general categories of reverse engineering:

- **Black Box Reverse Engineering:** The system/product is studied without examining its internal structure.
- **White Box Reverse Engineering:** The inner workings of the system/product are studied.

The results of reverse engineering can provide:

- An understanding of how a product works more comprehensively than by merely observing it.
- A means to investigate errors and limitations in existing programs and a help in correcting them.
- Details to help make products and systems compatible.
- Details to help evaluate a product and understand its limitations.
- Documentation of a product whose manufacturer is unresponsive to customer service requests.
- Details to help transform obsolete products.

5.14.3 Elements

- .1 Prepare for reverse engineering:
 - Determine the scope of the functionality that needs to be reverse-engineered.
 - Evaluate the cost-benefit. As reverse engineering can be time-consuming and expensive, consider whether the financial investment is warranted by evaluating the potential benefits gained from improved documentation and/or

derived abstraction in terms of maintenance of the existing system or development of a new system/product.

.2 Perform reverse engineering:

- Disassemble or decompile the original system either manually or with software.
- Document the results in a manner that can be reviewed and verified by a business subject matter expert. These can serve as baseline details to elicit requirements for extending the existing system

5.14.4 Usage Considerations

.1 Advantages

- Protects investment in existing system/product by enabling the analysts to 'build-up' existing functionality/business implementation.
- Provides detailed, current, information that can be used to update documentation of an existing system/product.

.2 Disadvantages

- Expensive and time-consuming.
- Often restricted by copyright laws when a system/product of another manufacturer is involved.
- Existing tools that support reverse engineering have limited capabilities and require training to use.
- Requires specialized skills:
 - Ability to abstract from 'specific' to 'general'.
 - Ability to draw inferences, especially, when documenting business rules.
 - Ability to co-relate the functions of component(s) of a system with the current and/or intended business processes.

5.15 Technique: Survey/Questionnaire

5.15.1 Purpose

A survey is a means of eliciting information from many people, anonymously, in a relatively short time. A survey can collect information about customers, products, work practices and attitudes. A survey is often referred to as a questionnaire.

5.15.2 Description

A survey administers a set of written questions to the stakeholders and subject matter experts. Their responses are analyzed and distributed to the appropriate parties.

Questions in a survey are of two types:

- **Closed:** The respondent is asked to select from available responses. Useful when the issues are known but the range of user responses to them is not. The responses to closed questions are easier to analyze than those gained from open-ended questions.
- **Open-ended:** The respondent is free to answer the questions as they wish. Useful when the range of user's responses is pretty well understood, but the strength of each response category needs to be determined. The responses to open-ended questions may provide more detail and a wider range of responses than those gained from closed-ended questions but open-ended questions are more difficult to quantify and summarize.

5.15.3 Elements

.1 Prepare

A survey requires detailed preparation to ensure the needed information is obtained while minimizing the responders' time to complete it.

- Define the purpose of the survey and the target survey group: Identify the objectives and the likely user group to be surveyed. Confirm with the sponsor.
- Choose the appropriate survey type: Initial steps of a survey are the same as for interview design (*see Section 4.7.2 Interview*), keeping in mind that semi-structured interviews are similar to 'open-ended' surveys; and structured interviews are similar to 'closed-ended' surveys.
- Select the sample group: Consider both the survey type ('open-ended' or 'close-ended') and the number of people in the identified user group to determine if the entire group should be surveyed. For example: When the sample group is small, it may be practical to survey all members of the group. When the sample group is large and the desired survey type is 'open-ended', it may be necessary to identify a subset of users. For such situations use of a statistical sampling method will help ensure that survey results are not biased.
- Select the distribution and collection methods: For each sample group determine the appropriate communication mode – surface mail; e-mail; web-based, telephone.
- Project the desired level of response: Determine what response rate would be acceptable. If the actual response rate is lower then the use of the survey results may be limited. Offering an incentive can raise the response rate but the cost of the incentive must be justified and budgeted.
- Determine if the survey should be supported with individual interviews: As a survey does not provide the depth of data that can be obtained from individual interviews consider:

- Pre-survey interviews may provide ideas for survey questions.
- Post-survey interviews can target specific survey responses or themes to elicit a greater level of detail.
- Write the survey questions:
 - Communicate the purpose: Explain the objectives of the survey. If the stakeholders can see the reason for completing the survey, they are more likely to do so.
 - Be cognizant of the group's characteristics: Understand the background of the target group including their environment and specific terminology. Use this information when writing the questions. If there is significant diversity in the group's background it may be useful to divide a large group into smaller and *homogenous* groups during the preparation stage and then produce variations of the survey that fit each group's background.
 - Focus on the requirement: All questions should be directed towards the stated objectives and the objectives should be supported by a comprehensive set of questions.
 - Keep the survey short. Less than 10 items is preferable.
 - Make the survey easy and fast to complete, ideally no more than five or 10 minutes.
 - Make sure that the question wording is clear and concise.
 - Avoid double questions in a single question.
 - Avoid questions involving negatives.
 - Avoid complex branching structures.
 - Avoid asking questions that make respondents feel uncomfortable. Trying to elicit information that is restricted by regulations is likely to put respondents on the defensive.
- Test the survey. Perform a usability test on the survey. Use the results to fine-tune the survey.
- .2 Distribute the survey
- .3 Document survey results
 - Collate the responses. For the responses to 'open-ended' questions, evaluate the details and identify any emerging themes.
 - Analyze and summarize the results.

- Report findings to the sponsor.

5.15.4 Usage Considerations

.1 Advantages

- When using 'closed-ended' questions, effective in obtaining quantitative data for use in statistical analysis.
- When using open-ended questions, the survey results may yield insights and opinions not easily obtainable through other elicitation techniques.
- Does not typically require significant time from the responders.
- Effective and efficient when stakeholders are not located at one place.
- May result in large number of responses.
- Quick and relatively inexpensive to administer.

.2 Disadvantages

- Use of open-ended questions requires more analysis.
- To achieve unbiased-results, specialized skills in statistical sampling methods are needed when the decision has been made to survey a sample subset.
- Some questions may be left unanswered or answered incorrectly due to their ambiguous nature.
- May require follow up questions or more survey iterations depending on the answers provided.
- Not well suited for collecting information on actual behaviors.

Chapter 6: Requirements Analysis

6.1 Knowledge Area Definition and Scope

The Requirements Analysis Knowledge Area describes the tasks and techniques used by a business analyst to convert *stated requirements* into a description of the required capabilities of a potential solution that will fulfill the actual needs of the stakeholders. To accomplish this, the stated requirements must be analyzed, verified, and validated to ensure they will meet the goals and objectives of the enterprise.

Requirements analysis and enterprise analysis are closely related, in that they require much of the same knowledge and skills and many of the same principles apply to both. The difference between the two is primarily one of perspective and scope. Business analysts perform enterprise analysis in order to understand the *goals* and *objectives* underlying a change in the structure and systems of a business, and the larger context within which the change must be implemented. Requirements analysis is performed in order to describe the nature and characteristics of a solution that can meet

6.1.1 Input

- Business Case
- Solution Scope
- Stated Requirements
- Stakeholder Analysis
- Business analysis plans

6.1.2 Tasks

Requirements Analysis is performed in order to increase the understanding of a *stated requirement*. The tasks defined as part of the Requirements Analysis KA include:

- 6.2 Prioritize requirements
- 6.3 Organize requirements
- 6.4 Specify and model requirements
- 6.5 Determine assumptions and constraints
- 6.6 Verify requirements
- 6.7 Validate requirements

6.1.3 *Techniques*

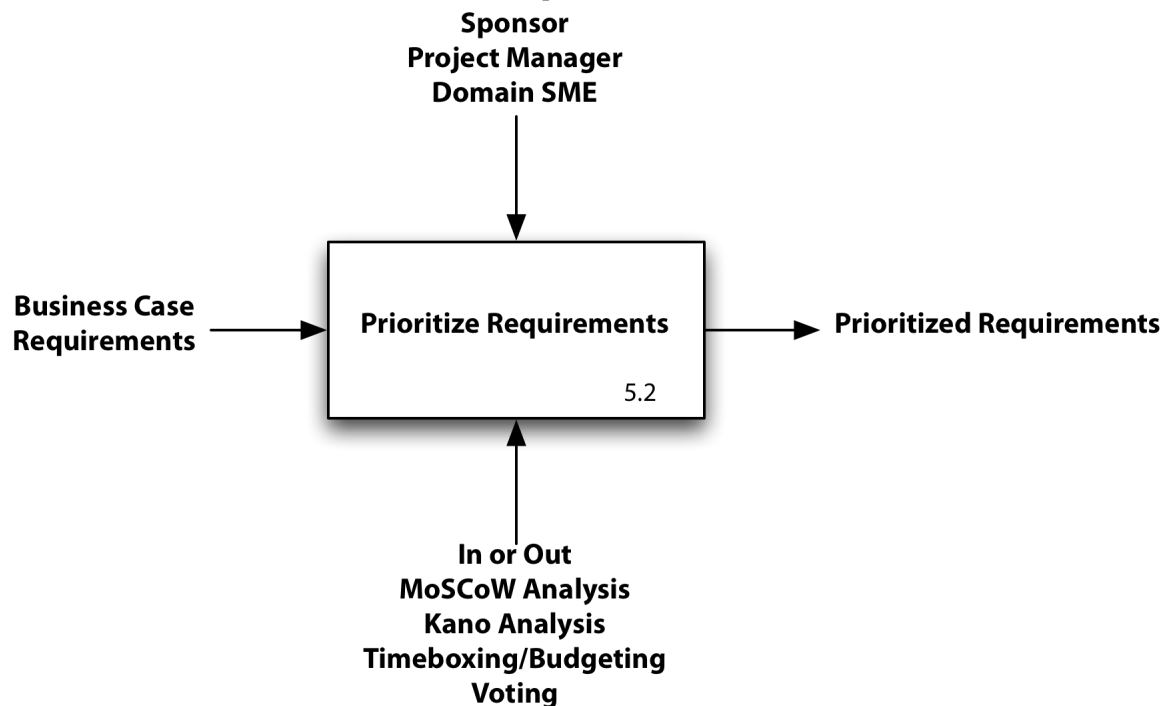
The Requirements Analysis KA includes descriptions of several techniques that may be used by the business analyst to define the solution requirements. These techniques represent a summary of common approaches to requirements definition. The major requirements analysis techniques described in this KA are:

- Business Rules
- Data Modeling
- Event and State Modeling
- Metrics and Reporting
- Non-functional Requirements
- Organizational Modeling
- Process Modeling
- Scenarios and Use Cases

6.1.4 *Outputs*

The output of the tasks in this KA is a set of specified and modeled requirements that have been prioritized, organized, verified and validated by the stakeholders, accompanied by relevant assumptions and constraints. The requirements are captured and managed in a form that makes them accessible to stakeholders and to the project team for however long they will remain relevant. Methods to manage requirements (including requirements management tools, documents, and other approaches) are described in the Requirements Management and Communication KA.

6.2 Task: Prioritize Requirements



6.2.1 Purpose

Requirements are not all equally important. Prioritization of requirements enables us to ensure that analysis and implementation efforts focus first on the most critical requirements.

6.2.2 Description

Requirement prioritization is a decision process used to determine the relative importance of requirements. The importance of requirements may be based on their relative value, risk, difficulty of implementation, or on other criteria.

These priorities are used while performing business analysis planning to determine which requirements should be targets for further analysis, or during the design, construction, and implementation of the solution to guide team efforts.

6.2.3 Input

Inputs needed to prioritize requirements include the following:

Business Case: Business requirements for the new solution are documented in the business case (see Enterprise Analysis KA). The business case states the key goals and measures of success for a project or organization. The priorities assigned to requirements should be aligned with strategic goals and objectives as documented in the business case.

Stated Requirements: Stated requirements are those that have been elicited from stakeholders (see Elicitation KA). Requirements prioritization requires that

requirements have been stated by stakeholders; however, the requirements do not need to be fully analyzed or in their final form. In fact, requirements should be prioritized as early in the project as possible to ensure the business analyst is working on the higher priority requirements first.

Stakeholder Analysis: The list of stakeholders that is developed during analysis planning activities (see Business Analysis Planning & Monitoring), and annotated with their levels of authority and influence, is used to determine which stakeholders need to participate in prioritization.

6.2.4 *Elements*

.1 Basis for Prioritization

The requirement prioritization approach is elicited from key business and technical stakeholders who have decision-making authority about how the solution will be implemented. Requirements may be prioritized on the basis of a number of different criteria, including:

Business Value: This approach prioritizes requirements based on cost-benefit analysis of their relative value to the organization. The most valuable requirements will be targeted for development first. This approach is common when enhancing an existing solution that already meets specified minimal requirements, or when delivering the solution incrementally.

Business or Technical Risk: This approach selects requirements that present the highest risk of project failure. Those requirements are investigated and implemented first to ensure that if the project fails it does so after as little expenditure as possible.

Implementation Difficulty: This approach selects requirements that are easiest to implement. This approach is often selected during a pilot of a new development process or tools or when rolling out a packaged solution, as it allows the project team to gain familiarity with those things while working on lower-risk requirements.

Likelihood of Success. This approach focuses on the requirements that are likely to produce quick and relatively certain successes. It is common when a project is controversial and early signs of progress are needed to gain support for the initiative.

Regulatory or Policy Compliance: This approach prioritizes requirements that must be implemented in order to meet regulatory or policy demands imposed on the organization, which may take precedence over other stakeholder interests.

Stakeholder Agreement: This approach requires the stakeholders to reach a consensus on which requirements are most useful or valuable. It is often used in combination with one or more of the other approaches described above.

.2 Challenges

There are a number of risks that may pose challenges when facilitating a requirements prioritization session, including:

Non-negotiable Demands: Stakeholders attempt to avoid difficult choices, fail to recognize the necessity for making tradeoffs, and/or desire to rank all requirements as high priority.

Gaming the System: A stakeholder who recognizes that all requirements that have significant business value are likely to be approved and supported by others, focuses on ensuring that the requirements of most interest to them are included.

Unrealistic Tradeoffs: The solution development team may intentionally or unintentionally try to influence the result of the prioritization process by overestimating the difficulty or complexity of implementing certain requirements.

6.2.5 *Techniques*

.1 MoSCoW Analysis

MoSCoW analysis divides requirements into four categories: Must, Should, Could, and Won't. It is most applicable for software development or timeboxed delivery efforts, as it focuses on determining which requirements can be implemented given specified time or resource constraints. Category descriptions are as follows:

Must: Describes a requirement that must be satisfied in the final solution for the solution to be considered a success.

Should: Represents a high-priority item that should be included in the solution if it is possible. This is often a critical requirement but one which can be satisfied in other ways if strictly necessary.

Could: Describes a requirement which is considered desirable but not necessary. This will be included if time and resources permit.

Won't: Represents a requirement that stakeholders have agreed will not be implemented in a given release, but may be considered for the future.

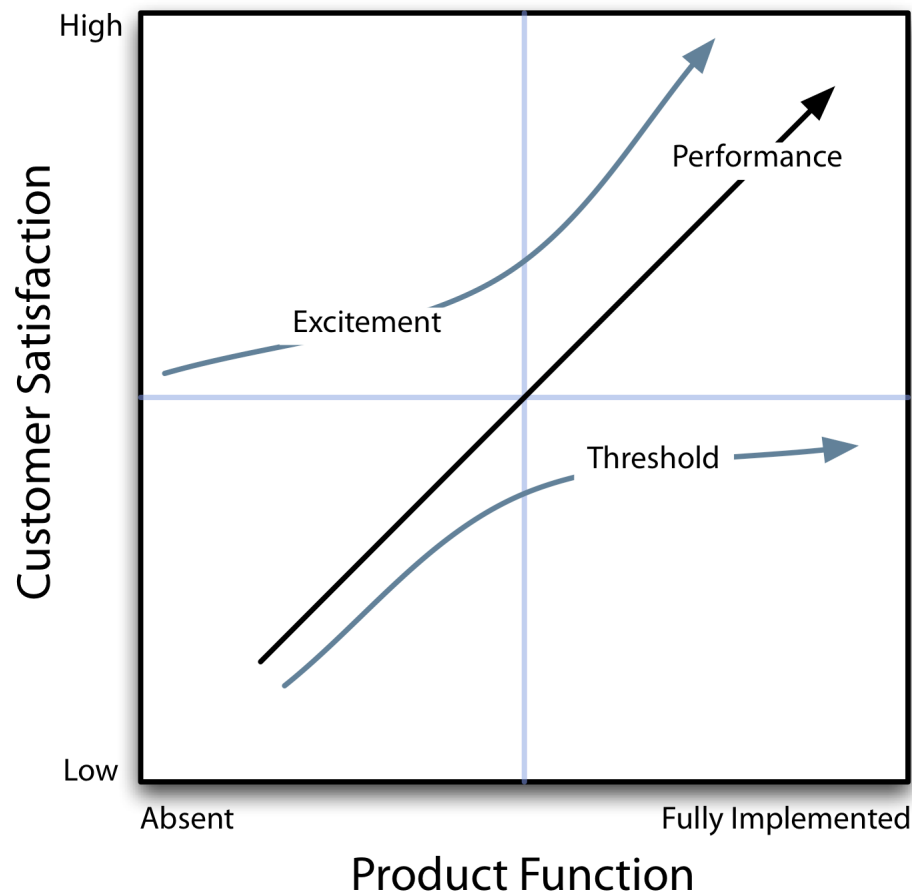
.2 Kano Analysis

Kano analysis divides product characteristics or qualities into three categories: threshold characteristics, performance characteristics, and excitement characteristics. This approach is most applicable for consumer products or goods that will be resold, as it focuses on identifying requirements that will encourage widespread use or adoption of a product. The categorization of a particular characteristic tends to shift over time, as customers grow to expect features or characteristics to be present in a product. Category descriptions are as follows:

Threshold characteristics are those that are absolutely necessary for stakeholders to consider adopting a product. Their absence will cause intense dissatisfaction, but as they represent minimum acceptance criteria, their presence will not increase customer satisfaction beyond a certain low level.

Performance characteristics are those for which increases in the delivery of the characteristic produce a fairly linear increase in satisfaction. They represent the features that customers expect to see in a product (speed, ease of use, etc).

Excitement characteristics are those that significantly exceed customer expectations or represent things that the customer did not recognize were possible. Their presence will dramatically increase customer satisfaction over time.



.3 Timeboxing/Budgeting

Timeboxing or budgeting prioritizes requirements based on allocation of a fixed resource. Timeboxing prioritizes requirements based on the amount of work that the project team is capable of delivering in a set period of time. Budgeting is used when the project team has been allocated a fixed amount of money. The approach is most often used when a fixed deadline must be met or for solutions that are enhanced on a regular and frequent basis. There are a number of approaches that can be taken to determine which requirements can be included in a timeboxed iteration:

- **All In:** Begin with all the eligible requirements with assigned Duration or Cost. Remove the requirements in order to meet the Calendar dates or Budget limit.

- **All Out:** Begin with adding the requirement(s) with assigned Duration or Cost to the Calendar or Budget. Stop when the Calendar dates are met or Budget limit is reached.
- **Selective:** Begin by identifying high priority requirements added to the Calendar or Budget. Add or remove requirements in order to meet the Calendar date or Budget limit.

.4 Voting

Voting allocates a fixed amount of resources (votes, play money, or other tokens) to each participant in prioritization for them to distribute among proposed features or requirements. The requirements that receive the most resources are the ones that will be investigated or developed first.

6.2.6 Stakeholders

Sponsor: Since sponsors are ultimately accountable for the business solution and major project decisions, they need to be invited to participate in the discussion.

Project Manager: The project manager is responsible for the implementation of the solution and will use the priority of requirements as an input into the project plan.

Domain SMEs: Domain SMEs may be invited to participate in the prioritization of requirements, to assess the relative business need, and to negotiate their importance.

Implementation SMEs: They may be asked to evaluate the relative complexity or risk associated with the implementation of certain requirements.

6.2.7 Output

At the completion of this task, each requirement should have an assigned priority. This may be a description (e.g., High, Medium, Low), a numerical designation (e.g., 1, 2, 3), or a prioritization label based on the technique used. The priorities may apply to a requirement or to a group or related requirements.

6.3 Task: Organize Requirements

6.3.1 Purpose

The purpose of organizing requirements is to create a set of views of the requirements for the new business solution that are comprehensive, complete, consistent, and understood from all stakeholder perspectives, including: business domain experts, business users, solution designers, developers, integrators, and testers.

6.3.2 Description

There are two key objectives when organizing requirements.

Create an organized structure for the requirements: Using a structured, disciplined, logical approach to organizing requirements that incorporates a top-down modularity allows for progressively elaborating the requirements into more detailed components.

This approach also allows for requirements components to be carefully allocated to solution modules, thus ensuring all requirements are satisfied.

Identify requirements interrelationships and dependencies: Requirements alone are not complex; it is the relationships and interdependencies among requirements that adds the element of complexity. Therefore, the organized requirements must also clearly depict the inherent relationships between requirements.

Like all business analysis tasks, organizing requirements is scalable. In fact, this task may not be required if the business analyst is specifying a small set of requirements—for instance, a small enhancement to an existing system.

6.3.3 *Input*

Although business analysis tasks are performed iteratively, when the business analysis professional is organizing requirements, the business requirements have usually been drafted at a high level in the business case, and the stakeholder requirements have been stated in some form as output from elicitation activities. Inputs include:

Business Case: this defines the business need in terms of the business problem or opportunity, goals that the solution is expected to achieve and the measures that will be used to determine the success of the deployed solution in terms of business benefits (see Enterprise Analysis KA).

Solution Scope: The business case also defines the solution scope. When complete, the requirements describe what is needed to meet this scope (see Enterprise Analysis KA).

Stated Requirements: Requirements are stated in various forms as an output to elicitation activities (see Elicitation KA). An organized requirements structure cannot be developed without at least some understanding of stakeholder needs and the solution scope. However, the requirements do not need to be in any particular state: organizing of the

Organizational Standards (if present) will likely describe the structures and types of requirements information that stakeholders in the organization expect.

6.3.4 *Elements*

There are many different ways to organize requirements, and as yet, no standard exists in the industry. When the business analysis professional organizes requirements, the following guidelines designed to promote consistency, repeatability and quality are taken into consideration:

- Follow organizational standards that describe the types of requirements that will be used consistently on projects; if no standard exists, the business analysis professional begins to develop a standard approach
- Use simple, consistent definitions for each of these types of requirements described in natural language, and using the business terminology that is prevalent in the enterprise

- Document dependencies and interrelationships among requirements
- Produce a consistent set of models and specifications to be used to document the requirements, e.g., textual documents, tables, graphs, and specific formal models (described in the next task, Specifying and Modeling Requirements).

Since the term requirement(s) takes on different meanings depending on the nature of the business analysis tasks that are underway, for clarification, *requirements* should always be preceded by a descriptor designating the requirement type, for example: business requirements, stated requirements, stakeholder/user requirements, system requirements, operational requirements, test requirements.

.1 Select the Method for Organizing Requirements

The approach to organizing requirements is greatly influenced by the nature of the project. The business analyst and project team members collaboratively select a method for structuring requirements. This choice will guide project work, influence sequencing of work packages, provide project milestones and assist in solution design. Some project characteristic considerations the business analysis professional and project team members take into account when deciding how to organize requirements include the following:

Process Focused Initiatives: Organize requirements by completing a high-level process architecture and then adding detailed work instruction for additional process details.

Custom Software Development Projects: The typical approach is to divide requirements into functional and non-functional categories.

Data Intensive Projects: Will be governed by the mix of data migration, data identification, data integration needed by the project. Business views for each need to be specified and modeled. For data intensive projects, the work is often structured iteratively as discovery is made in one area and incorporated for future iterations.

Software Service Identification: Requires structuring of cross-functional business processes accompanied by detailed steps and data views. This structure allows common services to be identified that can be reused across the organization.

.2 Determine Requirement Level

Requirements can be articulated on a number of different levels of abstraction. Requirements are frequently described as needing to say *what* needs to be done, not *how* to do it. This formulation can be problematic, as whether something is a “what” or a “how” depends on the perspective of the audience. For instance, a decision to implement a business process management engine can be what we are doing (from the perspective of the project team) and how we are improving our process agility (from the perspective of the enterprise architecture group). From the perspective of business analysis, the critical point is that

When practicing business analysis, we can usefully distinguish between what and how, (or between requirements and design), by understanding that our perspective on the difference between those terms needs to be aligned with the perspective of our business stakeholders. The purpose of business analysis is to ensure that solutions meet their needs. There are a number of formal structures for levels of abstraction, including those outlined in enterprise architecture models such as the Zachman Framework.

Structured Requirements Models

A reasonably simple model for structuring requirement levels follows. Each level can be referred to as a requirement “type”. These models were primarily intended for use in structuring business software application requirements, in that they seek to align the functional behavior of the software application with the business objectives of the organization and the needs of various stakeholders. However, the general concepts can be applied to many business analysis efforts. The structured requirements model defines the most often used categories or classes of requirements that can apply to a given situation to help capture requirements:

Business Requirements: These requirements describe business goals, objectives, or needs of the enterprise. They describe the reasons why a project is initiated, the objectives that the project will achieve, and the metrics which will be used to measure its success.

Stakeholder or User Requirements: These are statements of the needs of a particular stakeholder or class of stakeholders, and how that stakeholder will interact with the solution. Stakeholder requirements serve as a bridge between business requirements and the various classes of solution requirements.

Solution Requirements actually describe what the solution will do rather than the higher-level needs that it will meet. They are intended to guide the construction and delivery of a solution rather than evaluate which solutions are acceptable. They are broken down into:

- **Functional Requirements:** These requirements describe the behavior and information that the solution will manage. They describe capabilities the system will be able to perform in terms of behaviors or operations – a specific system action or response.
- **Nonfunctional Requirements:** These requirements capture conditions that do not directly relate to the behavior or functionality of the solution, but rather describe environmental conditions under which the solution must remain effective or qualities that the systems must have.
- **Implementation Requirements:** These requirements describe elements of the solution or capabilities that it must have in order to be implemented successfully, but which are not important after the implementation is complete. They typically cover data conversion from existing systems, skill gaps that must be addressed, and other related changes to reach the desired future state.

.3 Document Requirement Dependencies and Relationships

Individual requirements almost always have inherent dependencies and interrelationships. As we organize and structure requirements, we identify and depict these dependencies. Consider the following example:

#	<i>Requirement Descriptions</i>
A	The system shall generate a scheduled monthly report of total customer calls to the hotlines.
B	The system shall have reporting capability.

In this example, Requirement A is dependent on B. Requirement A is also a subset of Requirement B. There is also an implicit dependency for Requirements A and B: there must be a data source and a scheduler in place in order to implement the above two requirements.

After examining and organizing the set of requirements, the BA should document the dependencies and relationships for each of the requirements. Knowing the dependencies and relationships between requirements helps when determining the sequence in which requirements are to be addressed. The following are commonly known relationships:

Necessity: this relationship exists when it only makes sense to implement requirement A if requirement B is also implemented. This relationship may be unidirectional or bi-directional. Example:

#	<i>Requirement Descriptions</i>
A	The system shall have a reporting tool that allows user to search 48 data elements.
B	The system shall have reporting tool that allows user to specify up to 48 data elements to be displayed on the report.

Requirement A exists only when Requirement B exists. The assumption is that an ad-hoc reporting tool allows users to search using multiple criteria and generate reports that display the desired data set.

Effort: This relationship exists when requirement A is easier to implement if requirement B is also implemented. Example:

#	<i>Requirement Descriptions</i>
A	The system shall generate a scheduled monthly report of total customer calls received for product X.

B	The system shall generate a scheduled monthly report of total customer email received for product X.
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Requirements A and B can both be implemented through a reporting component, and so it will likely make sense to implement them simultaneously.

Subset: When the requirement specifications are the decomposed outcome of another requirement specification. Example:

#	<i>Requirement Descriptions</i>
A	The system shall generate a scheduled monthly report of total customer calls received for product X.
A.1	The scheduled monthly report of Product X Customer Calls shall include a header section indicating the start date and the end date of the period.
A.2	The scheduled monthly report of Product X Customer Calls shall include a footer section indicating the page number of the report and date of report generation.

Requirements A.1 and A.2 are subsets of Requirement A.

Cover: When the requirement specification fully includes the other requirement specifications. This is a special case of subset; as the top level requirement is the sum of the sub-requirements. Example:

#	<i>Requirement Descriptions</i>
A	The system shall have periodic scheduling capabilities
A.1	The system shall be able to generate daily reports.
A.2	The system shall be able to generate weekly reports
A.3	The system shall be able to generate bi-monthly reports.
A.4	The system shall be able to generate monthly reports
A.5	The system shall be able to generate quarterly reports
A.6	The system shall be able to generate annual reports

Requirement A covers A.1 through A.6, as if those requirements are implemented it will also have been implemented.

Value: when including Requirement A affects the desirability of requirement B (either increasing or decreasing it). This may occur because requirement B is only necessary if

A is implemented, or because only one of the requirements should be implemented (for instance, when discussing two features that potentially meet a business requirement).

6.3.5 **Techniques**

There are various techniques for organizing individual requirements into a logical structured set of requirements, including those described here and in the techniques section at the end of this chapter.

.1 Hierarchical Decomposition

A prevalent technique used to organize requirements is the functional decomposition diagram. The primary goal of *functional decomposition* is to ensure that functions are separated into sub-functions that interact as independently as possible, so that work can be assigned to different groups. This provides the ability to scale and manage larger projects. The process of functional decomposition continues until a sub-function cannot be broken down into two or more lower-level functions.

Decomposition is a technique to structure the requirements into business functions or in some other logical breakdown. The decomposition technique is a top-down, structured approach to organizing requirements that is used when scope is known, or to help determine the scope. Also referred to as *conceptual modeling*, because it represents the concept under consideration, decomposition diagrams are also used to scope the solution and build the business case (see Enterprise Analysis KA), and are decomposed in more detail during requirements analysis.

Decomposition can be a helpful technique to be used for virtually any project type, but is most often seen in a systems development project or an effort to develop the user or system *concept of operations*, which describes the planned use of any solution in the operational environment. The goal is to break down a high-level business view into smaller pieces to allow for analysis of the detail functions, processes, and physical solution components.

Decomposition diagrams are most often represented by a hierarchical diagram, but are also depicted as a tree diagram, or by numbering each sub-component. Each component consists of the sub-components beneath it. Functional Decomposition

.2 Networks

The primary alternative to structuring a problem in a hierarchical, top down fashion is to view it as a network of interrelated problems. This is sometimes referred to as a bottom-up approach. This approach generally involved taking one aspect or element of the problem under analysis, ensuring it is properly understood, and defining its relationship to other aspects, each of which can be further explored in turn.

A common example of this kind of structure for requirements is provided by the use of scenarios and use cases. Each use case stands alone, either allowing an actor to accomplish a goal or detailing the response to an event. Exploring use cases involves adding to that initial scope through the addition of alternative flows or new use cases.

The key to structuring requirements in a networked fashion is to ensure that the interfaces and connections between the network components are clearly defined and maintained (see *Interface Analysis*).

.3 Other Techniques

Techniques relevant to the organization of requirements include Business Rules, Data Models, Event and State Modeling, Goal Analysis, Metrics and Reporting, Organizational Modeling, Personas and User Profiles, Process Modeling, Prototyping, and Scenarios and Use Cases.

6.3.6 Stakeholders

The business analyst(s) works within established project procedures and milestones to provide all stakeholders with the opportunity to review and approve the approach to organizing requirements. Additional refinement of the organizational structure is needed if the information is not decomposed in a way that is easily reviewed or agreed to by the various stakeholder groups, including:

- Business Analyst
- Customer
- Domain Subject Matter Expert (SME)
- End User
- Implementation Subject Matter Expert (SME)
- Operational Support
- Project Manager
- Quality Assurance
- Regulator
- Sponsor

Business and technical stakeholders are impacted by analysis techniques used to organize requirements since they need to verify and validate the requirements. Decomposition is used to help them understand how requirements impact their business area. Therefore the business analysts tailors the organization approach to meet the needs of key stakeholder groups.

Project managers use the organized set of requirements to verify the scope of the solution and assess the work that needs to be done in the project. The implementation team can then be assigned to specific lower-level requirements. Business analysts can then choose to structure the models and specifications that are created (see next task) to meet the needs of each person, project team or vendor team. Clear alignment

between the lower-level requirement models and specifications and who is assigned to the work facilitates tracking and reporting of project progress.

6.3.7 **Output**

The output of this task is an organized structure for the requirements and a documented set of relationships between them.

6.4 **Task: Specify and Model Requirements**

6.4.1 **Purpose**

To document requirements in multiple ways using a combination of textual statements, matrices, diagrams and formal models articulated in natural (non-technical) language.

6.4.2 **Description**

The specification and modeling of requirements involves documenting stakeholder needs and describing them in ways that facilitate the identification of an appropriate solution. It enables the stakeholders to understand how their needs interact and where commonalities and differences exist.

6.4.3 **Input**

Requirements: A requirement cannot be specified or modeled until it has been identified. These requirements may be *stated requirements* (an expression of a stakeholder need, see Elicitation KA), a requirements that has failed verification or validation, or requirements that the solution team cannot implement (and so are in need of revision).

6.4.4 **Elements**

.1 Specifications using Natural Language

Requirements are used by all stakeholders, and therefore are better stated as simply as possible using natural, business language. Some requirements are best stated in simple textual sentences and paragraphs and other in table format. Requirements that have very precise meaning are best stated in textual form, whereas, models and graphs are better used to indicate sequence and dependencies.

Well-formed Requirements

Guidelines for writing well-formed requirements include:

- Express one and only one requirement at a time.
- Avoid complex conditional clauses.
- Do not assume your reader has domain knowledge.
- Use terminology that is consistent.

- Express requirements as a verb or verb phrase.
- Write in the active voice, clearly describing who or what is responsible for fulfilling the requirement.

A well-formed textual requirement must describe the capabilities of the solution, any conditions that must exist for the requirement to operate, and any constraints that may prevent the solution from fulfilling the requirement. Each of the following elements should be considered when structuring a requirement to ensure that it is well-formed.

Action Verb: Describes what the subject must do. Common actions include advise, assign, check, create, delete, display, obtain, and update.

Continuances: Phrases that introduce the specification of requirements at a lower level (and indicate dependencies between requirements). Examples of continuances are: as follows, listed, such as.

Directives: Phrases that point to illustrative information within the requirements document. These strengthen the document's specification statements and makes them more understandable. Directives can be identified by words like figure/diagram, for example, note.

Event/Condition: Describes when the requirement must be fulfilled. This may be an external event that triggers the requirement, or a condition under which the solution is operating.

Imperative: Words and phrases that command that something must be provided (e.g., shall, must, must not, is required to). Words such as should, can, or may imply that conformance to the requirement is optional, and so are to be avoided when specifying requirements.

Subject: Who performs the operation. This may be a person or a system, but the subject responds to the event or condition in an effort to fulfill the requirement.

Object: The entities or data that are involved in fulfilling the requirement.

Outcome: Describes the desired result, including any criteria used to determine that the requirement has been successfully fulfilled.

.2 Models

Models are an abstraction and simplification of reality. Each modeling technique, which results in a unique model as a deliverable, represents a different view into the reality of the business domain undergoing change. No one model represents the entirety of the business domain. Therefore, several different models are often needed to adequately analyze and document requirements.

A business domain is defined as the problem area undergoing analysis. A *business domain model* is a conceptual view of all or part of an enterprise focusing on products, deliverables and events that are important to the mission of the organization. It can be

thought of as a conceptual view of the solution which describes the various entities involved and their relationships. The domain model is useful to validate the solution scope with business and technical stakeholders. Elements typically include those listed below. These aspects of a business domain model do not have any inherent hierarchy--effective analysis can potentially start with any aspect of the model and reach out to encompass the others. For example, use case analysis can start with goals (Cockburn, 2001) or events (Robertson and Robertson, yyyy) and capture process and rules. BPM starts by identifying processes and then derives roles, events and rules.

User Classes, Profiles, or Roles. This is how we understand we describe the people who directly interact with our solution. Each role groups together people with similar needs, expectations, and goals. Those goals, needs, etc. are the source of requirements, and they need to be met somehow by our solution.

Entities and Relationships. These are the things we need to know about. They usually correspond to something in the real world; a place, a person, a thing, an organization. We need to know what objects, entities or facts are relevant to our business domain and how they connect to other things. Data models expand on this to also capture what information we know about things.

Events. When somebody asks our system or organization to do something, e.g., process an order, generate a monthly report, or anything else, it's an event. Events are things we need to respond to in some way.

Processes. Processes can be simple (involving one person and a system) or complex (involving many people, departments, organizations and systems), but they tell us who and what has to be involved in fully responding to an event, or how people in the enterprise collaborate to achieve a goal.

Rules. Rules are how we enforce our goals and how we make decisions. They can tell us when we can change information associated with an entity, what values of information are valid, how we make decisions in a process, and what our priorities are.

Modeling Formats

Models may be either textual or graphical. Graphical models are often referred to as 'diagrams'. Note that some industry literature may consider only graphical representations as 'models'. For purposes of the BABOK, a model may be either textual or graphical.

The choice of which model(s) to use for a particular project is determined by the type of information to be communicated, as well as the audience that will consume the information. Models can:

- Describe a situation or define a problem
- Define boundaries for business domains and sub-domains, and describe the components within each defined boundary
- Describe thought processes and action flows

- Categorize and create hierarchies of items
- Show components and their relationships
- Show business logic

Though textual descriptions of the above are possible, each of the above items can also be represented in a diagram. Whether or not a diagram is used in place of or in addition to a textual description is often determined by the audience for the information, as well as the level of detail in a particular model. For example, upper management frequently wants summarized information and quick snapshots, for which graphical depictions are suitable. On the other hand, technical resources need the detailed information that often can only be provided in textual descriptions. However, graphical depictions are also useful to the technical resources in order to establish the context in which the details operate, and some graphical models may provide a sufficient level of detail for the technical resources to perform their tasks.

Models may be used not only to document the final requirements, but also as a tool in the requirements elicitation process (see Elicitation KA). Graphical models in particular are useful for clarifying understanding of requirements, as the diagrams present a visual snapshot of an aspect of the business domain, which most people can more easily grasp, as opposed to a lengthy textual description. Models used during requirements elicitation may or may not result in a documented model in the final requirements package. It is the business analyst's responsibility to select the most appropriate model(s) at each stage of the requirements process to accurately communicate the requirements.

Describe Context

Describe the circumstances within which the model occurs, in order to give the model meaning. The context may be either business or technically oriented, depending on the specific information and the audience.

Model Selection Considerations

Items to be considered when determining the most appropriate models to use are listed below.

Notations

Declare and describe any symbol or notation used. On diagrams, this often means including a 'key' that aids in the interpretation of the symbols and/or colors used.

Formal vs. Informal Models

A formal model follows semantics that are defined in a standard to indicate the meaning of each model element. A formal model can often convey a great deal of meaning, but some of the subtleties of the model may not be properly conveyed to an audience that is unfamiliar with the specific notation.

An informal model doesn't have a formal semantic definition and instead connects elements in ways that are meaningful for the analyst and the audience. While the model may be less expressive, it requires no special training to interpret.

Style Considerations

There are some general principles that apply to all diagrams and models, no matter what notation is used:

Use terminology specific to your domain. Models are more easily understood if the labels match the words that the audience uses to describe things.

In addition, there are some general principles that apply specifically to diagrams:

Avoid crossing lines. Lines that cross one another are confusing and can make the reader uncertain if a connection is intended. If crossed lines cannot be avoided, it's usually best to include a little curve or 'hop' in one of the lines where they cross.

Similar elements should be consistent in shape, size and color. An element that is larger or colored differently automatically draws the reader's attention and may cause the reader to assume there is something about that element that warrants special attention. If this is not the intention, it's best to use the same shapes, sizes and colors for similar elements.

Show progression in the natural reading direction. For English-speaking audiences, this means that diagrams should flow from top to bottom and from left to right. This advice may not apply in all cultures and languages.

.3 Improvement Opportunities

As the requirements are developed, search for opportunities to improve the operation of the business. Many of these are specific to the analysis technique in question, but some common opportunities that should be considered as analysis is performed include:

Automate or simplify the work people perform: Relatively simple tasks, where decisions are made on the basis of strict or inflexible rules, are prime candidates for automation.

Improve access to information: Provide greater amounts of information to staff dealing with customers or to the customers themselves, reducing the need for specialists. Decision makers can be provided with more useful or more current data.

Reduced complexity of interfaces: Interfaces are needed whenever work is transferred between systems or between people. Reducing their complexity can improve understanding

Increase consistency of behavior: Different workers may handle similar cases in a very different fashion, causing customer dissatisfaction and frustration.

Identify similar or related requirements: Different stakeholder groups may have common needs that can be met with a single solution, reducing the cost of implementation.

.4 Capture Requirements Attributes

As each requirement or set of requirements is specified and modeled, the relevant attributes (as selected through Business Analysis Planning and Monitoring KA) must be captured.

6.4.5 *Techniques*

Unfortunately, there is not one technique that holistically pulls everything together in a nice, neat view of the business domain. As we attempt to structure business analysis deliverables, it is imperative that we use models to augment the requirements specifications that are documents drafted in natural, textual language. Whenever possible, business analysis professionals strive to use industry-standard language in their analysis models and specifications. However, unconventional modeling approaches tailored to the unique needs of the stakeholders, may be valuable in certain circumstances. The techniques described in this section are used for business analysts to depict the business domain or create conceptual representations of the business solution.

.1 Matrix Documentation

A table is the simplest form of matrix. A table is used when the business analyst is looking to convey a set of requirements that have a complex but uniform structure which can be broken down into elements that apply to every entry in the table.

Requirements attributes and Data Dictionaries are often expressed in tabular form. Matrices are often used for traceability of requirements to each other, from requirements to test cases, and for gap analysis. Matrices are also used for prioritizing requirements by mapping them against project objectives.

A more complex matrix will also express information in the rows of the table. Rather than presenting repeating information, this form of matrix is usually intended to indicate that two elements are related in some fashion (for instance, that a requirement affects a particular data element).

.2 Decision Tables/Trees

Decision tables are used to structure the presentation of a series of closely related business rules. Anything that is presented in a decision table or a decision tree can be stated as a series of sentences, but the tabular format makes it easier for stakeholders to understand the essential similarities and focus in on the differences. A decision table may also be used when multiple rules may apply to a situation.

6.4.6 *Stakeholders*

All stakeholders are impacted by requirements models and specifications, including:

- Business Analyst
- Customer
- Domain Subject Matter Expert (SME)

- End User
- Implementation Subject Matter Expert (SME)
- Operational Support
- Project Manager
- Quality Assurance
- Regulator
- Sponsor

6.4.7 Output

Modeled and specified requirements are produced by this task.

6.5 Task: Determine Assumptions and Constraints

6.5.1 Purpose

The purpose of this task is to identify the assumptions made and constraints identified during requirements analysis that will impact the solution design.

6.5.2 Description

Assumptions and constraints are generally documented throughout the life of a project, and are not the sole responsibility of the business analyst. They are generally documented as simple English statements, with associated attributes (e.g., date identified, owner, impact, associated risk, and other explanatory information).

Assumptions are factors that are believed to be true, but have not been confirmed. Assumptions may affect all aspects of the project and pose a certain degree of risk if they do not prove to be true. The business analyst is primarily concerned with assumptions made about to fill in gaps of knowledge about all types of requirements. The business analyst not only identifies and documents assumptions, but continually attempts to confirm the accuracy of the assumptions, and identifies and manages risks to the ability of the solution to meet the business need.

Constraints are defined as restrictions or limitations to the process. While the project manager is concerned with schedule, cost and resource constraints, the business analyst is responsible for documenting any restrictions or limitations to the solution design, construction, testing, validation and deployment. Solution constraints describe aspects of the current state, or planned future state that may not be changed. They are not requirements, since they are not implemented in any form by the project team. Constraints are provided to the project team to inform them that options they would normally be allowed to consider are not available. They place limitations on how the problem described by the requirements may be solved.

Assumptions and constraints are identified as an output of elicitation. They are defined and clarified as requirements are understood. In many cases, lower-level requirements may be dependent on, and therefore traced back to, the presence of an assumption or constraint and so may be impacted if the assumption proves false or the constraint is changed.

6.5.3 **Input**

Elicitation Results: Assumptions and constraints are identified through elicitation from stakeholders.

6.5.4 **Elements**

.1 Business Constraints

Business constraints describe limitations on available solutions, or an aspect of the current state that cannot be changed by the deployment of the new solution. They may reflect budgetary restrictions, time restrictions, limits on the number of resources available, restrictions based on the skills of the project team and the stakeholders, a requirement that certain stakeholders not be affected by the implementation of the solution, or any other organizational restriction. Constraints should be carefully examined to ensure that they are accurate and justified.

.2 Technical Constraints

Technical constraints include any architecture decisions that are made that may impact the design of the solution. These may include development languages, hardware and software platforms, and application software that must be used. Constraints may also specify restrictions such as resource utilization, message size and timing, software size, maximum number of and size of files, records and data elements. *Technical constraints* include any enterprise architecture standards that must be followed.

As a general rule, technical constraints generally are more likely to impact the solution team than they are the business analyst. However, technical constraints may create a situation where a requirement cannot be met and the business analyst must look for other ways to satisfy it.

.3 Assumptions

An assumption is anything that is believed to be true but that has not actually been verified. Assumptions need to be documented, and if an assumption is found to be false it will usually impact the project in some manner. Assumptions are therefore a source of potential project risk. Assumptions may also reflect an understanding of how desired outcomes are likely to be achieved--for instance, stakeholders may believe that customers will respond in a certain way to a change in how a product is delivered, but there may be only anecdotal evidence to support that implementation.

6.5.5 **Techniques**

Constraints and assumptions are generally documented in natural language in simple tables or spreadsheets. Both assumptions and constraints are often identified, reviewed

and managed using the ongoing planning, monitoring, and issue/risk management activities of the project team.

6.5.6 Stakeholders

The primary consumers of assumptions and constraints are the implementation SMEs, who will have to integrate them into their proposed solution. The stakeholder responsible for defining a particular assumption or constraint should be involved in any discussion that involves changing it. Since assumptions and constraints can originate from and/or impact any stakeholder, all stakeholders are involved.

6.5.7 Output

Documented assumptions and constraints.

6.6 Task: Verify Requirements

6.6.1 Purpose

Requirements verification involves evaluating requirement to verify that they meet quality specifications. It ensures that the requirements are sufficiently defined and structured so that the solution development team can use them in the design, development and implementation of a solution.

6.6.2 Description

Verifying requirements ensures that the requirements have been defined correctly; that is, that they are of good quality. This requires that selected project stakeholders agree that the requirements meet the relevant quality standards.

Requirements verification constitutes a final check by the business analyst and key stakeholders to determine that the requirements analysis has been correctly performed and that the requirements are: a) ready for formal review and validation by the customers and users, and b) provide all the information needed to develop the solution.

The terms *verification* and *validation* has several variations in meanings. Requirements verification differs from requirements validation in that requirements validation focuses on whether or not the stated requirements support and are aligned with the goals and objectives of the business and satisfy users, whereas requirements verifications focuses on the completeness, correctness, and usability of the requirements from a quality standpoint. Requirements validation is a form of backwards traceability, whereas requirement verification looks forward in preparation for the next project phases. Requirements validation is a pre-requisite for requirements verification.

6.6.3 Input

Inputs to requirements verification are a complete set of requirement artifacts that have been prioritized, specified and organized into a structured set of requirements models and documents.

6.6.4 *Elements*

The business analyst verifies that requirements have been specified in well-written requirements statements. Well-formed, unambiguous requirements allow for the more effective use of project resources, since they reduce rework caused by defects in the requirements.

.1 Characteristics of Requirements Quality

A quality requirement exhibits the following characteristics, at a minimum:

Cohesive: Each requirement should be cohesive, even though cohesion may vary with different types of requirements. Ensure that each requirement specifies only one thing. Ensure that all parts of the requirement belong together.

Complete: The entire set of requirements should represent all relevant requirements. Also each individual requirement should be complete. Ensure each requirement is self-contained without any missing information. It must define all possible situations that can be encountered and the appropriate response to each.

Consistent: Ensure that individual requirements do not contradict each other or describe the same requirement using different wording. Also the level of detail supplied for each requirement should be the same.

Correct: Defects in requirements will lead to defects in the resulting solution.

Feasible: Each requirement must be implementable within the existing infrastructure, with the existing budget, timeline and resources.

Mandatory: Although requirements can be prioritized, individual requirements should, by their very nature, be mandatory (i.e., required). Ensure each requirement is essential to the success of the solution and that each requirement is needed by a stakeholder(s).

Modifiable: Related requirements must be grouped together in order for requirements to be modifiable. This characteristic is exhibited by a logical structuring of the requirements.

Unambiguous: Individual requirements must never be unclear. An unambiguous requirement can only be interpreted one way; whereas, ambiguous requirements can be misinterpreted. Ensure that each requirement is clear and concise (i.e., without unnecessary information). Avoid potentially ambiguous words such as it, they, these, fast, slow, easy, adequate, new, old.

Testable: Each requirement should be testable—that is, it must be possible to design a test that can be used to determine if a solution has met the requirement.

.2 Verification Activities

Verification activities are typically performed iteratively throughout the requirements analysis process. Verification activities include:

- Check for completeness within each requirements model. For example, data flow diagrams should have all components and lines labeled, and all lines should have arrows indicating direction.
- Compare each prepared requirements model (textual or graphical) against all other prepared requirements models. Check for elements that are mentioned in one model that are missing in the other models. Also check that the same component is referenced the same way in all models – for example, use of consistent language, e.g., ‘customer’ and ‘client’. Resolve all discrepancies, correcting terminology, or adding/deleting components as needed.
- Make sure all variations to the documented processes have been identified and documented. Pay particular attention to common branching logic – e.g. ‘none found’, ‘one and only one found’ or ‘more than one found’.
- Make sure all triggers and outcomes have been accounted for in all variations.
- Make sure the document(s) is written in business terms to ensure understanding by the business users. Use the same business terms that were used by the business users during the requirements elicitation process (see Elicitation KA).
- Add business examples where appropriate for clarification.
- Make sure all requirements contribute to the stated project scope. If not, eliminate the requirement or modify the project scope through formal change control processes.
- Make sure the documents conform to the standards of the organization in terms of layout, content sections, modeling standards and terminology.
- Add formatting elements to the document, as needed – i.e. table of contents, headers and footers, page number, etc.
- Submit the document to peer reviews. Peer reviews include both other members of the requirements team, as well as members of the solution development team.
- Submit the document for review by the original participants of the requirements elicitation process.
- Submit the document for review to the approving stakeholders.

Note that the above steps do not need to be done in the exact sequence indicated – they may be resequenced and repeated as needed. For example, it’s possible that after a review, items will be identified that require additional work. Once those items have been addressed, another peer review may be desirable. Depending on the extent of the change, it may also be necessary to recheck the information for completeness and consistency.

6.6.5 **Techniques**

.1 Checklists

Checklists are useful as a quality control technique. They may include a standard set of quality elements that the business analyst or other reviewers use to validate the requirements or be specifically developed to capture issues of concern to the project. The purpose of a checklist is to ensure that items that the organization or project team has determined are important are included in the final requirements deliverable(s), or that process steps that the organization or project team has determined must be followed are addressed. Checklists may also be developed on a project basis to help ensure consistency of approach and outcomes, particularly on large projects where multiple sub-project teams are working.

.2 Structured Walkthrough

See the technique as described in *Solution Assessment and Validation*.

6.6.6 **Stakeholders**

The business analyst, in conjunction with the business and technical SMEs, will have the primary responsibility for determining that this task has been completed. Problematic requirements may be discovered by other stakeholders during requirements communication. Therefore, virtually all project stakeholders are involved in this task:

Each stakeholder is defined in Glossary and used consistently across the KAs. List of stakeholders:

- Business Analyst
- Customer
- Domain Subject Matter Expert (SME)
- End User
- Implementation Subject Matter Expert (SME)
- Operational Support
- Project Manager
- Quality Assurance.
- Regulator:
- Sponsor

6.6.7 **Output**

The output of this task is a verified set of requirements.

6.7 Task: Validate Requirements

6.7.1 Purpose

The purpose of requirements validation is to ensure that all requirements support the delivery of value to the business, fulfill its goals and objectives, and or meet a stakeholder need.

6.7.2 Description

Requirements validation occurs iteratively throughout the project. It is an ongoing process to determine whether the progressively elaborated requirements, and later, the design and development deliverables, continue to correctly align to the needs of the customer. The business analyst continues to assess whether requirements have been left out or solution components have been introduced that don't align to the customer need throughout the project. Validation reviews begin during requirements analysis activities to determine whether the requirements are accurate and have the appropriate level of detail needed for the design, development, and test phases. Validation continues through user acceptance testing to confirm that the solution is complete and can be delivered to the customer.

6.7.3 Input

Business Case: The business case describes the overall business objectives and measurements that the solution is expected to deliver. To be valid, a requirement must contribute directly or indirectly to the business case.

Verified Requirements: Requirements need to be verified for validation to be completed (if a requirement cannot be verified, it cannot be successfully implemented and so cannot fill a business need), although validation activities may begin before requirements are completely verified.

6.7.4 Elements

.1 Define Desired Outcomes

As requirements describe stakeholder needs, we can validate them by understanding what the outcome will be for the stakeholder when their need is satisfied.

Implementation of the requirements as a whole must be sufficient to achieve that desired future state for customers and users. A *desired outcome* is not a solution; it is the business benefits provided by the solution. Desired business benefits are defined in the business case (see Enterprise Analysis KA), and may include:

- Create a new capability such as a new product or service, addressing a competitive disadvantage, or creating a new competitive advantage
- Improve revenue, by increasing sales or reducing cost
- Increase customer satisfaction
- Increase employee satisfaction

- Comply with new regulations
- Improve safety
- Reduce time to deliver a product or service

.2 Identify Assumptions

In many cases it may not be possible to prove that implementation of the requirement will result in the desired benefit. If an organization is launching an unprecedented product or service, it may be necessary to make assumptions about customer or stakeholder response, as there are no similar previous experiences to rely on. In other cases, it may be difficult or impossible to prove that a particular problem derives from a identified root cause.

.3 Define Measurable Evaluation Criteria

While the forecasted business benefits are defined in the business case, the specific measurement criteria and evaluation process may not have been included. Following the definition of the benefits that will result from the implementation of a requirement, it is necessary to define the evaluation criteria that will be used to evaluate how successful the resulting change has been after the solution is deployed. (see the *Metrics and Reporting* technique for information on the selection of appropriate criteria, and the *Evaluate Solution* task for details on how this assessment is performed post-implementation).

.4 Determine Dependencies for Benefits Realization

Not all requirements contribute directly to the end result desired by the organization and described in the business case. See *Organize Requirements* for the types of relationships that might exist.

.5 Evaluate Alignment with Business Case

A requirement can be of value to a stakeholder and still not be a desirable part of a solution. Ultimately, each requirement must be traceable to the objectives in the business case, and should also minimize the *opportunity cost* of implementation. *Opportunity cost* refers to the benefits that could have been achieved with any investment. If a project team spends time and energy implementing a feature in a software application, that effort cannot be applied towards additional testing, training for the users, bug fixes, or other project work. That lost work represents the opportunity cost of the decision. The opportunity cost of any decision is equal to the value of the best alternative use of those resources. Conceptually, this is closely related to value dependency (described in *Organize Requirements*). Therefore, a requirement that is not aligned with the business case should be defined and approved in a separate business case, or considered for removal from the solution scope.

6.7.5 **Techniques**

.1 Structured Walkthrough

Review meetings are conducted to confirm whether the user or customer agrees that their needs are met. Review meeting objectives include the following:

- Confirm that the requirements accurately reflect the business and user need, and are complete enough to proceed with downstream work processes
- Identify inconsistencies between the documentation and needs of users or customers
- Determine whether cost and time is sufficient to achieve the product and project objectives

.2 Feasibility Studies

Feasibility studies to determine financial, technical, operational issues that prevent the proposed solution from satisfying customer needs (see Enterprise Analysis KA for details about feasibility studies).

.3 Acceptance Criteria

Acceptance criteria are the requirements that must be satisfied to achieve acceptance by a stakeholder. These are described in further detail the techniques section of this chapter, under *User Acceptance Testing*.

.4 Metrics and Reporting

This technique describes how we select appropriate performance measures for a solution, solution component, or requirement.

.5 Prototyping

Prototyping of product components is used to gain user agreement with the proposed solution.

6.7.6 **Stakeholders**

Virtually all stakeholders are involved in or impacted by validation activities, including:

Each stakeholder is defined in Glossary and used consistently across the KAs. List of stakeholders:

- Business Analyst
- Customer
- Domain Subject Matter Expert (SME)
- End User
- Implementation Subject Matter Expert (SME)

- Operational Support
- Project Manager
- Quality Assurance.
- Regulator:
- Sponsor

Customer and end user reviews and prototyping will include users, customers, sponsors and technical project team members. User acceptance testing will include users, subject matter experts and the technical team. The sponsor is very interested in the outcomes of validation activities.

6.7.7 Outputs

- Validated Requirements
- Evaluation Criteria

6.8 Technique: Business Rules

6.8.1 Purpose

The purpose of modeling business rules is to accurately capture the details that define, constrain, or enable business operations.

6.8.2 Description

Business policies and business rules are the means to achieve goals and objectives. Policies and rules direct and constrain the organization and operation of the business.

A business goal defines a state or condition the business must satisfy to reach its vision. Example: Decrease losses of terminated accounts' outstanding balances.

A business policy is a non-actionable directive that supports a business goal. Example: Utilize collection agencies to recover funds.

A business rule is a specific, actionable, testable directive that is under the control of the business and that supports a business policy. Example: When a terminated account has an outstanding balance greater than \$300 the account is turned over to a collection agency.

A number of basic principles guide the business analyst when stating and managing business rules. The business rules should be:

- Stated in business terms to enable business experts to validate the rules;
- Documented independently of how they will be enforced;

- Stated at the atomic level and in declarative format;
- Separated from process(es) that the rule supports or constrains. A business rule is not a process, and a process is not a business rule. An example:
 - Process: Determine account status.
 - Business Rule: An account that is delinquent for four billing periods is considered a terminated account.
- Maintained in such a manner that enables the business to monitor and adapt the rules as the business changes.

Business rules supplement a number of other analysis artifacts such as use cases, events, data entities, data relationships, and data attributes.

Particularly complex rules may be stated using a *decision table*.

6.8.3 **Elements**

Different classes or categories of rules include:

.1 Term and Fact Model

Business rules require a set of defined terms and facts. These models are conceptually similar to data models and are described as part of that technique. All business rules must either specify a term or fact or operate on a defined term or fact.

.2 Operative Rules

Operative rules are rules that the business chooses to enforce as a matter of policy. They are intended to guide the actions of people working within the business. They may oblige people to take certain actions, prevent people from taking actions, or prescribe the conditions under which an action may be taken. By definition, it must be possible for people to violate an operative rule, even if there are no circumstances under which the business would approve of them doing so. An example of an operative rule is:

Design of a solution must not begin until the requirements have been verified and validated.

Because it is possible to violate an operative rule, further analysis may be conducted to determine what kinds of sanctions should be imposed when a rule is violated, allow a rule to be overridden (before or after the fact) or the circumstances when an exception to a rule is appropriate. These may lead to the definition of additional rules.

.3 Structural Rules

Structural rules expand on the definitions established in the term and fact model. They are intended to help determine when something is or is not true, or when things fall into a specific category. They are expressed as rules, separate from the term and fact model, because they describe categorizations that may change over time. Because they structure the knowledge of the business, rather than the behavior of persons, they cannot be violated (but they can be misapplied). An example of a structural rule is:

A requirement is never considered valid if it has not been formally approved by the sponsor.

Structural rules may also describe how information may be inferred or calculated based on other data available to the business. A calculation may be the result of the application of many individual rules.

Inference rules can also be used to evaluate decisions during a process. For example:

A requirement is always considered to be invalid if it is traced from a requirement that has been changed and it has not been reviewed since the change was made.

6.8.4 Usage Considerations

.1 Strengths

Analyzing and documenting business rules using the general principles cited above yields higher quality rules.

The impact of changes to business rules can be assessed more easily when they are documented separately from the processes they detail or the means that enforce the rules.

.2 Weaknesses

Business rules are one aspect of analysis. It is necessary to analyze the user requirements the rules constrain or support to gain a comprehensive understanding of the business needs.

6.9 Technique: Data Modeling

6.9.1 Purpose

The purpose of a data model is to describe the structure and organization of data needed to support a business area, and the rules and constraints associated with the use of this data. It supports communication of information requirements between Business Analysts and stakeholders, as well as between Business Analysts and solution developers.

6.9.2 Description

A data model usually takes the form of a diagram supported by textual descriptions. It visually represents the types of people, places, things and concepts that are important to the business, as well as the significant business relationships among them.

In addition, though it is not always shown explicitly in the diagram, a data model usually includes a detailed itemization of the required data elements and their associated validation rules.

The traditional diagram type used for data modeling has been the Entity Relationship Diagram (ERD). The UML Class Diagram, which models similar concepts, is also used

frequently for data modeling. Other diagramming techniques, such as Object Role Modeling, may also be used to prepare a data model.

.1 Variations

There are several distinct types of data models in use.

Class models are used in object-oriented analysis. They include entities (in the form of *classes* or *objects*), the relationships between them, the attributes associated with each entity, and the operations or methods that can be performed on a class.

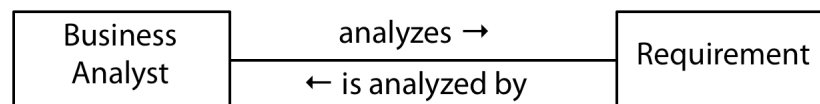
Data dictionaries includes definitions of the data elements used in a system, their meanings, allowable values, and so forth.

Entity-Relationship diagrams evolved from database models and follow the structure and concepts described below.

Term and Fact models are a variant on data models that are used for the definition of business rules. A term is an entity or concept with a fixed and defined meaning to the business, while a fact describes the relationships that exist between terms.

6.9.3 Elements

The Entity Relationship Diagram fragment shown below illustrates the detail typically found in a data model. Other diagramming techniques might represent some details with a different symbol or with a different name for the same symbol.



The following elements are represented in the diagram:

.1 Entity

An entity is something of significance to the business being described, about which that business needs data. The example shows the entities Customer and Account, each represented by a rectangle and with the entity name shown at the top. If a Class Diagram were used, a similar rectangle would represent a similar concept but would be referred to as a Class.

.2 Relationship

Relationships are significant business associations between entities (or classes in a Class Diagram). The example shows the relationships between Customer and Account as a labeled and annotated line. The labels explain the nature of the relationship from the perspective of each Entity, and the annotations at each end of the line indicate the numerical constraints on the relationships. In an ERD these constraints are referred to as the “cardinality” of the relationship. In a Class Diagram they are referred to as the “multiplicity” of the relationship and are indicated by a different notation.

The possible permutations of minimum and maximum cardinality/multiplicity are:

- Zero or one
- Zero or more
- One and only one
- One or more

Relationships define how information is used in the operation of the business, and indicate the important linkages that need to be managed and maintained in the solution.

.3 Attributes

An attribute (aka *data element*) defines a particular piece of information --how much information can be captured in it, allowable values, the type of information etc. In general, it is referred to as an attribute when it is a component of a larger entity and a data element when it stands alone. Attributes have the following characteristics:

Name: a unique name for the attribute.

Aliases: alternate names for the attribute used by various stakeholders.

Values/Meanings: a list of acceptable values for the attribute. This may be expressed as an enumerated list or as a description of allowed formats for the data (including information such as the number of characters). If the values are abbreviated this will include an explanation of the meaning.

Description: the definition of the data element in the context of the solution.

The example shows that the attributes Customer Number, Name, Address and Phone Number are required for the entity Customer. The attributes Account Number, Current Balance and Overdraft Limit are required for the entity Account.

.4 Unique Identifier

A unique identifier is the attribute (or combination of attributes) that uniquely identify each occurrence of an Entity. The example shows that each Customer is identified by a unique Customer Number, and that each Account is identified by a unique Account Number.

.5 Metadata

Metadata is defined as “data about data”. Metadata describes the context, use, and validity of business information. Thus, all the information in a data model may be described as metadata.

.6 Conceptual, Logical & Physical Data Models

Business Analysts complete high-level data models to develop and communicate their understanding of important business concepts, relationships and rules. These are called **conceptual data models**.

Business Analysts also complete detailed data models to communicate comprehensive specifications of data requirements to solution developers. These are called **logical data models**.

Database Designers may use logical data models prepared by Business Analysts as input to the design and implementation of a database. These designs are called **physical data models**, and represent the implementation of a solution in a specific technology environment.

6.9.4 Usage Considerations

.1 Advantages

Data models offer the flexibility of different scales and different levels of description. They are useful when prepared informally at a conceptual level, and also useful at a detailed level as input to database design. They provide a consistent modeling approach that supports the transition through planning, analysis, design and implementation.

Because they have a strong basis in mathematical concepts, data models are supported by rigorous rules for correctness and completeness. This encourages accuracy in the development of the models.

.2 Disadvantages

Data models can be complex, and they deal with concepts that may be unfamiliar to business users. If not properly presented, they can be difficult for users to understand and relate to.

Conceptual and logical data modeling is sometimes misunderstood to be a database design activity, and consequently thought to be inappropriate as a business analysis technique.

6.10 Technique: Event and State Modeling

6.10.1 Purpose

Events and states are analyzed to understand ‘when’ business activity is triggered and the results of the activities. Identifying events and states is a way to clarify the scope of the solution and distinguish planned events from unplanned events.

6.10.2 Description

An event is a change in the environment that triggers a response and produces a result. A state is a defined condition of a data entity or a system component. A response to an event may result in a change of the state. An event’s pre- and post-conditions may be described in state terms. An example: the event ‘Client cancels project’ has a pre-condition of ‘Project is active’ and a post-condition of ‘Project is canceled’.

Modeling events and states is a means to discover, verify and validate requirements. Subsequent analysis of the events and states results in details that may be documented

in other models such as business rules, data requirements and behavior models (e.g., processes, activity diagrams, use cases).

6.10.3 *Elements*

.1 Events

An event defines dynamic behavior. An event may be classified as a:

- Business Event – is initiated by a direct user, e.g., Client cancels project
- Temporal Event – is initiated by the passing of time, e.g., Time to produce overdue projects report
- Responses – the planned actions that execute when an event is triggered.
- Precondition(s) – fact(s) that must be true when the event begins.
- Post-condition(s) – fact(s) that must be true when the event is complete.

Event Dependencies – when an event's precondition is equivalent to another event's post-condition, the second event is dependent on the first event.

A simple table may be used to organize event details with columns for events, responses, preconditions, post-conditions.

The OMG/BPMN defines formal standards for modeling events from the perspective of business processes and those related events that change the flow of a process. Event modeling as described in this KA allows one to 'discover' events independently of a process model. Of course such events may be traced back to business process models and/or associated with scenarios, stories or use cases. (A scenario or story describes instances of event execution. An event may be considered a trigger for a use case.)

.2 States

State modeling is valuable for exploring and understanding an event-rich, complex topic. It may be an entity on an entity relationship diagram, or a system component such as a user interface window.

States – The condition of a state is definable (e.g., glossary term). Additional details of the state such as mandatory characteristics and relationships further describe the state. For example, a Canceled Project must have a canceled date. A complex topic may have more than one initial state and several intermediate and end states.

Transitions – A transition represents dynamic behavior that moves a topic from one state to another. When analyzing both states and events, a transition traces to an event.

The State Diagram visualizes one topic's states and its transitions from state to state. An example: the State Diagram for the Project entity would show all the states of the Project and the events that transition the Project from the 'Proposed' state to 'Approved' state and so on.

There are many titles for the state diagram including State Machine Diagram, State Transition Diagram, Entity Life Cycle Diagram. UML includes guidelines for modeling states.

6.10.4 Usage Considerations

.1 Advantages

Business experts are inherently aware of the events and responses in their current work environment.

Listing events and modeling their dependencies can be a quick, high-level way to clarify the solution scope.

Events can be used early in the SDLC to prioritize and partition requirements.

Events are method and methodology-neutral. One can choose any behavior model (e.g., activity diagrams, use cases, processes) to further analyze and define event and response details.

Typically business domain experts are intimately aware of life cycle states for their key concerns. Helping them list and describe the states and then draw the allowable transitions between states often uncovers missing data, control and behavioral requirements and may be helpful to clarify confusing or even conflicting requirements.

.2 Disadvantages

Notation for modeling event dependencies (pre & post-conditions) is not commonly understood. This may be a handicap in adequately verifying the event dependencies.

Since state machine diagrams can be drawn very quickly by business experts, it is important not to unintentionally expand the scope. Each state (and associated transitions) should be validated with the business case to determine if it supports a business need.

6.11 Technique: Indicators, Metrics and Reporting

6.11.1 Purpose

The purpose of indicators, metrics and reporting is to improve performance of solutions, solution components and requirements.

6.11.2 Description

An *indicator* identifies a specific numerical measurement that indicates progress toward achieving an impact, output, activity or input. A *metric* is a quantifiable level of an indicator that an organization wants to accomplish at a specific point in time. Reporting is the process of informing stakeholders of metrics of indicators in specified formats at specified intervals.

Metrics and reporting are key components of monitoring and evaluation, which is the generic of numerous terms – scorecard, balanced scorecard, dashboard, performance management, business intelligence, and others. *Monitoring* is a continuous process of collecting data to determine how well a solution is implemented compared to expected results. *Evaluation* can be described as the systematic and objective assessment of a solution to determine its status and efficacy in meeting objectives over time, and to identify ways to improve the solution to better meet objectives.

6.11.3 **Elements**

Monitoring and evaluation systems vary depending on their context and include the factors to measure, indicators, metrics, the system structure, data storage, and reporting.

.1 The Context

With sufficient resources, one can monitor and evaluate any solution and most other aspects of an organization. The context in which one measures is important. Examples of context are a strategic plan, policy implementation, program, project, software application, department, or enterprise-wide function. Good candidates for monitoring and evaluation include:

- A problem that persists for a long period and needs a solution
- Newly implemented solutions
- Solutions where actual performance diverges significantly from planned performance
- Similar solutions that experience different outcomes
- Pilot solutions under consideration for expansion
- Important resource allocation decisions

.2 Factors To Measure

Whatever the context, the top priorities of a monitoring and evaluation system are the intended goals and impacts of a solution. Without impact, there is no genuine reason for implementing a solution. Measuring that which supports achievement of goals – inputs, activities, and outputs – is also important. Inputs are resources such as money, people, and plans. Activities are the tasks and steps to transform inputs to outputs. Outputs are the products or services developed by completion of activities. Effective outputs cause impact or achievement of goals. To illustrate, consider a training program. The trainers, materials and facilities are inputs. The instruction and coursework are activities. A student's completion of a training course is an output. The increased skill, marketability and salary of the student are the impacts. Good monitoring and evaluation will emphasize goals and impact, but also help stakeholders understand the status of each of these four factors and how they inter-relate ("roll-up").

.3 Indicators

An indicator identifies a specific numerical measurement that indicates progress toward achieving the impact, output, activity, or input. Each goal has at least one indicator to measure it properly, but some may require several. Select enough indicators to answer the question, “Has the goal been achieved?” Each output, activity, and input also has at least one indicator. A good indicator has five characteristics:

- Clear: precise and unambiguous
- Relevant: appropriate to the factor
- Economic: available at reasonable cost
- Adequate: provides a sufficient basis to assess performance
- Monitorable: can be independently validated

In addition to these characteristics, stakeholder interests are also important. Certain indicators may help stakeholders perform or improve more than others. It is used to address these stakeholder needs as long as the indicators fit the characteristics described above. Over time, weaknesses in some indicators can be identified and improved.

Often, factors to measure reflect concerns, problems or deficiencies. However, good indicators are positive expressions of improvement. Therefore, concerns need to be transformed into positive measures. For example, a concern about lack of Oracle database skills could be transformed into, “X% of our department’s programmers will be certified in Oracle by the end of Year Z.” In this example, the indicator answers four questions – who, where, how much and by when? Each indicator should address these four basic questions.

Not all factors can be measured directly. Proxies can be used when data for direct indicators are not available or feasible to collect at regular intervals. For example, absent a survey of client satisfaction, an organization might use the proportion of all contracts renewed as an indicator.

As noted earlier, a good indicator is economical. In establishing an indicator, its source, method of collection, collector, and the cost, frequency and difficulty of collection need to be considered. Secondary sources of data are most economical, but to meet the other characteristics of a good indicator, primary research, such as surveys, interviews or direct observations may be necessary. The method of data collection is the key driver of a monitoring, evaluation and reporting system’s cost. Financial cost, number of data collectors, training for data collectors, completion time, and response rates are key elements in estimating costs.

.4 Metrics

Metrics are quantifiable levels of indicators that are measured at a specified point in time. A target metric is the objective to be reached within a specified period.

Improvement is the difference between the baseline and the target. In setting a metric

(usually one) for an indicator, it is important to understand clearly the baseline starting point, resources that can be devoted to improving the factors covered by the indicator, and political concerns. Good target metrics are neither too easy nor too ambitious, but realistic. The more politically sensitive a target metric is, the more likely the pressures to distort, subvert, or otherwise manipulate it in myriad ways. When determining target metrics, it is useful to meet the five characteristics noted earlier while minimizing exposure to political pressure.

A metric can be a specific point or a range. A range can be useful if the indicator is new. The scope of time to reach the target metric can be multi-year to annual or quarterly, or even more frequent, depending on the need. Realizing improvement takes time, so the stakeholders may want to gauge the scope of time with appropriate patience.

.5 Structure

Establishing a monitoring and evaluation system requires a data collection procedure, a data analysis procedure, a reporting procedure, and collection of baseline data. The data collection procedure covers units of analysis, sampling procedures, data collection instruments to use, collection frequency, and responsibility for collection. The analysis method specifies the procedures for conducting the analysis and the data consumer, who may have strong interests in how the analysis is conducted. Reporting procedure covers the report templates, recipients, frequency, and means of communication. Baseline information is that data provided immediately before or at the beginning of a period to measure. Baseline data is used to learn about recent performance and to measure progress from that point forward. Using the procedures above, it needs to be collected for each indicator, analyzed and reported.

The monitoring and evaluation system needs to link impact, output, activity and input indicators and, in doing so, span appropriate levels of an organization. All levels of an organization – policy, program and project – need performance information. Performance information also needs to flow horizontally. Therefore, an organization needs to identify demand for performance information throughout the organization. Stakeholders at each level and location need to understand the responsibility, source, frequency, methodology, consumer, and reporter of the data collection and analysis.

Rarely is a system set up throughout an organization all at once. Most organizations implement a system using a top-down approach, but bottom-up and pilot approaches are also successfully used. Most organizations using the top-down approach build down to the department level. Others go lower to create a more pervasive system. Very large organizations and small organizations tend to prefer the pilot approach.

The approach and organization of the system will affect data quality. There are three key factors in assessing the quality of indicators and their metrics – reliability, validity and timeliness. Reliability is the extent to which the data collection approach is stable and consistent across time and space. Certain parts of an organization may be new or targeted for termination. Will they be reliable monitoring and evaluation stakeholders? Validity is the extent to which data clearly and directly measure the performance the organization intends to measure. An organization may accept a second-best indicator due to economics. Over time, will the cost-benefit ratio support replacement of that indicator with something better? Goals, inputs, activities and outputs also change. Is

the indicator still valid in light of these changes? Timeliness is the fit of the frequency and latency of data to management's need for it. External environments and decision-maker needs can change. Will the monitoring, evaluation and delivery of the data meet these changing needs over time?

.6 Data Storage

Data produced by the process of establishing and operating a monitoring and evaluation system needs to be stored to enable convenient access by appropriate stakeholders. Such data includes the monitoring and evaluation system planning, design, management and training; procedures for data collection, data analysis, and reporting; indicators, baseline data, metrics, and reports. Typically, such information is under configuration management

.7 Reporting

The reporting procedures referenced above will help ensure that all get what they want when and how it was promised. Pre-testing the monitoring and evaluation system before reporting data to the stakeholders will safeguard the credibility of the system. Many systems report the most meaningful data prominently, putting less important information in appendices. Typically, reports compare the baseline, current metrics and target metrics to each other, with calculations of the differences presented in both absolute and relative terms. Trends are more credible and important than absolute metrics. Visual presentations tend to be more effective than tables, particularly when using qualitative text to explain the data.

6.11.4 *Usage Considerations*

.1 Advantages

Establishing a monitoring and evaluation system enables stakeholders to understand the extent to which a solution meets an objective, and how effective the inputs and activities of developing the solution (output) were. With this information, organizations can communicate success, reward achievement, win support, determine cause and effect, improve solutions, terminate failures, reduce costs, enforce compliance, and make decisions more quickly. Indicators, metrics and reporting also facilitate organizational alignment, linking goals to objectives, supporting solutions, underlying tasks, and resources.

Using a monitoring and evaluation system is most effective when there is leadership and team commitment to implementing it. Implementing a monitoring and evaluation system means accountability, and in most cases leadership commitment is required to resolve differences between stakeholders. Therefore, leadership understanding of the system and its maintenance needs will improve the chances of success. If goals or intended impacts have not been adequately identified, the relevant managers need to develop them before resources are expended to monitor and evaluate them.

Understanding the stakeholders involved – the measured, the measurers and their management – is also important to success. Who are the stakeholders? What are their interests? What are their motivations? What are their attitudes toward various goals, objectives, strategies, policies, solutions and projects? What are the incentives and

disincentives for supporting these? In light of stakeholder characteristics, how should the system be established, maintained and utilized? Who is responsible for what?

Another prerequisite of effective usage of indicators, metrics and reporting is understanding the capacity of an organization to design, establish, maintain and use the system. To what extent are the appropriate data already collected, analyzed, and reported? Which data? How is it collected? Who collects and analyzes it? How is it reported to whom and when? Who uses it? For what? Does the collection, analysis, reporting and use satisfy the organization's needs?

.2 Disadvantages

Depending on its purpose and scope, establishing a monitoring and evaluation system can initially consume considerable resources before returns are realized. Significant effort is also required to ensure the organization is committed to implementing a system, to understand its stakeholders, and to understand and/or build the necessary capacity. Often, an organization must develop appropriate data "from scratch." Some may also need to train personnel in the appropriate skills (statistics, information technology, evaluation, and/or managerial). A system can impose significant requirements on people's time, and the lack of manpower and/or money to overcome this obstacle can cause of failure.

Selecting indicators often involves trade-offs. It is tempting to select sub-standard indicators that are supported by existing sources rather than expending resources to support the best indicators. An organization may consider the consequences of making decisions with sub-standard indicators before making this trade-off.

6.12 Technique: Non-Functional Requirements

6.12.1 Purpose

The purpose of non-functional requirements is to describe the required qualities of a system, such as its usability and performance characteristics. These supplement the documentation of functional requirements which describe the behavior of the system.

6.12.2 Description

Non-functional requirements, also known as quality or supplementary requirements, are typically documented in text using declarative statements such as:

- Ninety percent of operators shall be able to use all the functionality of the system after no more than six hours of training
- The system shall provide 90% of responses in no more than 2 seconds

This documentation is presented as a part of the total set of requirements documentation, often in a section, or a separate document.

6.12.3 *Elements*

The following elements are usually included in the description of non-functional requirements.

.1 Category

Non-functional requirements are usually organized into categories. Categorization supports the discovery of non-functional requirements by providing a mental checklist of characteristics to consider when performing requirements elicitation.

Different experts (e.g. Wiegers, Leffingwell & Widrig, Robertson & Robertson) recommend different structures of categorization. The International Standards Organization also provides a classification system for software qualities in its ISO 9126 standard.

.2 Measurement

The definition of non-functional requirement should include an appropriate measure of success for each one so that it can be adequately tested. Some non-functional requirements may seem very subjective (e.g. "intuitive interface") but careful thought can usually provide an appropriate success measurement.

6.12.4 *Usage Considerations*

Business Analysts use non-functional requirements to document the qualities of a system that are important to:

- the user community, such as usability, learnability, reliability, etc.
- the development community, such as scalability, maintainability, reusability, etc.

.1 Advantages

Success in meeting non-functional requirements will have a strong influence on whether or not a system is well accepted by its users

.2 Disadvantages

Non-functional requirements are often more difficult to define than functional requirements. Expectations regarding quality attributes will often be unspoken by users.

6.13 *Technique: Organizational Modeling*

6.13.1 *Purpose*

Organizational modeling is used to describe the roles, responsibilities and reporting structures that exist within an organization and to align those structures with the organization's goals. They break down the work performed by the organization into smaller tasks performed by subunits of the organization, and describe how those subunits co-ordinate the work they perform.

Organizational models can support stakeholder identification (see Conduct Stakeholder Analysis), as well as being developed as part of a solution design.

6.13.2 Description

The fundamental diagram used in organizational modeling is the org (organization) chart. The org chart shows a functional decomposition of the organizational structure, indicating the lines of reporting that exist between the executive decision-making body of the organization and the employees.

There is no formal standard set for defining org charts, although there are certain standard conventions that most org charts follow. The org chart shows:

- **Organizational Units**, which may represent people, teams, departments, or divisions based on the level of abstraction of the org chart. Frequently, an org chart will mix organizational units, showing a mix of people, teams, and higher level divisions.
- **Lines of Reporting**, which trace accountability and control between organizational units. A solid line typically denotes direct authority, while a dotted line indicates information transfer. Lines of reporting visually depict the *span of control* of a particular manager or organizational unit.

Span of control is the number of employees a manager is directly (or indirectly) responsible for. If the span of control of a particular manager is too great, the manager will not be able to effectively track what people are doing, what their actual job responsibilities are, what training or development they require, and so forth. The appropriate span of control for a manager is determined by variables including the complexity of the work performed by an employee, the range of different tasks that employees may carry out, the reporting systems available to the manager, and the corporate culture.

The span of control will determine much of the organizational structure. For instance, if a division has twenty staff and a manager in that division can effectively oversee between 5-7 people, then the division will need to be organized into three teams, each of which will have a manager who reports to the division head. If the span of control remains the same, the division can grow to a maximum of fifty employees before another layer of management will have to be added.

However, team size is not the only consideration in designing an organizational model, and may not even be the primary consideration. Organization structures are set up in order to ensure that employees with similar responsibilities report into a single group, so that their incentives and instructions are clear and to ensure that the manager of the group has the appropriate expertise to effectively manage a team.

Naturally, there are many different ways that an organization may define “similar responsibilities”. Typically, the division is made using some combination of functional similarity (grouping together employees who do similar work) and market served (grouping together employees with similar internal or external customers).

The degree of functional specialization within the firm and the extent to which the organizational structure is market-oriented (that is, built around delivering a particular product or service, delivering a project, or servicing a particular customer type) determines its organizational configuration.

There is no perfect or ideal configuration that applies to all organizations. The selection of a configuration should be based on an understanding of the degree to which an organization can benefit from increased specialization and regularization of work, as well as the complexity and diversity of its customer base.

6.13.3 *Elements*

.1 Functions

Functionally-oriented organizations group together staff based on shared skills or areas of expertise. They are generally adopted in order to encourage a standardization of work or processes within the organization. Functional organizations enable better cost management and reduce duplication of work, but are prone to develop communication and cross-functional co-ordination problems (known informally as “silos”).

.2 Markets

The term “market-oriented” covers a number of different possible ways of organizing an enterprise, all of which are based on serving a particular customer segment rather than on the common skills or expertise of the employee. Market-oriented structures enable the organization to be better oriented with the needs of its customers, but are prone to develop inconsistencies in how work is performed and to duplicate work in multiple divisions.

Customer segment-focused organizations are oriented around serving clearly defined market segments. This kind of organizational structure is common when the organization serves a number of markets with distinct needs and expectations, even where those markets can use similar products or services.

Geographically-focused organizations are oriented around regional divisions. This kind of organizational structure is common when dealing with markets where local conditions create substantially different conditions (due to regulation, local tastes, and so forth) or where goods and services are likely to be purchased or used locally.

Process-focused organizations are oriented around the operation of end to end processes. This kind of organizational structure is common for internal support services and for customer-facing services, especially when the organization has a limited number of different services it provides, where the organization can benefit significantly from improving execution of those processes, and where there are clearly defined interfaces between processes.

Product-focused organizations are oriented around the delivery of individual products or services. This kind of organizational structure is common when there are few synergies between the products, possibly because they are marketed to different types

of customers, use different distribution channels, or require different skills and competencies for their development.

Project-focused organizations are organized around the delivery of unique projects. This kind of organizational structure is common where the primary purpose of the organization is project execution.

.3 Configurations

There are four major types of organizational configurations. In sufficiently large organizations, different groups or divisions may have different configurations. For example, a large organization may be divided into several different functional specialties (including IT) but the IT department may be divided based on the market served (i.e. with cross-functional teams supporting different systems).

A **simple** configuration is low on both market orientation and functional specialization and is most common in smaller enterprises. In this model, all people on the team report into a single executive or leader, and have no clearly defined responsibilities. Tasks and work are assigned as needed. It maximizes flexibility but minimizes specialization and requires a high degree of co-operation between workers to be effective.

A **functional** configuration is low on market orientation and high on functional specialization. In this model, each executive is responsible for staff performing a certain type of work. Those staff have clearly defined roles and responsibilities. It maximizes the ability to effectively perform work and develop efficiencies, but minimizes responsiveness to changing conditions and frequently encounters communication challenges across functional areas.

A **divisional** configuration is low on specialization and high on market orientation. In this model, each executive runs a portion of the organization as if it was its own business, with responsibility for all the work necessary to deliver a product or service, or meet the needs of an identified customer group. Tasks and responsibilities for staff are likely to be clearly defined within each organizational unit, but there may not be consistency in the definition of similar roles in different units. It maximizes the ability of the organization to deliver each product or service, but minimizes cross-functional efficiencies and co-ordination.

A **matrix** configuration is high on market orientation and functional specialization. In this model, there are separate managers for each functional area and for each product, service, or customer group. Staff typically report into a line manager, who is responsible for the performance of a type of work and for identifying opportunities for efficiency in the work, and to a market (product/service/project/etc.) manager, who is responsible for managing the product, service, etc. across multiple functional areas. The matrix organization can combine the strengths (or the weaknesses) of the functional and divisional configurations.

6.13.4 *Usage Considerations*

.1 Advantages

Organizational models are one of the few types of models any organization is likely to have in place. Even the simplest organization has to define the reporting structures that exist among team members in order to co-ordinate work between its people.

.2 Disadvantages

The primary limitation of organizational modeling is not the technique itself, but rather the implications of including organizational redesign in the scope of a project. Organizational redesigns are likely to be highly contentious and require significant executive support in order to be successful.

A secondary problem is that informal lines of authority and communication that are not reflected in the org chart are almost certain to exist within the organization.

6.14 **Technique: Scenarios and Use Cases**

6.14.1 *Purpose*

Scenarios and use cases are written to describe how an *actor* interacts with a solution to accomplish one or more of that actor's goals, or to respond to an event. They are intended to be easily understood by all stakeholders.

6.14.2 *Description*

While the terms scenario and use case are often used loosely, a scenario is generally understood to describe just one way that an actor can accomplish a particular goal, while a use case commonly describes all the possible outcomes of an attempt to accomplish a particular goal that the solution will support.

Scenarios are written as a series of steps performed by actors or by the solution that enable an actor to achieve a goal. A use case describes several scenarios in the form of primary and alternate flows. The primary or basic flow represents the simplest way to accomplish the goal of the use case. Special circumstances and exceptions that result in a failure to complete the goal of the use case are documented in alternate flows.

No formal standard exists for the use case description. This section describes elements common to most variants of the technique.

6.14.3 *Elements*

.1 Name

The scenario use case must have a unique name within the project. The use case name should describe which goal or event it will deal with, and generally includes a verb (describing the action taken by the actor) and a noun (describing what is being done or the target of the action).

.2 Actor(s)

An actor is any person, system, or event external to the system under design that interacts with that system through a use case. Each actor must be given a unique name that represents the role they play in interactions with the system. This role does not necessarily correspond with a job title and should never be the name of an actual person. A particular person may fill the roles of multiple actors over time.

Caution: A temporal event is rarely modeled as an actor initiating a use case. The most common use of a temporal event as an actor is the use of a “Time” actor to trigger a use case that must be executed based on the calendar date (such as an end-of-month or end-of-year reconciliation of a system). Some authors recommend against this use.

.3 Preconditions

A precondition is any fact that the solution can assume to be true when the use case begins. This may include textual statements, such as “user must be logged in” or “Item must exist in catalogue”, or the successful completion of other use cases.

.4 Flow of Events

Describes what the actor and the system do during the execution of the scenario or use case. Most use case descriptions will further break this down into a basic flow (representing the shortest successful path that accomplishes the goal of the primary actor) and a number of alternate flows that show more complex logic or error handling. If a circumstance still allows the actor to successfully achieve the goal of the use case, it is defined as an alternative. If the circumstance does not allow the actor to achieve their goal, the use case is considered unsuccessful and is terminated. This is defined as an exception.

.5 Postconditions

Any fact that must be true when the use case is complete. The postconditions must be true for all possible flows through the use case. The Business Analyst may distinguish between postconditions that are true for successful and unsuccessful executions of the use case.

.6 Relationships

Scenarios rarely include formalized relationships. There are two associations that may exist between use cases:

Extend: allows for the insertion of additional behavior into a use case. The use case that is being extended must be completely functional in its own right. The extending use case does not need to be complete without reference to the base use case. An extension is functionally identical to an alternate flow, but is captured in a separate use case for convenience.

Include: allows for the base use case to make use of functionality present in another use case. The included use case does not need to be a complete use case in its own right, if it is not directly triggered by an actor. This relationship is most often used when some shared functionality is required by several use cases.

.7 Use Case Diagram

The Use Case Diagram is a *Scoping Diagram* (q.v.) that shows how the use cases and actors involved in a solution interact. The format and elements of the Use Case Diagram are defined as part of the UML standard maintained by the Object Management Group.

6.14.4 Usage Considerations

.1 Advantages

Use cases are good at clarifying scope and providing a high-level understanding of user behavioral goals, normal situations, alternatives or exception situations. They provide a graphical or textual listing that combines the who i.e., actor with the what i.e., behavioral requirements and the why i.e., use case goals.

They are the basis for other more detailed analysis types, user interface design and prototyping activities. Use cases share most of the characteristics of a process/flow model and may be used to describe dynamic characteristics of a solution—they have been placed with the usage models largely because they focus on the system from the perspective of an actor.

.2 Disadvantages

The most significant challenge in documenting use cases is to make sure that they are structured and written consistently.

They are less effective for data intensive projects that are better captured through requirements statements or decision matrixes.

Business analysts are frequently tempted to describe most or all system behavior using use cases. Because many requirements can be captured in the use case format, there is frequently a temptation to use them to capture all requirements, even in cases where it is difficult to apply them. There is often a temptation to list every possible business rule or condition which may result in unmanageably large use cases.

Use cases do not have any features to support integration or the discovery of common elements, which is one of the reasons they are usually written at the highest-level of abstraction that's appropriate for the project. Additional analysis and design is usually required after use case definition is complete to identify these common elements.

6.15 Technique: Process Modeling

6.15.1 Purpose

Processes are how people within an organization collaborate in order to accomplish a goal. Essentially everything we do in an organization involves or contributes to some type of process. When we first started performing a process it was probably very efficient. Over time, however, as the process was changed to accommodate new users, add different functionality, and work with new customers that process has probably become very inefficient. At the very least, there are probably a number of new

components in the process and it is probably not completely understood by all of the people that use or interact with it.

There are a number of important characteristics that a process usually has:

- Collaboration between multiple people or groups;
- Takes place over a period of time;
- Can be accomplished in more than one way;
- Is repeatable.

Process models are used to:

- Develop and document an understanding of the current workflows included in a process.
- Identify opportunities for process improvement, and recommend alternative solutions.
- Understand and communicate complex business logic.
- Create documentation for user manuals and training.
- Create documentation for regulatory purposes such as SOX, Bill 198, Basel II, etc.
- Automate processes within BPM suites.

Process modeling is used to obtain a graphical representation of a current or future process within an organization. A model may be used, at its highest level, to obtain a general understanding of a process or, at a lower level as a basis for simulation so that the process can be made as efficient as possible.

Process modeling is usually the first step in understanding your processes and eventually to automating them. Modeling the process can take from a few hours to many months or even years to map out all of the processes within an organization. The main purpose of this is to improve the efficiency of the processes within the organization.

6.15.2 Description

A process model is a visual representation of the sequential flow and control logic of a set of related activities or actions.

A process is initiated by an event in the business domain, such as a sale of a product to a customer, a request for information by a senior executive, or a failure to complete a transaction. Events may be actions taken by a person, rules which cause action to be taken, or simply the passage of a period of time. The process model may involve manual

intervention, be completely automated, or a combination thereof. The process is complete when the objective or the goal of the process is achieved or completed.

Simple processes may involve more than one functional area or be completely contained within a functional area whereas more complex or higher level processes are more likely to cross many functional areas or departments. It is in this situation where process modeling achieves the most benefits.

Process models range from very low tech as in the case of “brown paper” modeling to mid-range as in the use of a drawing product such as Visio[®] or Smart Draw[®] through to very high tech products used in many of the Business Process Management Suites (BPMS) available. These models can be very high level as in the case of an end to end process or very low level wherein they include details of the process such as time, cost, and responsibility of individual tasks to mention just a few. If the model is used as part of a BPMS then it may be a tool employed by the business users to actually change how the process is executed within a software package such as an ERP (Enterprise Resource Planning) CRM (Customer Relationship Management) package, or any other legacy system through the use of more sophisticated software such as an Enterprise Service Bus (ESB) or Service Oriented Architecture (SOA).

The audience for process modeling ranges from users of the process, to process and business analysts, to team members all the way up to and including senior management as well as all of the stakeholders. Make up of the audience varies depending on the level of the process being modeled. Ideally, different individuals are involved as the level of the process decreases from senior management at the *end to end* process down to the actual users at the lowest process level.

.1 Standards

There are a number of standards that may be observed when doing business process modeling and which ones you observe depends on the purpose of the model and the software package you are using to create the models if, in fact, you are using one.

The most basic standard for process modeling is BPMN which stands for Business Process Modeling Notation. This notation is managed by the OMG (Object Management Group) and is the most widely accepted notation for business modeling.

BPEL which stands for Business Process Execution Language is a standard approved by OASIS (Organization for the Advancement of Structured Information Standards). BPEL is an XML (Extensible Markup Language) that allows the execution of business processes that have been mapped in a modeling package.

IDEF is a series of notations developed by the U.S. Department of Defense for software development. IDEF3 is the notation used for processes. It depicts a process as a set of linked activities, and shows the inputs and outputs used by each activity.

6.15.3 Elements

.1 Model Notation

Process models typically contain some or all of the following key elements:

Activities

The individual steps or pieces of work that must be completed in order to execute the business process. An activity is a relatively abstract concept in process definition.

Flow

Indicate the direction of the step by step sequence of the workflow. In general, diagrams are drawn from top to bottom or in the direction of reading to show the passage of time.

Decisions

Forks where the flow of work proceeds in two or more mutually exclusive flows and, optionally, where separate flows merge together.

Events

Events are discussed in detail under Event/State Model. Events trigger some kind of process behavior, including the creation of a process,

Roles

Roles in processes are more or less conceptually identical to their use in use cases. That is, a role represents a type of person or group.

Swimlanes and Pools

Swimlanes are horizontal or vertical sections of a process model that show which activities are performed by a particular role. When the flow of work crosses the boundary of a swimlane, responsibility for that work then passes to another person or group within the organization.

A pool represents an organizational boundary. It may include a number of swimlanes. Commonly, a process will include one pool for the customer and a second pool for the organization, although it is possible for a process to include any number of pools.

Terminal Points

Terminal points represent the beginning or end of a process or process flow. A terminal point generally represents some kind of event that is visible to the organization or outside of it.

Split and Merge

A split causes the process to divide into multiple flows, each of which can execute concurrently.

.2 Process Types

Process may be defined in many different ways but the most common breakdown is into these three types: Management, Core, and Supporting.

Management Processes

A management process is one which is more strategic in nature as opposed to more operational ones which include core and support types of processes. They tend to be more of a planning or controlling nature than core to the business.

Core Processes

A core process is a process that directly supports the organization's business. Most core processes are unique to the domain. Core processes are frequently unique either to the enterprise or to the business in which it operates and are generally viewed as a source of competitive advantage.

Supporting Processes

Support processes are those processes that are executed by those parts of the organizational structure that are not functionally unique to the domain (see the Fundamentals KA).

.3 Process Improvement

The initial purpose of process mapping is to gain visibility into processes that have probably changed so much over the life of the organization that the original process is not recognizable when compared to its current version. The end purpose of process mapping is to enable the people involved to ensure that the process is as efficient and cost effective as it could be. Ideally it should also be agile so that the process can be quickly changed to react to changing business needs. We also consider the use of simulations to be able to perform *what if* analysis on the process to help establish the best process while taking into account time and cost figures.

6.15.4 Usage Considerations

The modeling method employed depends on many factors not the least of which are the:

- Size and extent of the modeling exercise
- Complexity of the processes involved
- Level of knowledge of the team in process modeling techniques
- Budget allocated
- Time frame for the project
- Final use for the model(s)

Chapter 7: Solution Assessment and Validation

7.1 Introduction

7.1.1 ***Knowledge Area Definition and Scope***

Solution Assessment and Validation describes the business analysis tasks that are performed in order to ensure that solutions meet the business need and to facilitate their successful implementation. A solution will consist of one or more components, such as business processes, organizational structures, training, and software applications.

There may be many alternatives for solving the business problem that has been presented. The BA works with the implementation SMEs to review and analyze each possible option and together they recommend the best solution option to the sponsor and stakeholders based on all of the constraints, priorities, and risks. The BA assesses each solution proposal for requirements coverage and allocates requirements to each solution component.

Some solution examples include:

- Utilize existing software/hardware that already is available within the organization
- Purchase or lease software/hardware from an outside organization (commonly referred to as a vendor)
- Design and develop custom software
- Add resources to the business or make organizational changes
- Change the business procedures/processes
- Combinations of the above.

Once a solution option has been agreed upon or chosen, the business analyst assists the solution providers with detailed design work. This may include splitting a large project into phases/iterations, reviewing technical design deliverables, and participating in the design of solution components to maximize the value delivered by the component.

Although the business analyst rarely implements a change alone, he or she must be involved in reviewing, selecting, and/or designing the solution. The BA knows the business environment and can assess how each proposed solution would impact that environment.

The solution team is responsible for delivering the architecture or design of a solution with the business analyst as a key contributor. The business analyst is responsible for validating whether a proposed solution meets the business needs.

Solution assessment and validation tasks require the business analyst to work closely with implementation SMEs and quality assurance. The business analyst is responsible for ensuring that these stakeholders fully understand the solution requirements and that implementation decisions made by these stakeholders are aligned with the relevant business and stakeholder requirements.

.1 Interaction with Implementation SMEs

The implementation SMEs, typically under the direction of a project manager, will be responsible for designing and implementing potential solutions. The implementation SMEs will provide specialist expertise on the design and construction of the solution components that fall outside the scope of business analysis.

The business analyst will work with the implementation SMEs to identify possible options, evaluating each option and selecting the best option for each situation. To create a solution, the team members work together to identify solution options, evaluate the options and make a recommendation, and acquire/build the solution and deploy it to the business area.

In some cases, the same person may act as a business analyst and take on one or more Implementation SME roles.

While it is not possible to define a listing of implementation SME roles that is appropriate for all initiatives, some of the most common overlapping roles are discussed below.

Change Management Professionals

Change management professionals are responsible for facilitating acceptance and adoption of new solutions and overcoming resistance to change. Areas of expertise among change management professionals include industry and cultural expertise. Good change management can help to create advocates for change within an organization.

Developers/Software Engineers

Developers are responsible for the construction of software applications. Areas of expertise among developers or software engineers include particular languages or application components. Good software development practices will significantly reduce the cost to build an application, the predictability of the development process, and the ability to implement changes in the functionality supported by an application.

System Architects

System architects are responsible for dividing a software application into components and defining the interactions between them. Areas of expertise among system architects include understanding of methodologies and of solutions offered by specific vendors. Good system architecture will facilitate rapid development of solutions and reuse of components in other solutions.

Trainers

Trainers are responsible for ensuring that the end users of a solution understand how it is supposed to work and are able to use it effectively. Areas of expertise among trainers

may include classroom-based or online education. Good training will facilitate acceptance and adoption of a solution.

Usability Professionals

Usability professionals are responsible for the external interaction design of technology solutions and for making those solutions as simple to use as is feasible. Areas of expertise among usability professionals include user interface designers and information architects. Good usability will increase productivity, customer satisfaction, and reduce cost in solution maintenance and training.

.2 Interaction with Quality Assurance

Quality assurance is responsible for determining how to verify that the solution meets the solution requirements defined by the business analyst, as well as conducting the verification process.

As with implementation SME roles, it is commonplace for a business analysis practitioner to be assigned responsibility for the quality assurance role as well. Even where this is not the case, the quality assurance team is likely to seek out assistance from business analysts in performing QA activities. The BA may help their business stakeholders with user acceptance testing, defect reporting and resolution.

QA tasks which may involve the business analyst include:

- Assist with the development of a solution test plan
- Review the solution test plan
- Review the results of developer run unit tests
- Facilitate the generation of test case ideas
- Review test cases and procedures for compliance with requirements
- Trace requirements to test cases to assure complete coverage
- Plan and assist business stakeholders with User Acceptance Testing

The BA must be aware of the type of quality assurance standards and procedures that apply to the solution (regardless of whether the standards or procedures are imposed from inside or outside of the organization). The BA will work with a quality professional within the organization to understand the impact of the organizational quality assurance standards and procedures.

When the solution contains a software component, the typical software testing life cycle will be used. This life cycle generally includes unit testing, integration testing, system testing, and user acceptance testing (UAT). The BA should have a working knowledge of the software testing process in order to verify that the process sufficiently mitigates associated business risks.

The BA must assist the quality control professional in identifying the context, boundaries, and success criteria of the requirements to be tested. The quality professional may choose various strategies, top-down, bottom-up, black box, or simulation. The test design could be fault-error handling, fault-tolerant level, or boundary values.

7.1.2 ***Input***

- Business requirements
- Deployed solution performance metrics
- Identified risks and constraints
- Organizational RFI/RFQ/RFP standards (if available and applicable)
- Prioritized, approved business requirements
- Quality Assurance Plans
- Solution (Constructed or Deployed)
- Solution design
- Solution options
- Validated requirements

7.1.3 ***Tasks***

7.2 Assess proposed solution

7.3 Allocate requirements

7.4 Determine organizational readiness

7.5 Determine transition requirements

7.6 Validate solution

7.7 Evaluate solution performance

7.1.4 ***Techniques***

- Business Rules
- Cost/benefit analysis
- Coverage matrix
- Data Model

- Defect and Issue Reporting
- Focus group
- Force Field Analysis
- Observation
- Organizational Model
- Prioritization Techniques (see *Requirements Analysis* KA)
- Process Model
- Retrospective
- RFI, RFQ, RFP
- Root Cause Analysis
- Stakeholder Impact Analysis
- Survey
- Traceability
- User Acceptance Testing

7.1.5 Output

- Allocated Requirements
- Identified defects
- Mitigating actions
- Organizational Readiness Assessment
- Solution Design Assessment
- Solution performance assessment
- Solution Selection Recommendation
- Transition Requirements
- Validated solution

7.2 Task: Assess Proposed Solution

7.2.1 Purpose

To assess proposed solutions in order to determine the value they provide to the business, and make recommendations regarding solution selection.

7.2.2 Description

Solution assessment involves reviewing a proposed and designed solution to determine whether it meets the business need and the value it delivers. It may be performed on a single solution or to compare multiple proposed solutions against the requirements. When assessing a single solution, the business analyst is generally attempting to determine whether the solution delivers enough business value to justify its implementation. When assessing multiple solutions, the business analyst has the additional goal of attempting to determine which solution delivers the greatest business value.

The business analyst will be involved in developing the design/architecture strategy for the project. The business analyst will begin to map out a strategy with the business stakeholders and solution team to develop at least one, and possibly many, alternate solutions.

The solution team will consider the characteristics of the user when designing the solution features, and there may be tradeoffs with the business users that the business analyst will be responsible to present on behalf of the technicians.

Alternative solutions may be offered depending on the complexities of the features that must be implemented. The solution team may need to propose variations (for example: how the screens will interface with the end user and how much data can be presented on a screen). Usability requirements may need to be negotiated. The design is a collaborative effort, and tradeoffs between the desires of the stakeholders and the solution team always occur, with the business analyst playing a key role in the communication and negotiation. The business analyst also adds value by analyzing the pros and cons of each alternative against the requirements. It is important that all agreed upon changes in the solution design are signed off by the stakeholders and documented by the business analyst to ensure that all parties understand and are in agreement with the solution.

Sometimes a solution option, or part of a solution, is available for purchase from a vendor or a solution may be built by an outside or outsourced vendor. BAs are often responsible for supporting the Request for Information (RFI), Request for Quote (RFQ) and/or Request for Proposal (RFP) process. These documents are commonly used by organizations looking for detailed information and proposals from outside vendors. The RFI, RFQ or RFP will contain a description of the requirements, giving the proposed vendors the opportunity to describe how their solution will best meet the requirements.

7.2.3 *Input*

In order to begin identifying and evaluating any solution, the Business Analyst must have:

- Prioritized, approved business requirements
- Solution options
- Identified risks and constraints
- Organizational RFI/RFQ/RFP standards (if available and applicable)

7.2.4 *Elements*

.1 Solution Selection and Recommendation

Solution assessment criteria are the set of requirements that will be used to choose between multiple solutions, or the minimal set of requirements that must be met in order for a particular solution to be worth implementing.

Assessment criteria are used to compare a set of possible solutions to determine which solution best meets the business need. The comparison is generally made using a matrix which rates each solution to determine how well it meets the acceptance criterion. This may be done with a simple score (e.g. rating from 1–5) or a description of the different characteristics. When relatively few criteria are involved, it may be easiest to discard all of the criteria where the solutions perform at roughly the same level and focus on those criteria where substantive differences exist. Those differences then form the basis for the decision.

For more complex decision problems, a scoring system must be used, with sets of related requirements assigned a weighting to reflect their relative importance to the organization. Each solution is scored and the top-rated solution or solutions are then investigated in greater detail.

Solution options will sometimes offer benefits (whether potential or actual) to the organization above and beyond those identified in the requirements or the original business case. In many cases, these benefits are not of immediate value to the organization but have the potential to provide future value, as the solution may support the rapid development or implementation of new capabilities (for example, a COTS IT solution may have features that the organization anticipates using in the future).

.2 Assessing Solution Providers

When solutions are in part provided by third parties (who may be involved in design, construction, implementation, or maintenance of the solution or solution components), or when the solution is outsourced, it may be necessary to define requirements to understand what the business needs are in regard to the involvement of that third party.

Non-functional requirements can be used to define the service levels expected of a third party. In addition, there are a number of other requirements that may help to define the relationship:

Knowledge and expertise: A common reason for using third-party vendors is that they can provide knowledge and expertise not available within the business. In such cases, the business analyst should consider whether that expertise will need to be transferred to the business and how capable the provider is of performing that transfer. It may be desirable to target vendors with particular expertise in methodologies or technologies, with the goal of having that expertise transferred to people within the enterprise.

Licensing and pricing models: In cases when a solution or solution component is purchased from or outsourced to an outside vendor, the licensing or pricing model will need to be taken into account. In many cases, solutions that offer similar functionality may differ greatly in their licensing models, requiring an analysis of different usage scenarios to determine which option will provide the best cost/benefit ratio under the scenarios likely to be encountered in the enterprise.

Terms and conditions: Are the services provided by the vendor to be temporary or permanent? The business analyst should investigate whether the vendor's licensing terms and technology infrastructure are likely to present challenges if the organization later chooses to transition to another provider. There may also be considerations regarding the vendor's use of and responsibility for protecting the integrity of the organization's confidential data.

Vendor experience and reputation: The vendor's experience with other customers may provide valuable information on how likely it is that they will be able to meet their contractual and non-contractual obligations. The vendor can also be evaluated for conformance and compliance with external relevant standards for quality, security, and professionalism.

Vendor stability: How certain is it that the vendor will be able to provide the required services in the future? It may be necessary to request that steps be taken to ensure that there are no risks if the vendor encounters financial difficulties and that it will be possible to maintain and enhance the solution even if the vendor's situation changes radically.

7.2.5 *Techniques*

- Coverage matrix
- RFI, RFQ, RFP
- Traceability

7.2.6 Stakeholders

Domain Subject Matter Expert (SME): Provide guidance in the selection process of a solution. May need to include SMEs in procurement, drafting of legal agreements, and in negotiation.

Implementation Subject Matter Expert (SME): Input from SMEs with specific expertise in the solutions under consideration is valuable in the evaluation process. Interoperability with the organization's enterprise architecture needs to be considered.

Operational Support: Provide information on technical constraints that may limit the solutions that can be implemented.

Project Manager: Will need to plan and manage the selection process.

Sponsor: Approves the expenditure of resources to purchase a solution and approve the final recommendation.

7.2.7 Output

Solution Design Assessment: Assess the value delivered by each proposed solution.

Solution Selection Recommendation: A recommendation of the best solution should be made, or a recommendation to terminate the initiative should be given (if no solution delivers enough value to justify being implemented).

7.3 Task: Allocate Requirements

7.3.1 Purpose

Allocate requirements among releases and/or solutions components. This task ensures that the possible release options are designed in a way to maximize the possible business value given the options and alternatives generated by the design team.

7.3.2 Description

Requirements allocation consists of determining when and by which solution component a requirement will be fulfilled. The business value of a requirement will be affected by when and how it is met, and the business analyst must assess the tradeoffs between alternatives in order to maximize the benefits and minimize the costs associated with the delivery of solution functionality.

Requirements can be allocated between solution components, between releases, or both. Requirements allocation typically begins early in the project lifecycle (as soon as the Solution Approach can be determined; see *Enterprise Analysis*) and will continue to be performed until all valid requirements are allocated.

If the solution is being constructed and delivered in an iterative fashion, it is likely that high-level requirements will be allocated early on, and detailed analysis of only the requirements relevant to the current release will be performed. In addition, the

allocation will be revisited and changed as solution development proceeds and additional requirements are identified or known requirements are changed.

As mentioned above, requirements allocation cannot be performed until the broad outlines of a solution have been defined. Every solution will be composed of a set of solution components, which may include:

- Policies and rules that govern the operation of the solution
- People who operate and maintain the solution
- The organizational design supported by the solution
- The software applications used in the solution

During solution design, it may become necessary to revisit the initial allocation of functionality between components as the cost to implement each component becomes better understood. Business analysis must be performed to determine which reallocations have the best cost/benefit ratio.

In addition, the project team may decide to deploy the solution in phases instead of all at once. There are many factors that will guide these decisions, such as the overall project budget, the need to implement a solution, or parts of the solution, by a certain date, resource constraints, training schedule and ability for the business to absorb changes within a defined timeframe.

The business analyst facilitates the decisions about which requirements will be included in each release/phase/iteration of the project. The BA works with business stakeholders and the solution team to allocate the requirements to the solution by reviewing the list of requirements and making sure that each requirement is adequately addressed by the solution.

7.3.3 *Input*

Solution design: Requirements allocation requires that solution design have progressed to the point where it is possible to determine which components will be included in the solution design and for the implementation SMEs to assess the difficulty of designing and implementing those components. It does not complete until the solution design is finalized.

Validated requirements: While some preliminary requirements allocation can be done using requirements that are still in development, it cannot be finished until the solution requirements are validated (note that an invalid requirement is one that by definition is out of scope of the solution). These validated requirements can be high-or low-level. Constraints on the solution implementation may require that requirements be revised.

7.3.4 Elements

.1 Solution Components

The majority of business solutions (with the exception of minor changes or upgrades to an existing solution) will be composed of multiple components. Each component implements a subset of the requirements. Which requirements are implemented by each solution component will be a primary driver of the cost to implement the solution and the benefits delivered by it.

The most common recommendation that a business analyst will be required to make regarding the allocation of requirements is whether a requirement can be most effectively fulfilled manually or through automation. At lower levels, the business analyst may be required to assess the impact of allocating requirements to specific components within each category.

To be sure that a proposed solution meets requirements the business analyst assesses requirements coverage. This means that the analyst looks at each requirement and makes sure that it is covered by the solution design. This assessment may be done using techniques such as traceability or quality function deployment.

Example:

Business process	Where implemented in solution?
2.1 Receive an order	Web pages for Place order Interface to inventory system

As costs and effort are described for each solution component, the business analyst will need to assess whether the allocation represents the most effective tradeoff between delivery options. Considerations are likely to include:

- **Available resources:** The solution providers will be faced with limitations regarding the amount of requirements they can implement based on the allocated resources. In some instances, the business analyst may be able to develop a business case that justifies additional investment.
- **Constraints on the solution:** Regulatory requirements or business decisions may require that certain requirements be handled manually or automatically, or that certain requirements must be prioritized above all others.
- **Dependencies between requirements:** Some capabilities may in and of themselves provide limited value to the organization, but need to be delivered in order to support other high-value requirements.
- **Interaction between components:** As requirements are allocated, it will also be necessary to understand how these components will interact. It is likely that additional requirements will be identified governing the interaction between

components. Interface Analysis can be conducted to simplify these interactions and reduce the chances for problems to arise.

.2 Releases

The stakeholders will consider several factors when deciding which requirements will be allocated to each release. Some example factors are:

- Business priority
- Implementation difficulty
- Risk level
- Technical priority
- Cost estimate

When the system architect reviews the requirements package, the designer in turn will rate the complexity to implement a solution, and may also designate a technical priority for the requirement. There are many factors related to constraints in the technical environment that will dictate if the requirement must be rated high priority by the solution team, even though the business may have rated it low. Upon reviewing the requirements documentation at this stage, the Implementation SMEs may even identify new requirements that must be implemented due to environmental factors or technical constraints. At this stage, the system architect may also be able to provide a projected cost estimate to implement a solution as well as some possible ways to do it (e.g., on line screen, report, interface to another external system, etc.). The system architect will provide this information to the business analyst to include in the design plan.

Once business and technical priorities are established the project team can map out the release plan. This plan will describe the number of design phases the project will entail as well as a mapping of each requirement to the appropriate design phase.

In some cases, the solution provider may choose to deliver one or more “internal releases”, which allow quality assurance activities to be carried out on an interim version of the solution. The planning and deployment of such releases should be left to the discretion of the solution providers, as the business is not impacted by these releases.

Use Case	Business priority	Technical priority	Estimated cost	Release/phase/iteration
Record customer profile	High	Medium	Low	1
Place order	High	High	High	2

7.3.5 **Techniques**

.1 Prioritization Techniques

Prioritization techniques can be used to determine how to allocate requirements among releases. See *Prioritize Requirements* for details.

.2 Traceability

Traceability techniques are used to demonstrate the link from business, stakeholder, or solution requirements to solution components.

7.3.6 **Stakeholders**

Domain Subject Matter Expert (SME): May have recommendations regarding the set of requirements to be allocated to a solution component or to a release.

End User: May require a minimal defined set of requirements to be implemented before a release can be accepted. If requirements are reallocated to a manual process, they may experience a negative impact. End users may have concerns about the frequency of change that they are prepared to accept and will need to be aware of reallocations.

Implementation Subject Matter Expert (SME): Will be responsible for the design and construction of some or all solution components and the estimation of the work required.

Operational Support: Will be impacted by the allocation of requirements to components and releases and need to be aware of when and where requirements are allocated.

Project Manager: Responsible for the work being done by the project team and will need to participate in requirements allocation in order to manage the project scope and work. May need to request reallocation in order to reduce project work or seek adjustments to the scope or budget of the project.

Quality Assurance: Responsible for verifying releases and solution components and will therefore need to know how requirements have been allocated.

Sponsor: Responsible for funding of the project and therefore required to approve the allocation of requirements to components and releases based on the recommendation of the business analyst and the project team.

7.3.7 **Output**

Allocated Requirements to each release and each solution component.

7.4 **Task: Determine Organizational Readiness**

7.4.1 **Purpose**

Determine organizational readiness to effectively operate the new solution.

7.4.2 **Description**

The business analyst works together with the solution team to ensure the success of the implementation. The business needs for a smooth implementation are determined by assessing the organizations readiness to accept/utilize the solution. Implementation needs are documented as implementation requirements.

Organizational readiness assessment determines the impact of the solution on the business area(s) involved. Changes to software may require changes to employee procedures and/or employee job descriptions. Implementation requirements may include data conversion or migration. These changes must be identified and planned.

In addition, communicating the impact of the solution to the business stakeholders is a critical task for the business analyst. The BA understands the solution design and the business requirements and, as such, is in the unique position to clearly articulate how the solution will impact the business area and other stakeholders.

Solution impact communication is a component of the overall requirements communications plan. [See the *Requirements Planning and Monitoring KA – Create a Requirements Communication Plan*] The requirements communications plan should include session time to discuss impacts required as a result of solution implementation.

Effective assessment of the organization readiness and impact communication should result a smooth transition and increased user satisfaction with the deployed solution.

During any solution implementation, there are tasks that require coordination so that the end product is implemented successfully. Tasks will be of a combination of technical and non-technical nature. Business analysts facilitate a smooth implementation from the perspective of the business stakeholders. The BA will perform business impact analysis to identify changes that impact the business processes.

Business stakeholders will evaluate the success of the solution (or project) partially on how well it is implemented. Effective documentation and communication of solution impacts throughout the project assists in enabling necessary change management practices and training requirements for solution implementation.

Communicating the solution impacts is an ongoing and iterative activity done in parallel with (but not limited to) tasks described in:

- Requirements Analysis
- Requirements Communication and Management
- Elsewhere in Solution Assessment and Validation

Solution impacts can be both positive and negative. Success factors rely heavily on the ability to identify and effectively communicate the impacts to all stakeholders.

The business analyst may be responsible for all task deliverables or may partner with another group.

7.4.3 *Input*

Business Architecture: Describes the organizational units that will be impacted by the solution.

Solution Scope: used to determine which components of the business architecture are impacted. Depending on when this task is performed, this may represent a planned scope or an actual designed and constructed solution.

7.4.4 *Elements*

The business analyst will work with the solution team to ensure the solution is successfully implemented. An implementation plan should be created to outline the steps to be taken and the order in which they must be executed. This plan may consist of both technical and non-technical tasks. It is the business analyst's responsibility to work with the solution team to make sure the implementation is carried out according to the plan.

Dependencies/sequencing. If it is important that certain aspects of the implementation are carried out in a particular order, the business analyst must make sure that all interdependent items are accounted for and in the right sequence in the plan.

External considerations. There may be organizational restraints or policies that must be adhered to in any implementation. The business analyst must be aware of these and incorporate them into the plan. Items such as freeze periods for implementation, general company policies, and any phased-in activities must also be considered. Business Analysts assist in planning the timing of the implementation within a business cycle to cause minimal disruption of business activities.

End user training. The business analyst may develop training material and conduct training for users on the new software features.

Software support. The business analyst may assist with the training/support of Help Desk employees to prepare them to support the deployed solution. The BA may also assist with the transition of the solution software to the maintenance team.

In order to identify impacts the business analyst should understand what changes will occur in the business area, technical infrastructure or processes and how these affect other business units or operations.

All project stakeholders may have some integration or impact with solution implementation and should be addressed as part of the communications plan. [e.g., new software installed in your HR division could impact an Employee Service Center who uses the same programs to access employee information and therefore communication and training should include specifics for all groups who might interface with the new system.]

There are many ways to assess the readiness for and impact of a change. The Business Analyst should use the technique that works best for the business stakeholders and the

solution to be implemented. These techniques help to form the basis for your solution impact communications.

Example considerations for impact analysis:

- Cultural or organizational impact
- Strategic impact
- Business impact (operational, processes, procedures, rules, etc.)
- Technical impact (systems, maintenance, usability, etc.)
- Utilize bug or defect databases to assist in identifying problems and engaging the change management process prior to implementation
- Apply human factor analysis to identify and communicate usability impacts
- Simulate impacts (both positive and negative) for stakeholder awareness (e.g., HR adds new employees to gauge impact)

The BA may also use AS IS process documentation to help assess the business changes that will be required.

7.4.5 **Techniques**

.1 Force Field Analysis

Force field analysis is a graphical method for depicting the forces that support and oppose a change. It involves identifying the forces that support and oppose a change, depicting them on opposite sides of a line, and then estimating the strength of each force in order to assess which set of forces are stronger. Once this analysis is complete, the next step is to look for ways to strengthen the forces that support the desired outcome or generate new forces.

.2 Stakeholder Impact Analysis

As described in the *Requirements Elicitation KA* and *Requirements Analysis KA*, the business analyst will have uncovered and documented information regarding the user profiles which identify the characteristics of the end users who will interact with the system. Review stakeholder analysis as described in the *Business Analysis Planning and Monitoring KA*. The stakeholder listing will be used as input to guide the solution design. Some of the characteristics captured that the Business Analyst and the solution team must consider are the following:

Functions – What processes involve the stakeholder?

Location – Where are the end users located, are there global implications?

Access/authority – What is each user class allowed to do? What data are they allowed to see/update?

Number – How many end users are there in the class?

Tasks – What tasks are performed by the user class?

Concerns – What is this group’s usability requirements, preferences, and their proficiency level regarding interaction with computer systems.

7.4.6 **Stakeholders**

Domain Subject Matter Expert (SME): Provides information on the likely impact to stakeholders and the capabilities of the enterprise.

Implementation Subject Matter Expert (SME): Supplies information on the skills and capabilities necessary to successfully operate the new solution.

Operational Support: Provides information on their ability to support the operation of the solution.

Project Manager: Requires the organizational readiness assessment to determine if additional project work is required for a successful implementation of the solution.

Sponsor: Authorizes and champions action to resolve problems identified in the organizational readiness assessment.

7.4.7 **Output**

Organizational Readiness Assessment: Used to identify transition requirements. May lead to revisions in solution or project scope.

7.5 **Task: Define Transition Requirements**

7.5.1 **Purpose**

To define requirements for capabilities needed to transition to a new solution.

7.5.2 **Description**

In most cases, a solution is implemented into an enterprise in order to enhance or replace an existing solution. During the transition period (while the new solution is implemented), the enterprise may need to operate both solutions in parallel, move information between the new and old solution, conduct training to enable stakeholders to effectively operate the new solution, and so forth. In addition to developing the solution itself, the implementation team is likely to have to develop additional capabilities to support this transition.

These capabilities are requirements, as stakeholders need to be able to make this transition successfully—but they are different in nature from other kinds of requirements, as they cannot be defined until a solution has been designed. These requirements also have a different lifespan from other types of requirements, as they remain relevant only during the transition period between solutions. They are

accordingly defined as *transition requirements* to distinguish them from other levels of requirement.

Transition requirements are elicited, analyzed, managed, and communicated by performing the same tasks as for other requirements. The difference is not in the methods for defining them, but in the inputs, the nature of transition requirements, and in that they cease to be relevant once the existing solution is eliminated.

In instances where there is no existing solution, and the new solution is adding a entirely new and unprecedented capability to the enterprise rather than extending and improving an existing capability, then transition requirements do not need to be developed (they are included in the solution requirements).

7.5.3 **Input**

Deployed Solution: The deployed (or existing) solution will be investigated to understand what needs to be transitioned to the new solution. It may be necessary to elicit a description of the capabilities of the solution and perform some analysis tasks in order to ensure that current capabilities are fully understood.

Solution Design: The design for the new solution must be in place to allow the business analyst to assess the transition.

Organizational Readiness Assessment: Used to identify areas where the organization needs to add new capabilities to manage and operate the new solution.

7.5.4 **Elements**

The business analyst must examine the solution currently in place to identify features that are implemented in a substantially different fashion in the new solution, information that needs to be transferred to the new solution, and other areas of significant change. In terms of the elements of a business model, likely sources of transition requirements include:

Data. The actual data and metadata managed by the old system needs to be evaluated to determine whether it must be archived or transferred to the new solution. Rules for conversion of this information will need to be developed, and business rules may need to be defined to ensure that the new solution interprets the converted data correctly.

Ongoing work. It is likely that work will be ongoing in the old version of the solution at the time the new version is implemented. Plans for transferring this ongoing work must be developed. Options may include finishing existing work using the current solution and starting new work in the new solution, holding the processing of new work for a period of time, or converting all work at the time of implementation.

It is common while performing this task to identify functions in the existing solution that cannot be performed by the new solution. These newly identified requirements fall outside the scope of this task and are treated as any other requirement.

Organizational change. The BA may be involved in developing a process for managing the people side of change related to the solution. Organizational change management generally refers to a process and set of tools for managing change at an organizational level. The BA may help to develop recommendations for changes to the organizational structure or personnel, as job functions may change significantly as the result of decision or work being automated, new information may be made available to stakeholders, and new skills may be required to operate the solution.

7.5.5 *Techniques*

.1 Business Rules

Additional business rules may be defined to assist in migrating data, or to manage work migrated from the existing solution (as it is possible that different rules may apply depending on when the work was performed).

.2 Data Model

Physical data models of the existing and new solutions will be compared to enable a mapping between the two.

.3 Process Models and Organizational Models

These may be analyzed to identify the differences between the existing and new solutions.

7.5.6 *Stakeholders*

Customer: May experience a negative impact during the transition based on the transfer of ongoing work, or if information is incorrectly transferred. The goal in transition is generally to reduce or minimize this impact.

Domain Subject Matter Expert (SME): Will provide information on the existing solution and assist in verification and validation of the transition requirements.

End User: If the existing and the new solution are both in use for a period, they will need to know how to co-ordinate between them.

Implementation Subject Matter Expert (SME): Will be the source for many of the transition requirements.

Operational Support: May be impacted by the need to operate two solutions simultaneously.

Project Manager: Will need to plan for the work required to implement the transition requirements. This may impact the project scope.

Regulator: May require that records of the transition requirements and process be retained for long-term review and compliance with regulations.

Quality Assurance: Will verify that the transition has been performed correctly, including the development of test plans.

Sponsor: Will need to be informed of the potential impact of the transition on the costs and benefits of the new solution.

7.5.7 Output

Transition requirements. See Glossary.

7.6 Task: Validate Solution

7.6.1 Purpose

Validate that a constructed solution meets the business need and determine the most appropriate response to identified defects.

7.6.2 Description

Solution validation is the business analysis work required to ensure that a delivered solution meets the business needs on an ongoing basis. It has four major components:

- Define acceptance criteria for the solution
- Investigate the cause of defects in the solution
- Assess the impact of defects
- Recommend resolutions of defects

Of these four, the first only occurs before a solution or solution component is implemented. The others may occur before or after implementation.

The business analyst validates that the solution will meet the requirements and provide business value to the business stakeholders. Problems that are identified during this validation will be reported and prioritized for correction (defect reporting). When a problem is identified with the solution (i.e. a failure to meet a requirement whether or not the requirement was correctly specified) the business analyst will be able to help the team determine the most appropriate action.

The definition of quality varies from organization to organization. Quality may be defined as “the solution meets the approved requirements” or it may be defined as “the solution behaves as the users expect it to”. Whatever the definition of quality that has been agreed upon by the team, the BA works with quality professionals to assure that the solution satisfies this requirement. Assisting the business stakeholders with UAT has derived the maximum customer/client/stakeholder satisfaction.

To seek a perfect solution that meets all the quality criteria is often an impossible task. The team will use a risk-based approach during the quality process in order to meet project golden triangle: delivery according to schedule, within budget, and meeting the required quality standard. Business Analysts are a critical resource to QA because BAs review all quality deliverables (i.e. test plans, test cases, test procedures) to assure their consistency with requirements.

As discussed elsewhere in the BABOK, there is a distinction between validation and verification. Solution verification, also referred to as quality assurance or (in the context of software) as testing, falls outside of the scope of the discipline of business analysis.

7.6.3 *Input*

Constructed Solution: Validation can only be performed against a solution that has been built to ensure that it is meeting the business need. The solution may or may not be in actual use by the enterprise.

Prioritized and validated requirements: The priorities are needed to determine which requirements are candidates for acceptance criteria. The requirements are used to determine whether outputs of the solution fall within acceptable parameters.

Quality Assurance Plans: QA plans may be reviewed to ensure that the planned set of QA activities will sufficiently assure the organization that the solution is in conformance with the requirements.

7.6.4 *Elements*

.1 Define Acceptance Criteria

The definition of acceptance criteria requires that the business analyst:

- Determine the minimal set of requirements that must be implemented into a solution or solution component before it can be used effectively by the business.
- Assess whether the quality assurance plans for that solution or solution component sufficiently address the risk of defects in the solution going undetected.

Requirements prioritization is a necessary precursor to defining acceptance criteria. The business analyst will use the prioritized requirements and the solution design to determine the necessary performance levels for the solution and its components to ensure that those requirements are met.

Once those criteria are defined, quality assurance will develop appropriate quality assurance plans to assess whether the solution and its components meet them. The business analyst must assess those plans to ensure that the tested scenarios provide enough information on the performance of the solution to ensure an acceptable level of risk to the business.

.2 Investigate Defective Solution Outputs

When evaluating a solution, we identify defects in the solution by looking at cases where the outputs from the solution are below an acceptable level of quality. First, it is necessary to define what is considered to be a “defective” output. For example, a requirement might be considered to be “defective” if it is changed more than once before it is implemented, or if it is rejected by reviewers after the second round of reviews. Once this is defined, the next step is to determine how many defective outputs are considered acceptable to the business. In practice, it is rarely if ever possible to

eliminate all defects. Common applications of this principle include measures of system uptime, time to resolve an identified defect, and other work where the results can be clearly quantified.

When it can be determined that the solution is consistently producing defective outputs, root cause analysis should be performed in order to identify the cause of the problem.

.3 Assess Business Impact of Defects and Issues

When defects are identified, the business analyst must review the defect to determine the likely impact it will have on the operation of the organization. This requires determining the severity of the defect, the probability of the occurrence of the defect, the severity of the business impact, and the capacity of the business to absorb the impact of the defects. The business analyst may be required to identify which defects must be resolved and which can be mitigated through workarounds or other approaches.

.4 Recommend Measures to Mitigate Impact

If a defect cannot be resolved in a timeframe that is acceptable from a business perspective (due to complexity, because the cause cannot be identified, because it is not a sufficiently high priority, or for any other reason) measures to mitigate it must be identified. These may include additional quality control checks, new manual processes, removal of support for certain exception cases, or other measures.

7.6.5 **Techniques**

.1 Root Cause Analysis

Root cause analysis techniques are used to ensure that the underlying reason for a defect is identified, rather than simply correcting the output (which may be a symptom of a deeper underlying problem).

.2 User Acceptance Testing

User acceptance testing is an approach to software application testing that focuses on testing to ensure that acceptance criteria are met and that the application meets the usability needs of the people who will work with it.

.3 Defect and Issue Reporting

This technique is used to track identified defects to ensure that they are resolved.

7.6.6 **Stakeholders**

Domain Subject Matter Expert (SME): Will provide input into the development of business acceptance criteria.

End User: May assist in the development of business acceptance criteria and participate in acceptance testing.

Implementation Subject Matter Expert (SME): Will support the validation process, correct identified defects, and participate in the defect prioritization and resolution process.

Operational Support: Will support the deployment of defect resolutions.

Project Manager: Responsible for co-ordination of work between the parties involved in the validation process.

Quality Assurance: Will develop and execute test plans based on the requirements and on the acceptance criteria.

Regulator: May review the results of acceptance testing and require that records be kept regarding the process and outcomes.

Sponsor: The sponsor must approve the acceptance of the solution.

7.6.7 **Output**

- Validated solution
- Identified defects
- Mitigating actions

7.7 **Task: Evaluate Solution Performance**

7.7.1 **Purpose**

To assess the value of solution in use within an organization to understand the value they deliver and identify opportunities for improvement.

7.7.2 **Description**

Solution evaluation involves investigating how a solution is actually used after it is deployed to the business, and assessing the impact it has had, both positive and negative. It may also be referred to as post-implementation assessment.

There are two different perspectives that can be relevant to solution evaluation. A solution may have been implemented in order to accomplish a well-defined set of business goals and objectives. In this case, evaluation consists largely of evaluating how well the solution meets those goals and objectives. It is also possible, especially if a solution has been in use for some time, that no clear set of goals and objectives are available, or that there are no agreed-to performance metrics for the solution. In this instance, a business analysis effort may be required to define the goals, objectives, and metrics that the solution should be measured against.

In either case, it is likely that the solution will have been adapted and modified by stakeholders over time in order to resolve problems that have occurred or to allow new uses of the solution. In order to properly evaluate the solution, it is also necessary to

understand where this has occurred and assess the benefit that these changes bring to the organization.

In order to accomplish this task, the business analyst must:

- Measure the performance of the system against its defined performance metrics
- Assess the qualitative benefits and drawbacks of the solution
- Assess the constraints that the current solution imposes on the business

7.7.3 *Input*

Business Requirements. The performance of the solution will be measured against the business requirements that have been defined. Without clear business requirements it is impossible to effectively assess the solution's performance, since there are no goals that it is supposed to meet.

Deployed Solution: This task cannot be performed until the solution is in actual use.

Deployed Solution Performance Metrics: These represent the criteria by which the performance of the solution is to be assessed. They may be quantitative (measures of time, volume, revenue, errors found, or other information for which hard numbers are available) or qualitative (user or customer satisfaction, recommendations, or other measures which summarize the opinion of stakeholders).

7.7.4 *Elements*

.1 Assess Value Delivered By Solution

The business analyst must gather the actual metrics that describe the performance of the solution, using the defined metrics. The solution may have the capacity to generate reports on some or all of the defined metrics, but where it does not, it will be necessary to gather qualitative and quantitative performance information.

Significant underperformance against a defined metric needs to be investigated to determine the root cause. If the root cause is a factor that is potentially under the control of the enterprise, addressing it may become a business need.

Significant overperformance against a metric also should be investigated. It may indicate that resources devoted to the solution can be used elsewhere, or that the value of the solution to the business was underestimated. It is likely that there are lessons that can be learned and applied elsewhere.

.2 Assess Solution Metrics

In some cases, it is possible that the performance of a solution will be considered excellent, based on the defined performance metrics for that solution, but the business goals and objectives that those metrics are supposed to support is not being met. When this happens, it likely means that the metrics themselves are the problem. An analysis

effort to identify and define the correct metrics, including modification of the solution to support those metrics, may be required.

.3 Solution Replacement or Elimination

Eventually, it will be necessary to consider the replacement of a solution or solution component. This may occur because an IT system or other technology component has reached the end of its useful life, services are being insourced or outsourced, the solution is not fulfilling the business goals set for it, or any number of other reasons.

The Enterprise Analysis KA describes the tasks involved in building a business case for implementing a new solution or solution component. Issues that may impact the replacement or elimination decision may include:

- **Ongoing cost vs. initial investment:** It is common for the existing solution to have increasing costs over time, while alternatives have a higher investment cost up front but lower maintenance costs.
- **Opportunity cost:** Replacement of an existing solution is unlikely to produce high initial returns on investment (as it will likely replicate existing capabilities, at least initially, rather than create many new ones). As the effort to develop a replacement will pull resources away from other initiatives the organization may be considering, the potential benefits from those initiatives need to be considered to determine if they are greater than the benefit of replacement (this is generally not a consideration when considering elimination).
- **Necessity:** Most solution components have a limited lifespan (due to obsolescence, changing market conditions, and other causes). After a certain point in the lifecycle it will become impossible to maintain the existing component.
- **Sunk Cost:** Sunk cost is a psychological phenomenon that may make it difficult for stakeholders to objectively assess the rationale for replacement or elimination, especially in the late stages of an implementation or shortly after it is completed. Sunk cost describes the money and effort already spent on an initiative. There is a tendency for people to feel that replacement or elimination cannot be justified based on the amount already spent on a solution. As this investment cannot be recovered, it is effectively irrelevant when considering future action. Decisions should be based on the future investment required and the future benefits that can be gained.

7.7.5 *Techniques*

.1 Cost/benefit analysis

A cost/benefit analysis is typically used to determine the financial impact of the solution on the organization. While critical, it is important to ensure that non-financial costs (including opportunity cost) and benefits are evaluated.

.2 Focus Group

A focus group is a useful technique to gain a detailed qualitative understanding of the value of a solution to a group of stakeholders. It can be used to uncover new information beyond the scope of previously defined metrics.

.3 Observation

Observation allows a business analyst to see how a solution actually operates, and may reveal aspects of the solution that are not being reported.

.4 Retrospective

Retrospectives are used by team members to understand how their work is performing and to assess opportunities for improvement.

.5 Survey

A survey enables gathering quantitative or qualitative information from large numbers of stakeholders. If a survey is properly designed, and is responded to by a statistically significant and representative sample of the stakeholder population, it will accurately reflect the opinions of the entire population. Surveys are not especially effective at eliciting unexpected information.

7.7.6 Stakeholders

Domain Subject Matter Expert (SME): May provide recommendations for improvements.

End User: responsible for the day-to-day operation of the solution and a major source of information on problems or defects.

Operational Support: Will be involved in monitoring the performance and effectiveness of a solution or its components.

Regulator: May have requirements regarding the performance of a solution that must be met on an ongoing basis.

Sponsor (Business Owner): The person responsible for the operation of the solution from a business perspective will be responsible for deciding if the solution evaluation warrants the initiation of a change initiative.

7.7.7 Output

Solution performance assessment: describes how the solution is performing in relation to business goals and objectives. May be used as an input to Identify Business Need (see *Enterprise Analysis*).

7.8 Technique: Defect and Issue Reporting

7.8.1 Purpose

Issue Reporting provides an organized approach to tracking, management, and resolution of requirements issues throughout the requirements process.

Management of issues is important so that they can be resolved in a timely manner to ensure there is no impact to the requirements process and subsequent design and realization phases.

Defect Reporting provides the same benefits as Issue Reporting, but within the Solution Assessment and Validation Knowledge Area, during the task Validate Solution.

Defect Management is important so that defects can be analyzed, dispositioned, and resolved in a timely manner to ensure that the business has been provided with a solution that meets the agreed-to requirements.

7.8.2 Description

Issue and Defect Reporting includes status updates, assigning of issue/defect related actions that are required to team members and tracking the actions' Estimated Completion Dates (ECDs), resolution results, actions and decisions taken, priority, and impacts.

Communication of Issues and Defects and their status across the team via regularly scheduled reviews and provision of minutes along with the updated issue/defect report (a register/list) is essential to Issue and Defect resolution.

7.8.3 Elements

The Business Analyst should capture key details about the issue/defect to ensure precise ongoing tracking from initial identification to closure:

Description - a clear and concise description of the issue/defect identified

Ensure that the team understands the issue/defect and that there is no ambiguity.

- For an issue, ensure that it is requirements related, and if it is not, provide the information to the project manager for further management of the identified issue. An example of a common requirements issue is lack of clarity of a specific business requirement.
- Raised By - who identified it
- Date Identified
- Impact -

- Issue – determine the impact to the requirements/requirements process if the issue is not resolved by the Need by Date. Impact may be assessed based on schedule, cost, scope, as examples.
 - Defect – determine the impact to the solution if the defect is not resolved by the Need by Date. Impact may be assessed based on schedule, cost, scope, as examples.
- Priority – determine priority of issue/defect based on impact. An example of a priority scale that can be used is: Critical, High, Medium, Low.
- Need by Date –
 - Issue - date that issue needs to be resolved by so that there is no impact to the requirements/requirements process.
 - Defect - date that defect needs to be resolved by so that there is no impact to additional testing during the Validate Solution task.
- Owner – one team member who is assigned to manage the issue/defect to closure. This may not be the same person who identified the issue/defect and may not be the same person(s) who are assigned actions to resolve the issue/defect. May very often be the Business Analyst in the case of an issue, and may very often be the Development Lead in case of a defect.
- Status – the current status of the issue/defect. An example of statuses that can be used are: Open, Assigned, Resolved, Cancelled.
- Resolution Date – date that issue/defect is Resolved (or Cancelled).
- Action(s) Required to Resolve-
- Action Needed to Resolve – details of what action needs to be taken to resolve the issue/defect. May be more than one.
- Responsible for Action - person assigned to take the specific action.
- Estimated Completion Date (ECD) of Action.
- Status of Action - the current status of the action. An example of statuses that can be used are: Open, Assigned, Complete, Cancelled.
- Results (Issue) or Retest Results (Defect)-
 - Issue – once the issue has been resolved, capture the results of the resolution.
 - Defect - once the defect has been resolved, capture the results of the retest: e.g. Pass/Fail. If the result is Fail, then the Owner will lead the analysis to understand what further actions need to be taken to resolve.

- Decisions Taken – capture any decisions taken (by whom, and when) for the issue/defect. This will help to understand why the results were deemed sufficient to resolve the issue/defect.

Once the above details of the issue/defect have been captured, the ongoing tracking and management of the details must be done until the Issue/Defect is either Resolved or Cancelled (not determined to be an issue/defect any longer).

It is essential that the team understand each issue/defect, that each issue/defect has actions against it moving to resolution by the “Need by Date”. A regularly scheduled review of the issue/defect report by all relevant parties ensures visibility and focus on the issue/defects. The Issue/Defect Report should be readily available to be accessed by all team members, and kept up to date with current details after each review of the issue/defects with the team.

Issue/defects that are unable to be actioned and resolved by the team should be escalated by the Business Analyst to the Project Manager. If there is no PM, then the issue/defect should be raised to the next level of authority for the project such as the Business Sponsor or IT Manager, depending on the nature of the issue/defect.

An additional element that can be useful to gauge how the project is doing regarding issue and defect resolution is to decide on a set of metrics/key performance indicators (KPIs) and then measure and report them.

Examples of useful KPIs are:

- Number of issues/defect by status, priority.
- Cycle time for each issue/defect (number of days it took from Date Identified to Resolution Date).

7.8.4 Usage Considerations

.1 Advantages

Issue/Defect Reporting and Management provides an organized method for tracking, and reaching the goal of the resolution of Issues and Defects. It provides a mechanism to communicate issues/defects across the team, and helps to maintain focus on open issues/defects until they are resolved. The regular review of the issues/defects together with the team also helps to focus and is necessary to ensure resolution.

Commitment is required by the Business Analyst, Business Stakeholders, and IT Development (for Defects) and other impacted team members to ensure Issue and Defect Reporting and Management leads to:

- Resolutions in a timely manner that eliminate or minimize negative impacts.
- Resources allocated to resolution as required.
- Determine root causes of issues/defects so that they do not recur.

Issue and Defect Reporting and Management is effective for all sizes and types of projects.

For smaller projects with a small team, a simple spreadsheet suffices to track them.

For larger projects with a large dispersed team, an automated solution can help.

.2 Disadvantages

In the following situations, it may be challenging to use the technique:

- If regular prioritization and management of issues/defects is not done, the lists of issues/defects may be neglected.
- If key team members are not committed to be available to discuss regularly the lists of issues/defects to determine actions to be taken, then progress to resolve them may become very slow to non-existent.
- If there is a strict deadline to deliver the solution, then issue/defect management may become a lower priority. Often, root cause analysis of the issues/defects can take more time and resources than the project is willing to provide.
- If continuous accountability, ownership, and focus is not put on issue/defect reporting and management, and each action does not have a person responsible and ECDs, then progress will not be made to resolve the issues/defects.

7.9 Technique: RFI, RFQ, RFP

7.9.1 Purpose

If the solution team thinks that a potential solution is available from an outside party, a RFI (request for information), RPQ (request for quotation), or RFP (request for proposal) is created. These documents may also be used to gather information about vendors or other potential solutions providers who would be willing to create/develop the solution for the organization.

7.9.2 Description

A Request for Proposal (RFP) is sent to potential solution providers or vendors. The company's purchasing agent, legal department or procurement organization is usually the owner of this process. One business analysis activity is research to find these potential vendors. The research includes identification of existing solutions that may be applicable to the business stakeholder needs or identification of outside organizations that may be willing to develop/build a custom solution.

The BA can use industry information listings or references to identify possible solution providers and/or send a formal or informal RFI. An informal RFI can be phone call or email to solicit information and rule out the unsuitable providers. A RFI must minimally include the high level requirements. The outcome of the RFI response must minimally include whether the provider has a solution, a pricing model and major solutions features.

It is important to note that the solution team should carefully consider how each vendor solution will be evaluated before they evaluate the product offerings. Often stakeholders can be impressed by a product demo when the underlying product does not truly meet the business need. BAs must develop evaluation criteria based on the business requirements before looking at available products.

7.9.3 *Elements*

It is important to note that the solution team should carefully consider how each vendor solution will be evaluated before they evaluate the product offerings. Often stakeholders can be impressed by a product demo when the underlying product does not truly meet the business need. BAs must develop evaluation criteria based on the business requirements before looking at available products.

This task is to compile all of the requirements, business area background and related information into an RFP to ask for a proposal. The company's purchasing agent, legal department or procurement organization is usually the owner of this process. One business analysis activity is to provide well documented requirements in a format to which the vendor will be able to respond. In addition, business analysis skills may be used to help determine how the responses will be evaluated.

The evaluation criteria may simply be based on cost of the implementation or total cost of ownership. More often the evaluation criteria will include an objective measurement (weighting criteria) of how well the proposed solution meets the requirements as specified in the RFP. The more objective the measurement and vendor evaluations, the more objective the final recommendation. When developing RFP questions, avoid using closed ended questions.

Most RFPs include many sections or components. Examples include:

- User or Business Requirement for the particular problem/solution area
- Business strategy or business architecture description
- Technical environment constraints/limitations
- Legal, regulatory, or government requirements

The solution provider/vendor may be asked to submit specific items. Examples include:

- Solution cost or total cost of ownership
- Alignment with overall business strategy
- Solution architecture, performance, quality, and support
- Solution's extensibility and integration
- Provider's sustainability, and or provider's profile and reputation

Once RFP responses have been received from vendors, the next task is to evaluate the responses. The BA should involve all stakeholders in this process. Based on the information provided in each proposal, the project team can determine the extent to which the solution provider can meet the requirements. The responses should also contain specific product cost information along with total cost of ownership, and alignment with overall business strategy. The solution team should evaluate the solutions' extensibility, integration, architecture, and performance. A purchasing agent can aid in evaluating provider's profile, sustainability and reputation.

7.9.4 Usage Considerations

Advantages – allows for an objective comparison of competing vendor solutions.

Disadvantages – takes time for RFP preparation, vendor response, review of responses, and final selection.

7.10 Technique: Structured Walkthrough

7.10.1 Purpose

The purpose of a structured walkthrough is to review a project deliverable and is generally regarded as an efficient, effective method of catching errors, oversights and misconceptions. The technique has been around a very long time; but remains one of the most effective methods to detect errors and omissions. However, it should be used only to **detect** errors and omissions, not to **correct** them.

The business analyst can use structured walkthroughs as one of their tools to help answer the questions of “Validation” “**Are we building the right product**” and “Verification” “**Are we building the product right**”. A structured walkthrough is essentially a more formal version of a requirements review, and it is likely these techniques will be merged following the public review.

7.10.2 Description

A structured walkthrough is an organized peer review of a project deliverable with the objective of finding errors and omissions. It is considered a form of quality assurance.

The basic execution of a “walkthrough” involves the author of the deliverable explaining its content step by step to a small peer group. During this review, the members of the group will offer their comments. An interesting phenomenon very often encountered in this process is that the author will be the one to identify the error or omission! Regardless of who identifies the defect, the scribe will record all of them. The author will receive a complete list at the end of the walkthrough session.

An underlying concept of structured walkthroughs is that people often cannot see their own mistakes, so all deliverables should be reviewed by someone other than the author. The structured walkthrough is one technique that the business analyst can use to accomplish such a check.

7.10.3 *Elements*

The use, organization, degree of formality and the participants involved in structured walkthroughs will vary considerably among organizations.

Structured walkthroughs can be conducted during any project phase and are used to review a wide variety of deliverables. Business analyst use of walkthroughs is primarily concerned with requirements related deliverables.

In some organizations and on some projects, it may be useful to include end users in some walkthroughs. Management typically does not participate in structured walkthroughs; but may be called on to do so on small projects and/or in small organizations. If managers are involved, they must forget that they are managers and function as peer reviewers if the structured walkthrough is to be effective. Otherwise the other participants, particularly the author, may alter their behavior to the detriment of the results of the walkthrough.

Although organizations will often define different roles to participate in the structured walkthrough, a typical set is provided below.

Author - responsible for requesting the walkthrough when ready. This is the creator of the deliverable under review.

Presenter (often the author) - develops the agenda for the walkthrough and presents the deliverable being reviewed.

Facilitator/Coordinator - facilitates and manages the meeting.

Reviewer(s) - evaluates the deliverable and may also check to see if it meets organization standards.

Standards Representative – checks to insure that the deliverable meets organization standards

Scribe/Recorder/Secretary - records the errors and other technical comments, suggestions, and unresolved questions.

Note that the business analyst may fill a number of these roles depending on the particular deliverable being reviewed. Users may also be called upon to fill some of these roles. It must be remembered that these are “roles”. A single person may be responsible for multiple roles.

Some organizations feel that the reviewers should do advance preparation for the walkthrough while others do not require this; preferring to have the reviewers come with an open mind. At any rate, the advance preparation should involve no more than an hour or two of reading the deliverable.

A structured walkthrough will usually involve anywhere from 3-6 people filling the above mentioned roles and will usually last from 1-2 hours. This time frame will necessarily limit the amount of material that can be reviewed in any one session.

The actual execution of the walkthrough usually proceeds with the author/presenter explaining the deliverable in detail with the reviewers asking questions as this is done.

The output of the walkthrough will usually include:

- List of errors/omissions and the date
- List of participants and the deliverable reviewed
- Indication of deliverable status
- Accepted
- Minor corrections needed
- Major errors requiring another review
- Indication of the need for a further review
- Signoff (when appropriate) form

The structured walkthrough process can be a very formal one with extensive record keeping and accountability or can be a very informal one, depending on the organization and its culture. Regardless, the following should be kept in mind if structured walkthroughs are to be utilized:

- Observe a time limit on the meetings
- Remember the purpose is error detection, not correction
- Review the product, not the author
- Managers should usually not be involved
- The walkthrough is NOT a performance review

One factor the business analyst should consider is the tradeoff between the value of the walkthrough and its cost. If the cost of a walkthrough is computed as the number of person hours needed to prepare and hold the review; then the business analyst can compare that to the value of finding requirements or other errors early in the project life cycle. If we assume 5 people attend the walkthrough with 4 hours for each along with an additional 2 hours for the author to get ready, there is a total of 25 hours. How many requirements defect/errors must be detected to make the walkthrough worth the effort?

7.10.4 Usage Considerations

Structured walkthroughs offer considerable advantages to the business analyst in detecting errors/oversights/misunderstandings very early in the project. Any potential

disadvantages are people related and should be able to be minimized with proper planning on the part of the business analyst.

.1 Advantages

- An extremely effective approach to detecting “errors” very early in the project life cycle when the cost of detection and correction is at a minimum.
- Structured walkthroughs can provide a very effective learning tool if younger, less experienced business analysts are included as participants.
- Structured walkthroughs can be used as a tool to encourage (and enforce!) standardization if this is desirable in the organization.
- Promotes project continuity and reduces project risk since the walkthroughs force multiple people to become familiar with the deliverables under review.
- Obtain input from reviewers with varied backgrounds, experience, and expertise.

.2 Disadvantages

There are some potential disadvantages sometimes encountered with using structured walkthroughs. Among these are the following:

- The author of the deliverable may get “defensive” when they perceive any criticism directed toward their effort. This is also referred to as the “ego” problem.
- Managers may perceive the walkthrough to be a tremendous waste of time due to the number of people sitting in the meeting, along with the preparation time for all participants.
- Some organizations may try to use the walkthrough as a performance review of the author
- Some authors become very nervous due to the pressure of the walkthrough reviews.

7.11 Technique: User Acceptance Testing (UAT)

7.11.1 Purpose

There are a number of different levels and types of testing commonly seen in software development including unit, integration, system, performance, security, etc.

UAT is an additional form of software testing normally conducted by the user or their representative, the business analyst.

The main purpose of UAT is to allow the user and their representative, the business analyst, to prove that the new system meets essential user and performance requirements. UAT should be conducted to measure the user's satisfaction as well as test business functionality. It is also used to “prove” that the software will work in the

intended business environment and with the existing business processes – in other words, in the “real world” environment.

UAT usually takes place after the software has been completed from the developer’s view. With some of the more iterative types of software development, this may not always be the case and UAT can be conducted on an iterative basis. UAT is also used in the acquisition of purchased software and is then usually done prior to final purchase.

In either case, UAT is usually the last step prior to the actual live installation and use of the software.

Responsibility for UAT has been increasingly assumed by business analysts in many organizations. They may actually perform the UAT, or they may be responsible for seeing that it is accomplished in a professional manner.

A major purpose of UAT is to catch errors or assumptions that will not be caught by the other types/levels of testing.

7.11.2 Description

UAT is often known by different names such as Acceptance testing, Application testing, User testing, Beta testing and others. By any name, this type of testing is based upon previously identified business requirements.

UAT is not intended, nor should it be used, to replace any other type or level of software application testing.

UAT may be defined as a system test of the new or modified software using an environment, processes and inputs that simulate the expected actual working world as closely as possible.

UAT is a critical part of the systems development life cycle. “Acceptance” criteria should be designed and developed in precise detail to define the means by which “Acceptance” will be evaluated.

The focus of the business analyst during UAT should be on a production like simulation of the software by getting as close as possible to exact real world usage of the application.

A major difference between developer testing and UAT is that the developer tests the code and technical documentation; while the UAT business analyst tests the application against the business requirements. The UAT is the last step prior to actual implementation of the software application. Once the UAT is “passed”, the software is “accepted” and signed off as meeting the requirements.

7.11.3 Elements

As we saw above, the business analyst is increasingly involved in the UAT process. Their exact role will naturally vary from organization to organization. In some cases they may be completely responsible for planning and carrying out the UAT. In other instances,

the business analyst may only be responsible for insuring that the UAT is planned and executed properly. Most business analyst roles will fall somewhere in between these two. In the remainder of this section we will briefly examine the UAT process keeping in mind the business analyst role.

Steps in the UAT process will usually include the following:

- 1) Plan the testing
- 2) Design the test cases
- 3) Select the test team
- 4) Run the tests and compare the actual results to the expected
- 5) Document any defects and omissions identified
- 6) Meet to evaluate results and identify resolution
- 7) Iterate steps 4-6
- 8) Sign Off

Key UAT related deliverables will usually include:

- 1) A UAT Test Plan to outline the testing approach and resources
- 2) UAT Test cases – To effectively test the application and “prove” that it works as the users expect
- 3) The Test Log – A recording of the environment, all inputs and results
- 4) User Sign Off – Indicating application acceptance (note the criteria!)
- 5) Accepted software application

By basing the UAT test cases on the user requirements previously developed by the business analyst and reviewing the expected results with key users; the business analyst will be conducting a review and verification of the requirements and user expectations for the application. The business analyst must insure that the UAT has been designed to test all reasonably expected user events.

Passing UAT test results to the development team will vary depending on the organization, but should be defined and agreed to by all involved groups before the UAT is begun. The approach to version control and scheduling UAT repeat testing should also be defined prior to beginning the testing.

Identified defects will usually be classified based on severity and the likelihood of occurrence of the defect. Acceptance of the finished product will depend on the number

of various levels of defects found and their likelihood of occurrence in the live environment.

A sample severity list is shown below: (note that the classification is subjective)

- **Show Stopper** - cannot continue with the testing
- **Critical** - cannot go into production
- **Major** - causes severe impact on business processes
- **Medium** - some impact on business processes
- **Minor** - should be corrected, but little impact on business processes
- **Cosmetic** - spelling, color, fonts, etc. (these may impact reputation!)

Users, with the assistance of the business analyst, must define and agree to the approach to handle defects found in each category as well as the final acceptance criteria, *i.e.* the application can go live if no more than 1 Major and less than 5 Minor uncorrected defects exist.

7.11.4 *Usage Considerations*

UAT provides the business analyst with an opportunity to provide a final evaluation of the new application and insure that it will meet user expectations. It should be employed whenever possible by the business analyst. Potential disadvantages can usually be managed to avoid any negative impacts on the project and organization.

Especially for the first few projects involving UAT, the business analyst may have to convince their users that their participation in UAT is important to the success of the project. Many users may feel that they do not have the time to invest in testing and that testing is “their” (developers) responsibility. The advantages of UAT are such that the business analyst should persuade their users that it is worthwhile!

.1 Advantages

1. Users gain an understanding of the application
2. Provides users with a early look at the system functionality
3. Provides the possibility of beginning user training
4. UAT planning provides verification of user expectations
5. Provides an early “real world” test of the application
6. Identify potential of adverse impacts on the business processes
7. Lower the risk of the new/changed application

- a. Organization reputation
- b. Legal considerations
- c. Schedule, cost and performance problems

.2 Disadvantages

- Increased cost and time required to complete application testing
- Can lead to increased requests for system changes
- Can lead to less testing by the developers since “they will catch any errors that we miss”
- Need for time commitment from the UAT team

Chapter 8: Underlying Competencies

8.1 Introduction

8.1.1 *Knowledge Area Definition and Scope*

The *Underlying Competencies* Knowledge Area is a description of the behaviors, characteristics, knowledge and qualities that support the practice of business analysis.

The underlying competencies are, of course, not unique to the business analysis profession. Rather, it is intended to ensure readers are aware of the range of fundamental skills employed, and provide a basis for them to dig further into the skills and knowledge that will enable them to be accomplished and adaptable analysts.

It brings together competency expectations found within this KA and across the breadth of the BABOK. As such it can provide a checklist for everything from career and development planning, to interview preparation and candidate selection.

8.1.2 *Competency Categorization*

The underlying competency areas relevant to business analysis include:

.1 Analytical Thinking and Problem Solving

Analytical thinking and problem solving supports effective identification of business problems, assessment of proposed solutions to those problems, and understanding of the needs of stakeholders. Analytical thinking and problem solving involves assessing a situation, understanding it as fully as possible, and making judgments about possible solutions to a problem. This may be accomplished by breaking down a problem into smaller, related subproblems, identifying cause-and-effect relationships between aspects of the problem, and synthesizing descriptions of the problem to create a new and more useful way of investigating the situation.

.2 Behavioral Characteristics

Behavioral characteristics include qualities such as ethics, trustworthiness, and personal organization. A business analyst who does not have these characteristics will not earn the respect of stakeholders, and as a result, stakeholders may choose to withhold potentially sensitive information. A business analyst who establishes strong interpersonal rapport with their stakeholders will enhance their openness and depth of communication, significantly mitigating the risk of inadequate requirements discovery.

.3 Business Knowledge

Business knowledge is the combination of learned and experience-based knowledge pertaining to the:

- Industry or type of business, including the business' role and position in the industry

- Role of business areas within the business, including professional knowledge and the fit of the function within the business
- Operational characteristics and principles, including the impact of size, organizational structure, and business culture
- Knowledge of the characteristics of a proposed/existing solution

The depth of prior domain knowledge needed can vary dramatically from project to project, depending on the complexity of the solution. An understanding of the business domain supports effective business analysis and improves the quality of solution recommendations.

.4 Communication Skills

Communication skills support business analysts in eliciting and communicating requirements among stakeholders. Strong communication – the base written and oral (speaking and listening) capabilities themselves, plus skill at their appropriate use – makes all business analyst tasks easier. Many failures of projects and other work activities can be traced to miscommunication of one sort or another. Accurate communication is important to overcome the many opportunities for misunderstanding, even in the simplest of contexts. All messages can be interpreted through four prisms:

- What people think they are saying;
- What they are actually saying;
- What recipients hear; and
- What recipients think was said.

Communication skills help the business analyst narrow or negate the gap between what she thinks she is stating and what the recipient believes that she is stating. It addresses the need to listen to and understand the audience, standing with the audience, communications objective(s), the message itself, and the most appropriate media and format for the communication.

.5 Group Interaction Skills

Interaction skills support the business analyst when working with large numbers of stakeholders, and involve both the ability to work as part of a larger team and to help that team reach decisions. While most of the work of business analysis involves identifying and describing a desired future state, the business analyst must also be able to help the organization reach agreement that the future state in question *is* desired through a combination of leadership and facilitation.

.6 Software Applications

Software applications are used to facilitate the collaborative development, recording and distribution of requirements to affected stakeholders who may be separated in time

or location. While it is possible to define, develop, and implement a solution using nothing more than verbal communications and temporary documentation of artifacts (such as through whiteboards), most enterprises will use some combination of software applications to store the results of business analysis work. Business analysts should be skilled users of the tools used in their organization and must understand the strengths and weaknesses of each.

8.2 Analytical Thinking and Problem Solving

8.2.1 Decision Analysis

.1 Purpose

Business analysts must be effective in understanding the criteria involved in making a decision and in assisting others to make better decisions.

.2 Definition

A decision is required whenever it becomes necessary to select an alternative or approach from two or more options. Decision analysis includes gathering information relevant to a decision, breaking down the information relevant to a decision, making comparisons and tradeoffs between similar and dissimilar options, and identifying the option that is most desirable. Business analysts must be aware of the traps that can impede successful decision making.

.3 Effectiveness Measures

Measures of successful decision analysis include:

- Confidence of the participants in the decision-analysis process that a decision is correct.
- New information or alternatives that cause a decision to be revisited are genuinely new and not simply overlooked.
- Decisions are effective in addressing the underlying problem.
- The impact of uncertainty and new information when making decisions can be effectively assessed.

8.2.2 Learning

.1 Purpose

Business analysts must be effective at learning about business domains and how they function, and then translate that learning into an understanding of how to improve the functioning of the business.

.2 Definition

Learning is the process of gaining knowledge or skills. Learning about a domain passes through a set of stages, from initial acquisition and learning of raw facts, through

comprehension of their meaning, to applying the knowledge in day-to-day work, and finally analysis, synthesis, and evaluation of the domain. A business analyst must be able to describe their level of understanding of the business domain and be capable of applying that level of understanding to determine which analysis activities need to be performed in a given situation. Once learning about a domain has reached the point where analysis is complete, the business analyst must be able to synthesize the information to identify opportunities to create new solutions and evaluate those solutions to ensure that they are effective.

.3 Effectiveness Measures

Measures of successful learning include:

- Agreement by stakeholders that analysis models effectively and completely describe the domain.
- Identification of related problems or issues from multiple areas in the domain.
- Rapid absorption of new information or new domains.

8.2.3 ***Problem Solving***

.1 Purpose

Business analysts must be effective at framing and solving problems in order to ensure that the real, underlying problem is understood and that solutions actually address that problem.

.2 Definition

Framing a problem involves ensuring that the nature of the problem is clearly understood by all parties and that the underlying problem is properly understood. Conflicts between the goals and objectives of the stakeholders need to be brought to the surface and addressed. Underlying assumptions are identified and tested. The objectives that will be met once the problem is solved need to be clearly specified and alternative solutions should be developed. Alternatives are measured against the objectives to determine which possible solution is best and the tradeoffs that may exist between solutions. The business analyst should be aware of a number of problem solving techniques that may be applied. Ultimately, a solution must be chosen for implementation.

.3 Effectiveness Measures

Measures of successful decision analysis include:

- Confidence of the participants in the problem-solving process that a selected solution is correct.
- New solution options can be evaluated effectively using the problem solving framework.

- Selected solutions meet the defined objectives and solve the underlying problem
- The problem-solving process avoids making decisions based on preconceived notions, organizational politics, or other traps that may cause a sub-optimal solution to be selected.

8.2.4 Systems Thinking

.1 Purpose

Business analysts must be effective at understanding how the people, processes and technology within an organization interact in relationships and patterns to create a system as a whole.

.2 Definition

A system includes all of the interacting parts of the system, including all of the inputs and outputs. Systems theory and systems thinking suggest that the system as a whole will have properties, behaviors and characteristics that emerge from the interaction of the components of the system, and which are not predictable from an understanding of the components alone.

.3 Effectiveness Measures

Measures of effective use of systems thinking include:

- Understanding of how a change to a component affects the system as a whole.
- Identification of reinforcing and compensating feedback loops.
- Understanding of how systems adapt to external pressures and changes.

8.3 Behavioral Characteristics

8.3.1 Ethics

.1 Purpose

A business analyst must be able to behave ethically in order to earn the trust and respect of stakeholders, and be able to recognize when a proposed solution or requirement may present ethical difficulties.

.2 Definition

Ethics requires both an understanding of moral and immoral behavior, or the standards that should govern one's behavior, and the willingness to act to ensure that one's behavior is moral or meets those standards. Business analysts need to consider the impact that a proposed solution will have on all stakeholder groups and work to ensure that those groups are treated fairly. Fair treatment does not require that the outcome be beneficial to the stakeholder group, but it does require that the affected stakeholders understand the reasons for the decision, that they are not deceived about the outcome,

and that decisions which are made are in the best interest of the organization. The business analyst should be able to identify when an ethical dilemma occurs and understand how such dilemmas may be resolved.

.3 Effectiveness Measures

Measures of ethical behavior include:

- Decisions are made with due consideration to the interests of all stakeholders
- Reasons for a decision are clearly articulated and understood
- Prompt and full disclosure of potential conflicts of interest
- Honesty regarding one's abilities, the performance of one's work, and accepting responsibility for failures or errors

8.3.2 *Personal Organization*

.1 Purpose

Personal organization skills assist the business analyst in effectively managing tasks and information.

.2 Description

Personal organization involves the ability to readily find files or information, timeliness, management of outstanding tasks, and appropriate handling of priorities. Managing time effectively can assist in building a relationship. While the details of time management are outside of the scope of this document, some areas for attention are effective prioritization, elimination of procrastination, clarity of goals and expectations. The business analyst must do what they say they will do and when. Standard techniques such as action plans, to do lists and setting priorities are among the common approaches to effective time management.

.3 Effectiveness Measures

Measures of personal organization include:

- The ability of the business analyst to find information
- Regular on-time completion of tasks
- Efficiency in the completion of work
- The ability to easily identify all outstanding work and the status of each work item

8.3.3 *Trustworthiness*

.1 Purpose

Earning the trust of key stakeholders is necessary to ensure that the business analyst is able to elicit requirements around sensitive issues and to ensure that recommendations are evaluated properly.

.2 Definition

A trustworthy business analyst must constantly demonstrate to stakeholders that they deserve the stakeholder's confidence and are concerned with that stakeholder's best interests. The business analyst must achieve a balance of trust from two key perspectives: trust in the business analyst's ethics and capability to conduct the project, while finding an equilibrium of trust to offset the inherent mistrust (by at least some affected by any project) based upon the risk to vested interests in the status quo, or simple fear of change. Trustworthiness requires that the business analyst engage with the stakeholder's needs, not the stakeholder's desires, and that the business analyst must honestly address issues when they occur.

.3 Effectiveness Measures

Measures of trustworthiness include:

- Stakeholders involving the business analyst in decision-making
- Stakeholder acceptance of the business analyst's recommendations
- Willingness of stakeholders to discuss difficult or controversial topics with the business analyst
- Willingness of stakeholders to support or defend the business analyst when problems occur

8.4 *Business Knowledge*

8.4.1 *Business Principles and Practices*

.1 Purpose

Business analysts require an understanding of fundamental business principles and best practices, in order to ensure that they are incorporated into and supported by solutions.

.2 Definition

Business principles are those characteristics that are common to all organizations with a similar purpose and structure, whether or not they are in the same industry. Almost all organizations need certain functions or capabilities in order to operate. Business areas within and across industries often have a common set of business processes and associated systems. Common functional areas include:

- Human Resources
- Finance
- Information Technology
- Supply Chain Management

While these areas have common processes, they can also vary widely based on the industry and size of an organization (e.g. human resources will be guided by different regulatory and cultural influences, but there are universal commonalities in roles such as finding, retaining, counseling, compensating, and removing staff). Other areas, such as production, tend to have fundamentally different demands between different industry classifications (e.g. agriculture and software). Understanding how other organizations have solved similar challenges can be useful when identifying possible solutions.

.3 Effectiveness Measures

Measures of knowledge of business practices and principles may include:

- Focuses on broader business principles, practices and processes ensuring details are consistent with the high-level view
- Has very good understanding of business environments, operations, process and practices relating to:
 - Common business management and decision making concepts, principles activities and practices
 - Typical organization structures, job functions and work activities
 - Complex business functions and operations

8.4.2 ***Industry Knowledge***

.1 Purpose

Business analysts should have an understanding of the industry that their organization is in so that they may understand new challenges that may be posed by competitive moves, and which solutions have proven effective elsewhere.

.2 Definition

Industry knowledge is the understanding of the competitive forces that shape an industry. It requires that the business analyst understand the various customer segments that the industry services and the demographic or other characteristics common to that segment. An understanding of major trends impacting the industry will help shape business requirements. Competitors will be making changes to their product lineup and business operations in response to these changes, and the business analyst

may need to recommend changes to an ongoing change initiative in order to respond to a competitor's action.

.3 Effectiveness Measures

Measures of effective industry knowledge may include:

- Understanding of industry related material and keeps abreast of what is taking place in the industry
- The ability to identify key trends shaping the industry
- Knowledge of major competitors and partners for the organization
- Knowledge of major customer segments
- Knowledge of common products and product types
- Knowledge of sources of information about the industry, including relevant trade organizations or journals.
- Understanding of industry-specific resource and process documents
- Understanding of industry standard processes and methodologies

8.4.3 ***Organization Knowledge***

.1 Purpose

Business analysis is significantly assisted by an understanding of the organization for which it is being performed.

.2 Definition

Organization knowledge is an understanding of the business architecture of the organization which is being analyzed. It includes an understanding of the business models that the organization (that is, how the organization generates profits or otherwise accomplishes its goals), the organizational structure that is in place, the relationships that exist between business units, and the persons who occupy key stakeholder positions. Understanding of an organization requires understanding of the informal lines of communication and authority that usually exist in parallel with the formal ones, and the internal politics that govern or influence decision making.

.3 Effectiveness Measures

Measures of a business analyst's organizational knowledge may include:

- Understanding of terminology or jargon used in the organization
- Understanding of the products or services offered by the organization
- Ability to identify SMEs in the organization

- Organizational relationships and politics

8.4.4 *Solution Knowledge*

.1 Purpose

Business analysts can use their understanding of existing solutions in order to identify the simplest means of implementing a change.

.2 Definition

Business analysts frequently work on projects that involve enhancing an existing solution rather than developing entirely new ones. In these circumstances, it is likely that the method of implementation chosen will make a significant difference in the time and effort required. A business analyst who is familiar with the workings of a solution may be able to more easily identify and recommend changes that can be implemented easily while still providing concrete benefits.

.3 Effectiveness Measures

Measures of useful solution knowledge can include:

- Reduced time to implement a required change
- Shortened time on requirements analysis and solution design
- Understanding when a larger change is justified based on business benefit

8.5 *Communication Skills*

8.5.1 *Oral Communications*

.1 Purpose

Oral communication skills enable business analysts to effectively express ideas in ways that are appropriate to the target audience.

.2 Definition

Oral communication skills are used to verbally express ideas, information, or other matters. Oral communications are a rich channel which allow for the efficient transfer of information, including emotional and other non-verbal cues. Effective oral communication skills include both the ability to make oneself understood and the active listening skills that ensure that the statements of others are accurately understood. The business analyst must have an understanding of tone and how it can positively or negatively influence the listener. Oral communication is most effective when the information being communicated will be used in the short term.

.3 Effectiveness Measures

Effective oral communication skills can be demonstrated through:

- Effectively paraphrases to ensure understanding

- Effectively facilitates sessions, ensuring success through preparedness and coordination
- Develops and delivers powerful presentations by positioning content and objectives appropriately (i.e. positive versus negative tone)
- Can communicate the criticalness or urgency of a situation in a calm, rational manner with proposed solutions

8.5.2 Teaching

.1 Purpose

Teaching skills are required to ensure that business analysts can effectively communicate issues and requirements and to ensure that the information communicated is understood and retained.

.2 Definition

Teaching requires an understanding of how people learn and the ability to use this understanding to effectively facilitate the learning experience. A business analyst must be aware of different learning styles, including visual learners (who learn best through the presentation of visual guides and models), auditory learners (who learn best through oral communication and written language) and kinesthetic learners (who learn most effectively through doing). The business analyst should understand how different learning styles may determine the form of requirements communication. Effective teaching also requires an understanding of methods that may be used to confirm that the student has learned and can apply what they have learned.

.3 Effectiveness Measures

Effective teaching skills can be demonstrated through:

- Verifying that students have learned information that has been imparted to them
- Ability of learners to use new skills or demonstrate new knowledge

8.5.3 Written Communications

.1 Purpose

Written communication skills are necessary for business analysts to document elicitation results, requirements, and other information for which medium-to-long term records are required.

.2 Definition

Written communication involves the use of symbols to communicate information. It includes the ability to write effectively for various contexts and audiences. Written communication is required when information will be used at a time or place that is remote from the time and place it was created. Effective written communication

requires that the business analyst have a broad vocabulary, strong grasp of grammar and style, and an understanding of which idioms and terms will be readily understood by the audience. Written communications are capable of recording a great deal of information, but it is frequently challenging to ensure that the written text is correctly understood.

.3 Effectiveness Measures

Effective written communication skills can be demonstrated through:

- Ability to adjust the style of writing for the needs of the audience
- Proper use of grammar and style
- Appropriate choice of words
- Ability of the reader to paraphrase and describe the content of the written communication

8.6 Interaction Skills

8.6.1 *Facilitation and Negotiation*

.1 Purpose

Business analysts facilitate interactions between stakeholders in order to help them resolve disagreements regarding the priority and nature of requirements.

.2 Definition

Facilitation is the skill of moderating discussions among a group to enable all participants to effectively articulate their views on a topic under discussion, and to further ensure that participants in the discussion are able to recognize and appreciate the differing viewpoints that are articulated. In many cases, an effectively facilitated discussion will help participants to recognize that they have differing views on a topic under discussion. The business analyst may be required to support negotiation between parties on how best to resolve those differences. The business analyst must be able to identify the underlying interests of the parties, distinguish those interests from their stated positions, and help the parties to identify solutions that satisfy those underlying interests.

.3 Effectiveness Measures

Effective facilitation and negotiation skills are demonstrated though:

- Participants in a facilitated discussion are able to correctly describe one another's viewpoints
- Discussions do not get sidetracked onto irrelevant side topics
- Common areas of agreement are identified

- Has knowledge and experience with different negotiation styles
- Focuses on what is important during negotiations
- Understands and considers all parties' interests, motivations and objectives
- Negotiates successfully towards win/win outcomes on a regular basis
- Can distinguish the less important items and leverage them in the negotiations event
- Understands the political implications and negotiates in a politically sensitive manner
- Understands the impact of time and timing on negotiations and applies as required
- Understands the impact of different negotiation styles and selects the appropriate style considering the situation and the other parties' negotiation style

8.6.2 Leadership and Influencing

.1 Purpose

Business analysts need to be able to be effective in formal and informal leadership roles, in order to guide analysts investigating requirements and to help rally stakeholder support for a necessary change.

.2 Definition

The business analyst's responsibility for defining and communicating requirements will place him or her in a key leadership role in any group or project team, whether or not there are people formally reporting to the business analyst.

Leadership involves motivating people to act in ways that enable them to work together to achieve shared goals and objectives. The business analyst must understand the individual needs and capabilities of each team member and stakeholder and how those can be most effectively channeled in order to reach the shared objectives. Effective leadership therefore requires that the business analyst be able to develop a vision of a desired future state that people can be motivated to work towards and the interpersonal skills necessary to encourage them to do so.

.3 Effectiveness Measures

Effective leadership and influencing skills are demonstrated though:

- Reduced resistance to necessary changes
- Team members and stakeholders demonstrating a willingness to set aside personal objectives when necessary

- Articulation of a clear and inspiring vision of a desired future state

8.6.3 Teamwork

.1 Purpose

Business analysts must be able to work closely with other team members to effectively support their work so that solutions can be effectively implemented.

.2 Definition

BAs customarily work as part of a team with other BAs, project managers and other stakeholders and solution delivery staff. Relationships within the team are thus an important part of the success of any project or organization.

There are a number of team development models that attempt to explain how teams form and function. These models outline how the team progresses and what is normal at various stages of the team lifecycle. Recognizing the stage of the teams progress through the model can lower the stress of team relationship development by allowing members to recognize behaviors as normal, expected, and a stage to be worked through. Communications and trust can also be enhanced through understanding and awareness of facets such as the process of setting of rules for the team, team decision-making, formal and informal team leadership and management roles.

Team conflict is quite common. If handled well, the resolution of conflict can actually benefit the team. The basic types of conflict are emotional and cognitive. Emotional conflict is personal while cognitive conflicts are based upon the disagreements on matters of substantive value or impact for the project. Cognitive conflict focuses the team on examining the premises, assumptions, observations and expectations of the team members. Working through such problems can have the beneficial effect of strengthening the foundation of the analysis and the solution.

.3 Effectiveness Measures

Effective teamwork skills are demonstrated through:

- Fostering a collaborative working environment
- Effective resolution of conflict
- Developing trust among team members
- Support among the team for shared high standards of achievement
- Team members have a shared sense of ownership of the team goals

8.7 Software Applications

8.7.1 General-Purpose Applications

.1 Purpose

Business analysts use office productivity applications to document and track requirements.

.2 Definition

These applications generally consist of three components in a suite of tools: word processing, spreadsheets, and presentation software. The documents produced by these tools are the primary way in which information is stored and distributed in many organizations, and business analysts need to be proficient with their use even where more specialized tools are available. They have the advantage of being low-cost or even free, and almost every stakeholder will have access to them.

Word processors are commonly used to develop and maintain requirements documents. They allow a great deal of control over the formatting and presentation of a document. Standard requirements documentation templates are widely available for word processors and such templates can be readily downloaded from the internet without much difficulty. Most word processing tools have a limited capability to track changes and record comments, but they are not really designed for collaborative authoring.

Spreadsheets are often used to maintain lists (such as atomic requirements, features, actions, issues, or defects). They can also be used to support decision analysis and are very effective at summarizing complex scenarios. Spreadsheets also support limited change tracking, and can be shared among multiple users in much the same way as a word processing document.

Presentation software is commonly used to support training or to introduce topics for discussion among stakeholders. While some of these applications can be used in a very limited way to capture requirements or simulate a low-fidelity prototype, their primary purpose is to support the structuring and delivery of verbal information.

Collaboration and knowledge management tools are used to support the capturing of knowledge distributed throughout an organization and make it as widely available as possible. They enable documents to be made available to an entire team and facilitate collaboration on those documents, enable multiple users to work on a document simultaneously, and generally support commenting on or discussion about the documents or their content as well. These tools may take the form of document repositories (which integrate with office productivity software), wikis (which allow easy creation and linking of web pages), discussion forums, or other web-based tools. They can vary widely in cost.

Communication tools, such as email and instant messaging applications, are used as needed to communicate with stakeholders who are remotely located, who cannot respond to queries immediately, or who may need a longer-term record of a discussion.

They are generally available to almost all stakeholders and are very easy to use. However, they are generally not effective for long-term storage or retention of information. Their primary use is to facilitate communication over time or distance.

.3 Effectiveness Measures

Measures of skill with specialized applications include:

- The business analyst is able to apply their understanding of one tool to other similar tools.
- The business analyst is able to identify major tools in the marketplace and describe how they are used in any given situation
- The business analyst understands and is able to use most of the major features of the tool
- The business analyst is able to use the tools to complete requirements-related activities more rapidly than is possible without them
- The business analyst is able to track changes to the requirements made through the tools

8.7.2 *Specialized Applications*

.1 Purpose

Business analysts use modeling tools to support the development of formal models, and in some cases, their validation and implementation as well.

.2 Definition

Diagramming tools are designed to support the rapid drawing and documentation of a model, typically by providing a set of templates for a particular notation which are used to develop diagrams based on it. They generally do not enforce or verify compliance with the notation standard, or do so in a limited fashion. They are generally low-cost and relatively easy to use, and the resulting diagrams can be integrated into a word processing document.

Modeling tools facilitate the conversion of the model into an executable form, either by use of a proprietary engine for executing the model or by generating application code which can be enhanced by a developer. The model will verify compliance with the notation. These tools potentially allow for very rapid development and deployment of new applications, but in many cases significant customization of the output is required and it is challenging to keep the model in sync with the deployed application. They are medium to high cost and often require some specialized training to use.

Prototyping tools support the rapid creation and modification of a proposed user interface. They are designed to simulate the front-end behavior of an application so that its users can understand how it will be used in practice and identify improvements to it cheaply and easily. They may have a limited capability to embed some functional logic

or business rules in the prototype. Some prototyping tools also support the documentation of relevant requirements. Prototyping tools are generally not designed to replace or supplement the application development tools which will be used to build the actual application. They are highly variable in cost, but often require training to use.

Requirements management tools are used to support change control, traceability, and configuration management of requirements and requirements artifacts. Some tools are also capable of linking requirements to software code. They are designed to ensure that a reason is recorded for any changes to the requirements and to help to rapidly identify any impacts from those changes. They are medium to high-cost and often require specialist training. They are most commonly used by large and/or geographically dispersed teams.

.3 Effectiveness Measures

Measures of skill with specialized applications include:

- The business analyst is able to apply their understanding of one tool to other similar tools.
- The business analyst is able to identify major tools in the marketplace and describe how they are used in any given situation
- The business analyst understands and is able to use most of the major features of the tool
- The business analyst is able to use the tools to complete requirements-related activities more rapidly than is possible without them
- The business analyst is able to track changes to the requirements made through the tool