



State of Tennessee

Division of Health Care Finance and Administration

Tennessee Technical Advisory Services (TN TAS)

Requirements Management Plan

Version: 1.0

Submitted Date: March 31, 2016

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1. Executive Summary

This document is intended to be used by the Medicaid Modernization Program (MMP) project team members to create and implement Requirements Management Plans on individual MMP projects. This document includes a sample template that can be completed by a project, subject to a project's Deliverable Expectation Document (DED) for their Requirements Management Plan. This guide can be adapted on individual projects as needed – the DED will explain those differences and the reasons why an individual project may require different methods, tools, or approaches to the State standard.

Requirements management is the planning, execution, monitoring and controlling of the work associated with requirements development and implementation. The Requirements Management Plan governs this capability within a project. Requirements management is important because a requirement is a representation of a problem that needs to be solved. A requirement must be concise, stated clearly, and managed properly so that a solution can be

Requirement Types, Attributes, Life Cycle and Roles & Responsibility

MMP projects will define requirements as per the BABOK™, which uses the hierarchy of business, stakeholder, solution (functional and non-functional), and transition requirements. This standard defines the attributes which should be described as part of defining a requirement. It is important that the stakeholders only record the minimum essential information, so that the process is not cumbersome and therefore not followed. A simple life cycle, from gathering through to implementation, is proposed as the standard and incorporates all State and external stakeholders in Section 5 Roles & Responsibilities.

This standard recommends that the best practice for the development and implementation of requirements is that the State, or a Technical Advisory Services (TAS) Contractor on the State's behalf, manages the gathering of solution requirements, which are approved by the State. Once approved, a Systems Integrator (SI) Contractor is engaged to design and implement a solution that meets those requirements.

This standard assumes that requirements management starts at the beginning of a project, and governs the management of requirements throughout the project life cycle. The Requirements Management Plan is a governance document that starts with project planning, and is updated throughout the life cycle of a project; as such, it is a living document that is updated as methods, tools, roles, responsibilities, stakeholders, and greater levels of detail are defined or changed.

Future iterations of this document can address implementing a program-level capability that allows for the reuse of requirements managed across multiple projects, with a master requirements repository.

Methods

This document has drawn upon the standards defined by the International Institute of Business Analysis (IIBA) Business Analysis Body of Knowledge (BABOK™), State publications on requirements from the Tennessee Business Solutions Methodology (TBSM), and from organizations such as the Centers for Medicare and Medicaid Services (CMS).

Because the document is completed during project initiation and planning, the State will control how requirements will be developed and managed, and how the quality of requirements are measured, even if the work is conducted on the State's behalf by a third party. As different stakeholders (such as the SI Contractor) are engaged through the project life cycle, the Plan is updated to reflect any needed alignment between the Plan and project conditions as they change.

Requirement Deliverables, Reporting & Quality Measurement

Each Requirements Management Plan will define how requirements are published, reported upon during their life cycle, and how the quality of requirements will be tracked and measured. The quality of requirements will be measured throughout the entire life cycle, and includes all stakeholders in requirements measurement.

Continual measurement of requirements volatility is a key factor in ensuring project success. The cost associated with requirements rework and poor definition results in substantial project cost overruns, delays and scope creep. Careful monitoring of requirements quality throughout the project life cycle will help mitigate project risks.

Requirement Tools, Repository and Traceability

This document includes a standard that projects must use or adapt to ensure traceability of requirements to each other, and from business objectives through to implemented solutions. State standards for interoperability of tools and the use of requirements repository tools on projects is described and defined.

2. Introduction

This document is intended to be used by MMP project team members as a guide for managing requirements on MMP Projects. The intended audience includes project managers, business and systems analysts, architects, developers, testers and business subject matter experts.

The method used to define the Requirements Management Plan came from industry standards such as the International Institute of Business Analysis (IIBA) Business Analysis Body of Knowledge (BABOK™), State publications on requirements from the Tennessee Business Solutions Methodology (TBSM), and from organizations such as the Centers for Medicare and Medicaid Services (CMS) for solution requirements.

If an MMP contractor proposes an alternate approach for a project than what is presented in this Management Plan, that approach must satisfy the requirements of this Plan, and the contractor must provide justification for the proposed approach as well as demonstrate how the requirements are satisfied.

2.1. Purpose

This document defines the requirements management standard that will be used on all MMP projects.

As such, this document describes:

- The standard methodology for defining and managing requirements, including the requirements life cycle
- The standard roles and responsibilities of stakeholders in the requirements life cycle
- How requirements tools will be used during the requirements life cycle, and the interoperability requirements with the State's requirements management tools
- How requirement quality will be measured and tracked
- How requirements will be traced from business need through to implemented solutions, other requirements, and the solution design and target-state architecture artifacts
- How the requirements life cycle will be governed
- How requirements are approved and aligned to the Systems Development Life Cycle (SDLC) project phases and gate reviews

2.2. Objectives

A Requirements Management Plan is a document that guides and governs all stakeholders during the requirements life cycle of a project. A Requirements Management Plan will help ensure that all parties involved in the process – from start to finish – will understand their role and the outcomes that will be achieved.

Requirements management is important because it helps ensure that:

- implemented solutions align to business need
- there are no gaps or missing requirements in an implemented solution
- an implemented solution does not have unnecessary functionality, and
- the process of implementing the solution is done as efficiently as possible.

2.3. Scope

In Scope

This standard defines the template for writing Requirements Management Plans on MMP projects, and the template is elaborated in Appendix C. A project's Requirements Management Plan can deviate from the standard presented in this document, with the approval of the State. The reasons for varying from this standard are documented in the Deliverable Expectation Document (DED) for the project's Requirements Management Plan.

This document presents a generic pattern that assumes that the State defines and approves requirements, and then procures an SI Contractor to complete the design, development and implementation (DDI) of a solution that meets those requirements. This pattern also assumes that during the DDI process that new requirements may be uncovered that the SI Contractor will manage through the entire requirement life cycle. If this pattern does not apply to a specific MMP project, the State may choose to update this Management Plan to reflect a new standard, or it may be elaborated in a project specific Requirements Management Plan.

Future iterations of this document can address implementing a program-level capability that allows for the reuse of requirements across multiple projects, managed in a master requirements repository.

Out of Scope

This document does not include guidance for business analysis.

2.4. Referenced Documents

The Requirements Management Plan is interrelated with other deliverables as illustrated in the table below. These deliverables have been considered in the design of the Requirements Management Plan and will continue to be aligned to these and other relevant MMP management plans in future iterations.

Table 1: Referenced Documents

#	Document Name	Content Overview
1	Program Governance Management Plan (PGMP)	Deliverable to define the process for establishing Requirements Management Governance and the Requirements Change Board.
2	System Development Life Cycle Methodology Plan	Defines the MMP SDLC standard to which the Requirements Management Plan must align.
3	EA-BOM Management Plan	Defines the enterprise architecture standards, methodology, and templates that will be used during MMP, specifically for requirement types and the requirement traceability matrix.
3	Request for Qualifications (RFQ) for Systems Integration (SI) Services RFQ #32101-15557	RFQ defining the State's requirements for an SI Contractor to develop, operate and maintain the Tennessee Eligibility Determination System (TEDS).
4	The TBSM Requirements Development Plan Template	Tennessee Business Solutions Methodology template outlining the requirements path from initiation to solutions design. http://www.tn.gov/assets/entities/finance/attachments/TBSMRequirementsManagementPlan.docx
5	The TBSM Requirements Management Plan Template	Tennessee Business Solutions Methodology template outlining how requirements are identified, analyzed, documented, and managed. http://www.tn.gov/assets/entities/finance/attachments/TBSMRequirementsManagementPlan.docx
6	CMS Requirements Writers Guide Version 4.11, August 31, 2009	Guide for writing requirements on CMS projects.
7	Software Requirements, Karl Wieggers, Copyright Microsoft Press, 2003	Elaboration of industry standards for requirement management & development.

#	Document Name	Content Overview
8	More About Software Requirements, Karl Wiegers, Copyright Microsoft Press, 2006	Elaboration of industry standards for requirement management & development.
9	International Institute of Business Analysis (IIBA®) Business Analysis Body of Knowledge (BABOK™) Version 3.0	Industry standards for requirements definitions.
10	CMS eXpedited Life Cycle (XLC) Requirements Document	Template for publishing CMS project requirements.
11	CMS Enterprise Life Cycle (ELC) Requirements Document	Template for publishing CMS project requirements.

2.5. Assumptions, Risks & Constraints

Assumptions

- The requirements life cycle described in this document assume a scenario where the State, or a TAS Contractor on the State’s behalf, has gathered requirements that have been approved by the State for procurement with an SI Contractor, who is accountable for the solution design and implementation.
- The life cycle and standard presented in this document assumes that development is based on a waterfall or iterative software development methodology and would need to be updated if an Agile or other software development methodology is used.

Risks

- Contractors may have requirements management tools and methodologies that need to be aligned with the standards in this Requirements Management Plan. This risk will be mitigated by aligning a Contractor’s toolset and methods within a project’s Requirements Management Plan.
- There is overlap between the processes and activities that are performed to manage requirements and the processes and activities performed during business analysis on a project. The Business Analysis Plan defines the approach, methods, roles and responsibilities for business analysis, of which requirements management is a subset.

Constraints

- Industry-standard requirements management tools may not be able to accommodate the requirements management life cycle described in this document. Once tools are selected for a project, the life cycle states allowed on a project may need to be aligned with the standards presented in this document, and must be documented in the project's Requirements Management Plan.

3. Requirements Management Plan Vision

This section describes:

- The practice of requirements management
- Why requirements management is important
- The benefits that an organization and a project will achieve by having a disciplined requirements management capability
- How it will apply to MMP projects

Each MMP project is required to complete a Requirements Management Plan that follows the standard outlined in this document. Each individual project will need to align the needs of the project with the standard approach to requirements management. As part of initiating a project, a Requirements Management Plan will be completed and published that will define a specific project instance of how the requirements will be managed on that initiative. A template for producing a project specific Management Plan (for completion during the Initiation Phase) is included in Appendix C. If the SI Contractor is engaged after the Initiation Phase, the SI Contractor is responsible for updating and maintaining the Requirements Management Plan.

A Requirements Management Plan is a living document that must be updated to reflect changes or greater levels of detail about requirements management, such as changes to roles, responsibilities, stakeholders, tools, methods, etc. during the life cycle of a project.

A project instance of a Requirements Management Plan can deviate from the standard presented in this document, with the approval of the State. It is assumed that MMP projects will complete Deliverable Expectation Documents that define the content for a deliverable which is approved by the State. However it is recommended that the standard presented in this document be adhered to as a baseline so that the State achieves a consistent approach to requirements management across all MMP projects.

3.1. Requirements Management

Requirements management is the planning, execution, monitoring and controlling of any or all of the work associated with requirements elicitation and collaboration, requirements analysis and

design, and requirements life cycle management¹. A Requirements Management Plan is the document that governs this capability.

Requirements management is important because requirements represent the business need that must be present in a solution. In order for the correct solution to be implemented, the problem must be stated in a clear way and managed properly.

Requirements management processes fit into a hierarchy of processes that helps a business achieve its business goals when implementing IT projects. A business defines strategic goals and objectives with outcomes that must be achieved. The practice of enterprise architecture is used to define a set of blueprints or a target operating model that will achieve these business goals and objectives. Solution requirements are then derived from the enterprise architecture blueprints in a model-driven requirements discovery process. Systems design can then address how a solution will be designed and implemented to meet the solution requirements.

3.2. Requirements Management and Solution Design

The process of designing a solution and the definition and management of requirements are closely linked within the practice of business and systems analysis. This document defines just the framework for managing requirements. The practice of business analysis, which includes requirements management and solution design are highly related but not the same. In order to define the scope of requirements management within this context, it is important to understand that:

- Requirements are focused on the business need; designs are focused on the solution
- The distinction between requirements and designs is not always clear
- The same techniques are used to elicit, model, and analyze both requirements and design
- A requirement leads to a design which in turn may drive the discovery and analysis of more requirements.

¹ Business Analysis Body of Knowledge (BABOK™) Version 3.0

Examples of the differences between requirements and design include:

Table 2: Examples of Requirements versus Design

Requirement	Design
View six months of MAGI Enrollment data for Medicaid and CHIP	A sketch of a dashboard
MAGI Eligibility information must be verified via the Federal Data Services Hub.	Process model
Record and access a Medicaid Member’s eligibility history.	Screen mock-up showing specific data fields

3.3. Benefits of Requirements Management

The Requirements Management Plan will help stakeholders achieve success and operate in a disciplined environment. If completed and executed correctly, the Requirements Management Plan should lead to lower costs by reducing defects and rework needed; saving time because the management of requirements will ensure that unnecessary features are not added; and additional customer satisfaction is through better communication in the definition and management of requirements throughout the life cycle.

It is important that the processes and the method used to govern a requirements life cycle are easy to follow and only require stakeholders to record the minimum essential information. This will prevent the process from becoming so cumbersome that the stakeholders do not follow the process, which may lead to risks that requirements are not managed properly.

3.4. How Will Requirements Management Apply to MMP?

A Requirements Management Plan is a subset of the Business Analysis Plan for a specific initiative, describing specific tools, activities, and roles and responsibilities that will be used on a project to manage requirements. This Requirements Management Plan defines a template that an MMP project will complete for a specific initiative. Appendix C contains a template that a project can use for the basis of the Requirements Management Plan.

4. Requirements Management Plan Methodology and specifications

This section defines:

- The different types of requirements, and their formal definitions, that will be adopted throughout the MMP
- The relationship between requirements and requirement deliverables
- The activities and processes involved in requirements management
- The requirements management life cycle that will define the allowable states for requirements, in the context of releases, test cases and defects
- Requirement attributes
- Requirements definition templates
- How requirements are approved within the MMP SDLC

4.1. Requirements Types

The MMP will use the standard defined by the International Institute of Business Analysis (IIBA) – Business Analysis Body of Knowledge (BABOK®) Version 3.0 as the standard for the definition of requirements.

A **requirement** is defined as a usable representation of a business need. Requirements focus on understanding what kind of value could be delivered if a requirement is fulfilled. The nature of the representation may be a document (or set of documents), but can vary widely depending on the circumstances. The BABOK® Guide classifies requirements in the following way:

Business requirements are defined as statements of goals, objectives, and outcomes that describe why a change has been initiated. They can apply to the whole of an enterprise, a business area, or a specific initiative. They answer the question, ‘Why do I need this?’

Stakeholder requirements are defined as the needs of stakeholders that must be met in order to achieve the business requirements. They may serve as a bridge between business and solution requirements. They answer the question, ‘What is the need?’

Solution requirements are defined as the capabilities and qualities of a solution that meets the stakeholder requirements. They provide the appropriate level of detail to allow for the development and implementation of the solution. They answer the question, ‘What do I need?’ and are divided into two sub-categories:

Functional requirements describe the capabilities that a solution must have in terms of the behavior and information that the solution will manage, and

Non-functional requirements or quality of service requirements do not relate directly to the behavior of functionality of the solution, but rather describe conditions under which a solution must remain effective or qualities that a solution must have.

The types of non-functional requirements may include but are not limited to:

- Privacy
- Security
- Usability
- User Interface
- System Interfaces
- Accessibility
- Business Environment
- Information Security
- User Access
- Performance/Capacity
- Business Continuity/Recoverability
- Logging/Monitoring/Alerting
- Archive/Retention
- Expected Life Span
- Documentation/Training/Help
- Communication
- Legislative and Regulatory/Compliance
- Integration
- Data Migration
- Deployment

Transition requirements are defined as the capabilities that the solution must have and the conditions the solution must meet to facilitate transition from the current state to the future state, but which are not needed once the change is complete. They answer the question, 'What are the conditions?' They are differentiated from other requirements types because they are of a temporary nature. Transition requirements address topics such as data conversion, training, and business continuity.

Not all MMP projects will have all types of requirements within the scope of the project. Each MMP project will define the types of requirements that are within the scope of the project in the project's Requirements Management Plan.

4.2. Relationship between Requirements and Deliverables

The following diagram illustrates the relationship between the different types of requirements and the documents or deliverables within which they are published. This is a generic pattern, which may need to be adapted depending on the needs of a specific MMP project. Each project's Requirements Management Plan will describe how requirements will be documented for that project.

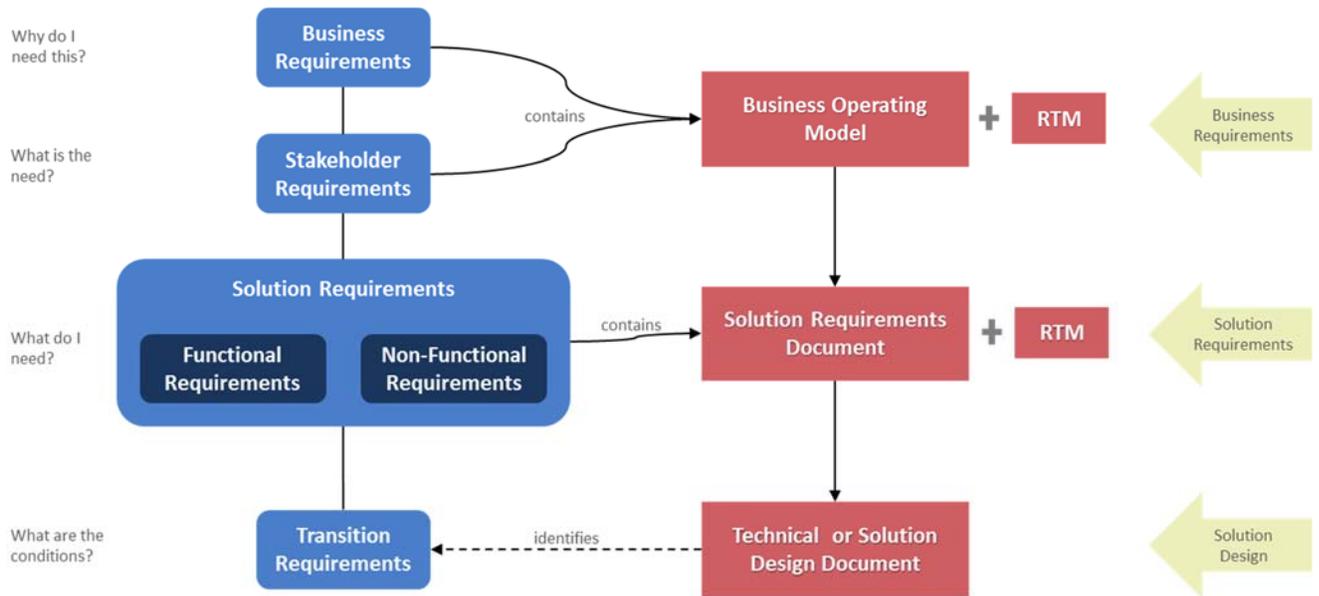


Figure 1: Relationship of Requirements to Requirement Documents

Business and stakeholder requirements, along with other requirements information such as business process models, context models and stakeholder analysis are uncovered and published in Business Operating Model (BOM) documents. A Requirements Traceability Matrix (RTM) should be attached to a BOM as an appendix, mapping business and stakeholder requirements to stakeholders, business functions, applications, test cases, etc. depending on the project need.

Solution requirements are usually published with other types of requirements artifacts, such as use cases and logical data models, in a Solutions Requirement Document. This document is a complete statement of the requirements that a solution must meet. An RTM can be attached as an appendix or as a stand-alone document that maps solution requirements to releases, application components, data elements, stakeholders, etc. depending on the need of the project to document requirements.

A technical solution is designed and documented in a set of Technical Design Documents, Solution Design Documents, and Solution Architecture Design Documents. These design documents describe a solution design that meets the requirements. This solution design does not contain any requirements, but traces to the solution requirements that the design addresses.

Transition requirements are identified as a result of having a completed solution design.

4.3. Requirements Management Activities and Processes

This section describes the tasks that are performed in order to manage and maintain requirements through its life cycle. This includes establishing meaningful relationships between related requirements and designs, and assessing, analyzing and gaining consensus on proposed changes to requirements and designs.

There is an overlap between the processes and activities that are performed to manage requirements and the processes and activities within the work of business analysis on a project. The Business Analysis Plan defines the detailed approach, methods, roles and responsibilities for business analysis, of which requirements development are a subset.

Requirements development is the process of eliciting, analyzing and validating a project's requirements. Once reviewed and approved, these requirements are validated with SI prior to baselining for a release or development effort. This is an agreement between the developers and the stakeholders about the scope, functionality and features of the product that will be built and implemented. Phased implementation projects would require this step multiple times throughout the project to baseline requirements by phase/release. The requirements need to be managed through this entire life cycle, and changes to requirements tracked and reported

During requirements development, there are parallel tracks of work that happen as part of the SI Contractor Business Analyst's work. The SI Contractor BA works closely with the State and the MMP Contractors to understand the priority and business need of requirements and how each requirement relates to each release. As requirements are baselined for the current release, the SI Contractor BA can also be working to analyze future business requirements and assisting the State in prioritizing the backlog of requirements into releases. The SI Contractor BA will act as a first-level respondent for requirements when any changes to requirements happen, for example, making updates to prioritization, complexity, changes to Legislation and/or Federal BRD or targeted release.

Each MMP project-level Requirements Management Plan needs to define the set of processes and tasks that the project team is expected to perform to manage requirements, regardless of the stakeholder (State, TAS Contractor, SI Contractor, etc.). At a minimum, the Plan must include the following categories of activities, but a project specific plan can adapt this list as needed, as agreed to within the project's DED for the Requirements Management Plan:

Table 3: Requirements Activities

Activity Category	Description
Complete Requirements Analysis and Development Plan	<p>Analyze requirements for context and understanding so that the Development Plan can be created. At a minimum, as part of the Plan, the following activities need to be performed:</p> <ul style="list-style-type: none"> • Completion of a work breakdown structure for completing the requirements analysis work that is aligned with, or as a subset of, the project work breakdown structure • Allocation of appropriate resources to execute the requirements management • Completion of time estimates • Development of the Requirements Communication Plan

Activity Category	Description
	<ul style="list-style-type: none"> • Defining elicitation techniques that will be used to analyze and model requirements, and how stakeholders will be identified • Defining how requirement conflicts will be resolved
Detail the processes that will be used to manage requirements through the entire requirements life cycle	Define processes to gather, validate, approve, verify with SI Contractor, baseline, allocate to releases, cancel, defer or implement requirements. Phased implementation projects would require this step multiple times throughout the project to baseline by phase/release.
Define the process for prioritizing requirements and the allocation to releases	Detail the process that will be used to prioritize requirements based on the State's needs.
Define when and how requirements will be baselined	Detail the process that will be used to baseline requirements. The process shall describe the key participants and their related activities.
Describe the requirement change control process (as described in the Change Management Plan)	Detail the requirements change control process, including the key participants and activities. At a minimum, the process needs to incorporate the following activities: <ul style="list-style-type: none"> • Proposing changes • Analyzing impacts • Making decisions • Updating requirements documents • Updating Requirement Management Plans • Measuring requirements volatility • Managing version control
Define a version identification scheme, based on industry best practices	Detail the tools, techniques and conventions for controlling versions of the requirement documents and individual requirements.
Define the process for requirements status tracking	Detail the tools and processes by which requirement statuses will be defined, recorded, updated, and reported. Include key

Activity Category	Description
	participants allowed to perform activities that impact the status of requirements.
Complete requirements tracing	Ensure that the mechanisms are in place that allow the linking of requirements to other requirements or other design and architecture elements.

4.4. Requirements in Context of Testing, Software Releases and Defects

Figure 2: Solution Requirement Context, illustrates requirements in the context of software releases, testing and defect management. Requirements are contained within releases, and testing is completed to prove that solutions have met requirements. Each test may result in one or more defects.

The statuses presented in this model for releases, tests and defects are included as examples. Please refer to the Test Management Plan and the SDLC Management Plan for the standards on tests, defects and release statuses.

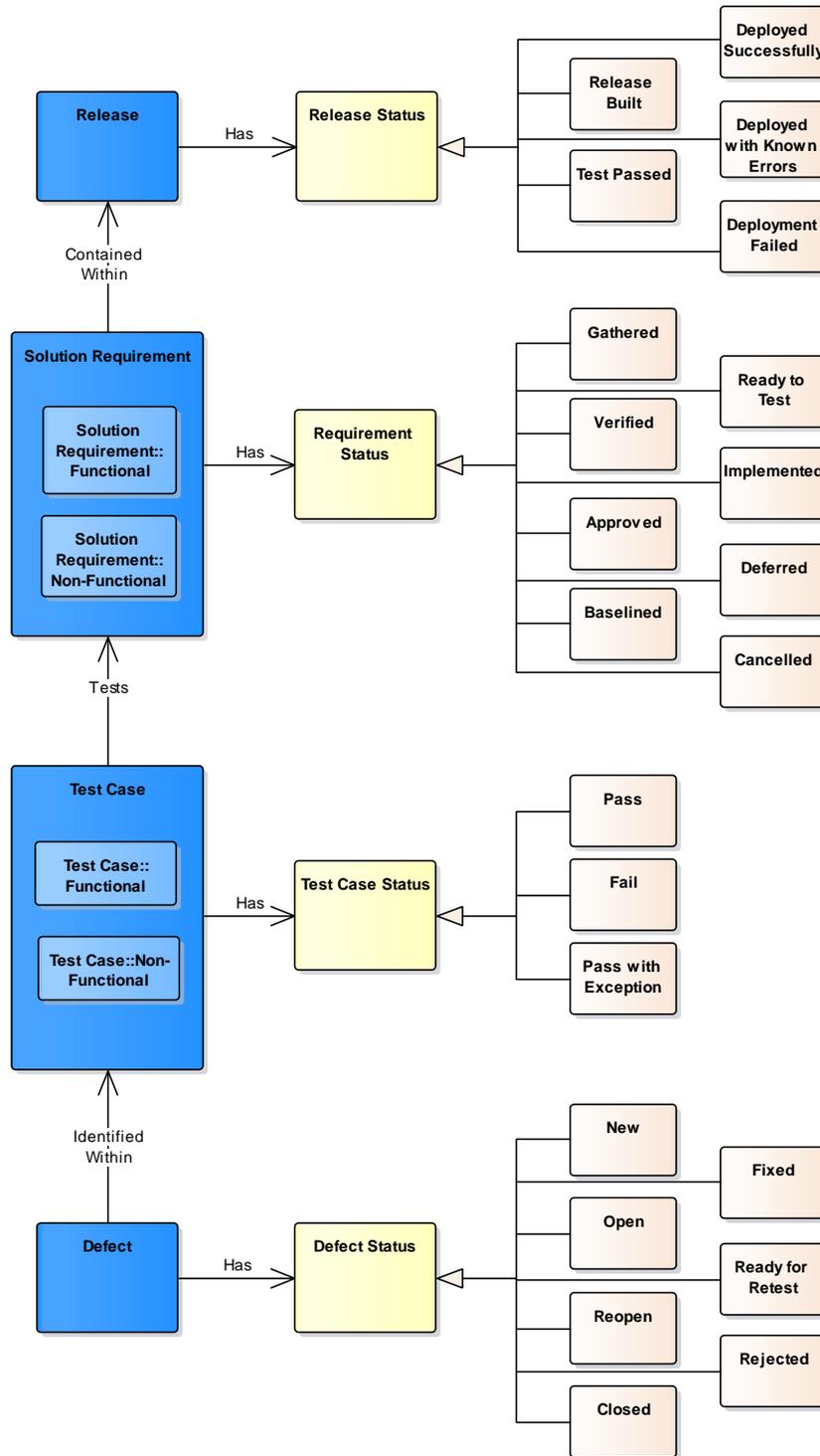


Figure 2: Solution Requirement Context

Therefore, trying to answer questions such as the following require not only looking at requirement statuses, but also the statuses of related releases, test cases and defects:

- How many requirements were implemented in a release? (information is in relationship between a release and allocated requirements)
- How many requirements are still being tested? (information is in relationship between a requirement status and the related test cases)
- How many requirements are still in development? (requirement status and release status)
- How many requirements are awaiting allocation to a release? (information is in relationship to a release)

4.5. Requirements Life Cycle

The requirements life cycle describes the allowed states and workflow for requirements. The requirements life cycle:

- begins with the representation of a business need as a requirement,
- continues through the development of a solution, and
- ends when a solution and the requirements that represent the business need are implemented.

Figure 3: Requirements State Transition Model, describes the states a requirement goes through during its life cycle specific to an MMP project where an SI Contractor is engaged to design, develop, test and implement a solution. This life cycle assumes that the State, or a TAS Contractor on the State's behalf, elicits and validates the requirements for procurement, and that the State approves the requirements. Once an SI Contractor is engaged, requirements are validated with the SI Contractor against solution, are then baselined and the development process starts as it applies to a release within a phased implementation.

Once a requirement is baselined it is subject to the requirements change management process, as a subset of the project change management process (documented in the Change Management Plan).

Once development is complete, the solution components related to the requirements are tested and implemented. A requirement will then be updated with a status of implemented. Along its life cycle, a requirement can be cancelled or deferred to a different release. At any time, new requirements can be identified and must be managed through the entire life cycle.

This model specifically describes the statuses of solution and transition requirements. Business and stakeholder requirements do not have a status of being tested because they are at a higher level of granularity.

This life cycle does not include a status to retire a requirement. In future releases of this Management Plan, requirement reuse can be addressed which will include the concept of retirement. In the context of an MMP project, a requirement's life cycle ends when it is implemented, cancelled or deferred without resolution.

The RACI (Responsible for, Accountable for, has Shared Responsibility, Consulted on, Informed on) matrix presented in Section 5 Requirements Management Roles & Responsibilities maps the roles that can move requirements through their life cycle.

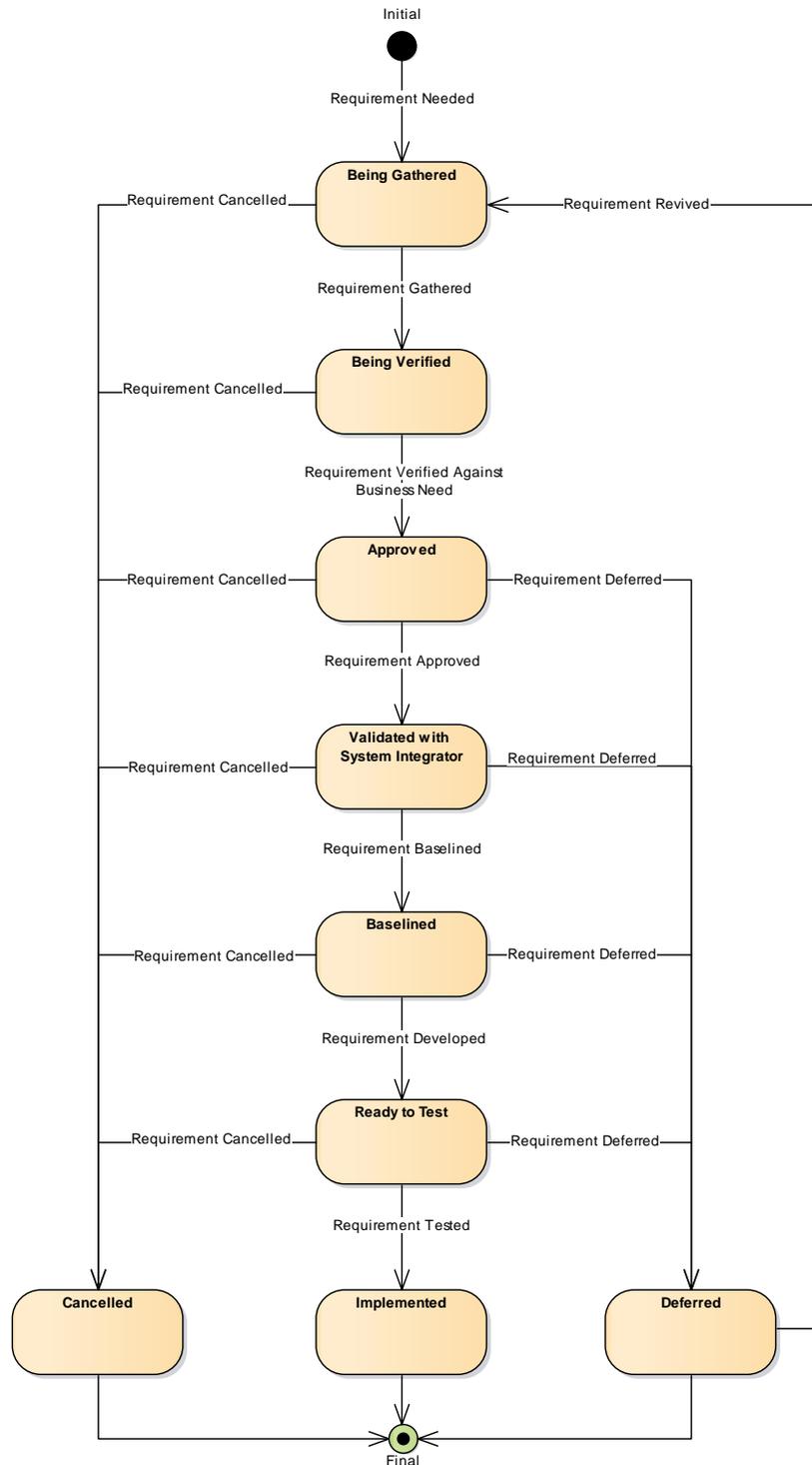


Figure 3: Requirements State Transition Model

4.6. Requirements Attributes

The following diagram illustrates the attributes for solution requirements (functional and non-functional) and transition requirements. Business and stakeholder requirements may not require all of these attributes. The Requirements Management Plan completed for each MMP project should define the standard mandatory attributes which it will use for each requirement type. Detailed specifications for business, functional and non-functional requirements are included in the EA-BOM Management Plan.

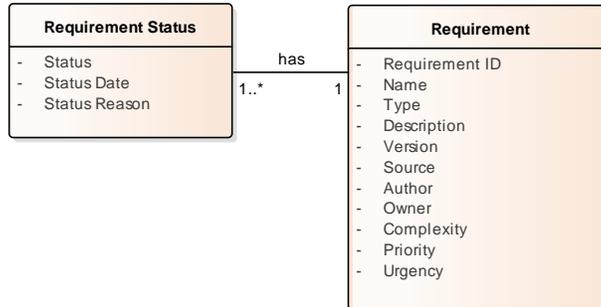


Figure 4: Solution and Transition Requirement Attributes

Table 4: Solution and Transition Requirement Attributes

Attribute	Description
Requirement ID	Unique reference that is not altered or reused if the requirement is changed.
Name	Requirement title or short name.
Type	Identifies the type of requirement (e.g., business, functional, non-functional, transition). For non-functional requirements, the following sub-types are suggested: <ol style="list-style-type: none"> 1. Privacy 2. Security 3. Usability 4. User Interface 5. System Interfaces 6. Accessibility 7. Business Environment 8. Information Security 9. User Access 10. Performance/Capacity 11. Business Continuity/Recoverability 12. Logging/Monitoring/Alerting 13. Archive/Retention

Attribute	Description
	14. Expected Life Span 15. Documentation/Training/Help 16. Communication 17. Legislative and Regulatory/Compliance 18. Integration 19. Data Migration 20. Deployment
Description	Gives a detailed description of the requirement.
Version	Requirement increment.
Source	Identifies the origin of the requirement. The source is often consulted if the requirement changes or if more information regarding the requirement or the need that drove the requirement has to be obtained.
Author	Provides the name of the person who needs to be consulted should the requirement later be found to be ambiguous, unclear, or in conflict.
Owner	Indicates the individual or group that needs the requirement or the business owner after the solution is implemented.
Complexity	Indicates how difficult the requirement will be to implement. This will assist in estimating how long a development effort is required, or the release to which it will be allocated. Complexity is measured as: <ol style="list-style-type: none"> 1. This requirement is not very complex. <ol style="list-style-type: none"> a) The requirement does not require a large amount of effort to implement. b) This requirement does not require input from a Subject Matter Expert to implement. c) This requirement does not require integration with outside systems or interfaces. d) This requirement does not require a large amount of change to the implementation or organization. e) This requirement does not have a large security impact or risk profile. 2. This requirement is somewhat complex. <ol style="list-style-type: none"> a) This requirement requires more than a small amount of effort to implement. b) This requirement requires consultation with a Subject Matter Expert during implementation. c) This requirement requires implementation with outside systems and services that are already in a steady operational state.

Attribute	Description
	<ul style="list-style-type: none"> d) This requirement will require minor changes to the organization. e) This requirement has some security impact and risk profile, but it is thoroughly managed. <p>3. This requirement is very complex.</p> <ul style="list-style-type: none"> a) This requirement requires a large amount of effort to implement. b) This requirement requires a Subject Matter Expert to implement. c) This requirement has a major security impact or risk profile, and without proper management can cause major impact to the project or organization. d) This requirement requires implementation with outside systems and services that are not yet in a steady operational state.
Priority	<p>Indicates relative importance. Priority can refer to the relative value of a requirement or to the sequence in which it will be implemented.</p> <ul style="list-style-type: none"> 1. High <ul style="list-style-type: none"> a) Implementing this requirement is imperative for the overall solution. b) This requirement must be implemented along with the solution, and if it is not, it will be a major block to the solution. c) This is a high risk requirement and should be addressed sooner rather than later. d) This requirement's completion is a dependency on other high priority requirements. e) This requirement has a set timeline to implement. f) This requirement requires additional staff focus to implement. 2. Medium <ul style="list-style-type: none"> a) Implementing this requirement is needed for the overall solution. b) This requirement needs to be implemented along with the solution, but will not stop the overall solution if the requirement needs to be adjusted. c) This requirement has some risk, but the risk can be easily managed or mitigated in order to successfully implement the requirement. d) This requirement's implementation does not have dependencies on other high priority requirements. Any

Attribute	Description
	<p>dependencies on medium requirements can be mitigated with workarounds if this requirement is not implemented.</p> <p>e) This requirement has a set timeline, but that timeline can be adjusted without introducing risk to the overall solution.</p> <p>3. Low</p> <p>a) Implementing this requirement is helpful in the overall solution, but is not pivotal.</p> <p>b) This requirement can be implemented at a later time without major impact to the overall solution.</p> <p>c) This requirement has little to no risk associated with its implementation.</p> <p>d) This requirement's implementation has no dependencies on other high or medium priority requirements.</p> <p>e) This requirement does not have a set timeline.</p>
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.
Status	Indicates the state of the requirement, as per the allowed requirement states.
Status Date	The date on which the status became effective.
Status Reason	The reason that the status was set – for example, if the status is cancelled or deferred.

Each requirement must also have a set of traceability relationships. These are not captured as attributes, but as a set of relationships to:

Other requirements to show dependence or sequence

Other requirements to show groupings (such as a hierarchy of functionality)

Other requirements to show traceability to parent or child requirements (i.e., traceability from parent business requirements to child stakeholder or solution requirements)

It will also be important to track relationships to other elements such as:

Business Rules – solution requirements have relationships to business rules which are invoked in the requirement

Activities – solution requirements have relationships to activities on process models

Application Components – solution requirements have relationships to the application components that satisfy that requirement

Stakeholders – to show ownership of requirements

Test Cases – the set of test cases, and their test statuses, associated with the requirement. It is important to know if these tests are completed, passed, or have defects which are being managed. Defects are related to test cases

Releases – the current and past release allocation history for the requirement. Is also important to know the release status, for example, whether the release is built, tested, deployed, etc. Once the release that the requirement is allocated to is implemented, then the status of the requirement should be set to be implemented.

Appendix E,

Requirement Traceability Semantic Model, contains a model describing the relationships between requirement elements and other design or architecture elements.

4.7. Requirements Writing Style Guide and Quality

CMS has published a requirements writing style guide² that is a good reference for writing requirements. In general, good quality requirements are:

- Complete – Fully describes the functionality to be delivered or the need of the business
- Consistent – Requirements should not conflict with other requirements of the same type or with higher-level requirements
- Correct – Accurately describes the functionality to be built
- Feasible – Can be implemented within the known capacities and limitations of the system and its operating environment
- Necessary – Documents a needed capability or one required to comply with an external system requirement or a standard
- Prioritized – Is assigned an implementation priority (in the case of each functional requirement) to indicate how essential it is
- Unambiguous – Enables all readers of a requirement statement to arrive at a single, consistent interpretation of it
- Verifiable – Indicates through tests or other verification approaches, such as inspection or demonstration, that it implements the required action properly
- Traceable – Can be linked backward to its origin and forward to the design elements and source code that implement it as well as to the test cases that verify it was implemented correctly
- Testable – the requirements must be able to be tested in the solution

Checklists are provided in Appendix D which can be used and adapted to verify requirement completeness and quality.

4.8. Writing Requirements

The process of writing requirements are described in such documents as the following, as so techniques for writing requirements are not repeated here.

² CMS Requirements Writers Guide Version 4.11, August 31, 2009

- Software Requirements, Karl Wieggers, Copyright Microsoft Press, 2003
- More About Software Requirements, Karl Wieggers, Copyright Microsoft Press, 2006
- International Institute of Business Analysis (IIBA®) Business Analysis Body of Knowledge (BABOK™) Version 3.0
- CMS Requirements Writers Guide Version 4.11, August 31, 2009

However, it is important to note that business requirements can be discovered through many techniques such as architecture model-driven design, data modelling, modeling of business processes, business rules, user stories, or the process of developing or interpreting policy, legislation and regulations, and stakeholder analysis.

4.9. Requirements Templates

Templates for defining business and solution requirements are defined in the EA-BOM Management Plan Appendix D, Framework Specifications. See the EA-BOM Management Plan document for templates for:

- Business requirement specification
- Functional requirement specification
- Non-functional requirement specification
- Requirement Traceability Matrix specification

4.10. Requirement Review, Approval and Alignment to MMP SDLC Gates

The requirements life cycle is iterative throughout the MMP SDLC. Within the SDLC, business and stakeholder requirements development begins at the Initiation, Concept, and Planning Phases, and become more refined and granular as solution requirements in the Requirements Analysis and Design Phases. These solution requirements become the driver for the completion of the Build and Test Phases. Once implemented, the life cycle begins again for post-implementation activities.

Assessing the need for a requirement involves the State business owners, and potentially MMP Contractors, reviewing the current operating model and defining the Target Operating Model. In addition to the review of the current versus future state of the business, the State will begin to develop business and stakeholder requirements that will be used in the Initiation Phase for a business case. In some cases, the solutions requirements will be defined before the Requirements Analysis Phase, allowing time for the SI Contractor to focus on how those requirements will be implemented. Depending on the size and complexity of the project, solution requirements definition may wait until the beginning of the Requirements Analysis Phase.

Furthermore, different MMP Contractors may be tasked with creating and documenting requirements. In such cases, the Project Management Plan and Requirements Management Plan shall describe in detail the role that stakeholders will play in the requirements life cycle.

The figure below illustrates when requirements are defined in relation to the MMP SDLC.

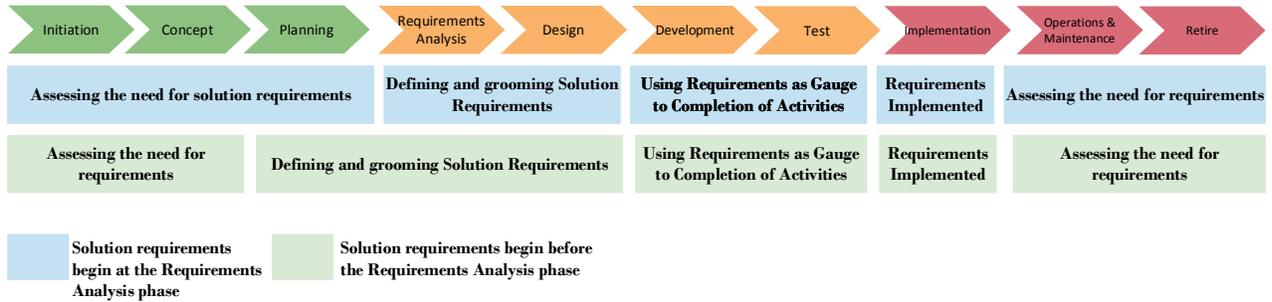


Figure 5: Requirements Life Cycle in the SDLC Phases

At a minimum, all requirements must meet the following milestones:

- Need for requirement is identified
- Requirement(s) gathered
- Business owners validate functional requirements, review and approve the requirements for their functional areas, or amend them as appropriate
- System owners validate non-functional requirements, review and approve the requirements for their functional areas, or amend them as appropriate
- The State and SI Contractor implementing the solution verifies the quality and availability of requirements and identifies any gaps or new requirements needed. Requirements are then baselined
- The SI Contractor implementing the solution provides a design that aligns with the baselined requirements for State approval
- The SI Contractor implementing the solution builds the approved design that is based on baselined requirements
- The IV&V Contractor is responsible for verification of gaps between solution and baselined requirements
- The SI Contractor implementing the solution provides the test cases to the State and the IV&V Contractor. The SI Contractor performs the test cases to demonstrate how the requirement will be validated
- The SI Contractor implements the approved design, based on the approved requirements, in all relevant environments.

Although the requirement life cycle does not have gate reviews, the MMP SDLC does. As such, the Requirements Management Plan shall describe how the requirements life cycle milestones will be constructed to complement the needed activities and artifacts within the MMP SDLC Phase Gate Reviews.

5. Requirements Management Roles & Responsibilities

This section describes the stakeholders involved in the requirements management life cycle and their responsibilities and accountability.

There are many roles which support the requirements life cycle that need to be put in place by the State, TAS Contractor, SI Contractor, SPMO Contractor, and IV&V Contractor. The RACI matrix in **Error! Reference source not found.**, outlines which stakeholder is Responsible for or has Shared Responsibility, Accountable for, Consulted on, or Informed about moving requirements through their life cycle.

Each MMP project will be responsible for producing a RACI that shows the requirement life cycle used for that project, and the roles that each stakeholder plays in the life cycle.

Each MMP project will also be responsible for producing a RACI that shows the role of each stakeholder in the requirements management activities listed in the Requirements Management Activities and Processes Section.

The following table summarizes the key roles and responsibilities for the State and MMP Contractors in the management of requirements. Please refer to Appendix B for detailed role descriptions and RACI conventions.

Table 5: Requirements Roles and Responsibilities

Requirements Analysis	SDLC Stage Gate Review	Requirements Activities	State				Contractor				
			HCFA Business	HCFA IS	HCFA Enterprise Security	Program & Project Management	STS (Infrastructure)	SI	TAS	SPMO	IV&V
Requirement Analysis	Preliminary Design Review	Gather Requirements	A	SR	C	C	I	SR	SR	I	C
		Verify Requirements	A	SR	C	C	I	SR	SR	I	C
		Approve Requirements	A	SR	C	C	I	SR	SR	I	C
		Verify Requirements with System Integrator	A	SR	C	C	I	R	SR	I	C
		Cancel Requirements	A	SR	C	C	I	R	C	I	C
Design	Detailed Design Review	Baseline Requirements	A	SR	C	C	I	R	C	I	C
		Cancel Requirements	A	SR	C	C	I	R	C	I	C
		Defer Requirements	A	SR	C	C	I	R	C	I	C
	Final Detailed Design Review	Cancel Requirements	A	SR	C	C	I	R	C	I	C
		Defer Requirements	A	SR	C	C	I	R	C	I	C
Development	Validation Readiness Review	Test Requirements	A	SR	C	C	I	R	C	I	C
		Cancel Requirements	A	SR	C	C	I	R	C	I	C

Requirements Analysis	SDLC Stage Gate Review	Requirements Activities	State				Contractor				
			HCFA Business	HCFA IS	HCFA Enterprise Security	Program & Project Management	STS (Infrastructure)	SI	TAS	SPMO	IV&V
		Defer Requirements	A	SR	C	C	I	R	C	I	C
Test	Implementation Readiness Review	Test Requirements	A	SR	C	C	I	R	C	I	C
		Cancel Requirements	A	SR	C	C	I	R	C	I	C
		Defer Requirements	A	SR	C	C	I	R	C	I	C
Implementation	Operational Readiness Review	Implement Requirements	A	SR	C	I	I	R	R	I	C

The **HCFA Business** (business owner) and the **HCFA IS** (IT owner) are accountable for ensuring that the requirements capture the business or technology need properly. HCFA IS is also responsible for ensuring that the impact of requirements on the organization as a whole are defined, understood, and are balanced against the needs of an individual project. The State or TAS Contractor, on the State’s behalf defines business requirements and stakeholder requirements, and gathers solution requirements. The HCFA Business approves all types of requirements.

The **TAS Contractor**, on behalf of the State, is responsible for managing the elicitation of the requirements through to the point of procuring an SI Contractor.

The **Strategic Project Management Office** (SPMO) Contractor is responsible for the review of requirements and the gathering and analysis work, and is therefore consulted throughout the requirements life cycle.

HCFA Enterprise Security is responsible for ensuring that security requirements are properly captured, and include the risk of unauthorized access to systems associated with Confidentiality, Integrity, and Availability of HCFA IT Assets.

Strategic Technology Solutions (STS) is responsible for ensuring that non-functional requirements (such as technology standards, performance standards, etc.) are captured properly within the set of solution requirements.

The **SI Contractor** as the primary integrator is responsible for designing a solution that meets the requirements. They are also responsible for managing the requirements life cycle for new requirements, or existing requirements, through to the end of the project. The SI Contractor:

- Refines / manages solution requirements
- Defines solution design
- Implements solution
- Defines transition requirements

The **IV&V Contractor** the IV&V Contractor is responsible for verifying requirements against defined specifications and verifying that requirements are traceable throughout the SDLC for the project. The IV&V also validates that the system satisfies the business objectives.

6. Requirements Management Traceability

This section describes how requirements will be traced to each other, from program needs and goals through to implemented solutions. This section will specify a requirements metamodel that must be followed within a project's toolsets to ensure that requirements traceability can be proven and reported upon.

In general, the State, or the TAS Contractor on the State's behalf, will create Enterprise Architecture (EA) artifacts and business, stakeholder and solution requirements in architecture and requirements management tools. To date, the TAS Contractor has completed this work using one integrated tool called Sparx Enterprise Architect, for the Eligibility Modernization Project (EMP).

Each artifact or model contains elements or objects in a relational database. Relationships have been created in the repository tool's database between requirement elements and model elements using UML associations (for example, between a functional requirement element and a business process element). This repository also contains relationships between EA artifact elements (for example, between a stakeholder element and a business process element).

MMP projects and SI Contractors within those projects are not required to use the State's tools or approach for traceability. The SI Contractor is required however to document in a project's Requirements Management Plan how this traceability will be implemented. The project (and SI Contractor) is also required to describe how the project repository of architecture artifacts and requirements will interoperate with the State's requirements and architecture management tools.

The diagram attached in Appendix E illustrates a traceability model for the requirement and architecture elements. Traceability of requirements to other design objects, or to other requirements, are captured in the relationships that the requirements have to these objects and in the requirement attributes. This diagram does not specify all of the relationships between the architecture and requirement elements, but those that are required for traceability.

Regardless of how the traceability is stored in a requirements management tool, it is important to understand the different types of traceability that must be defined. Types of traceability should be stored as attributes on the relationships between the elements. These include:

- **Derived:** relationship between two requirements, used when a requirement is derived from another requirement. This type of relationship is appropriate to link the requirements on different levels of abstraction. For example, a solution requirement is derived from a business or a stakeholder requirement.
- **Dependent:** relationship between two requirements, used when a requirement depends on another requirement. Types of dependency relationships include:
 - **Necessity:** when it only makes sense to implement a particular requirement if a related requirement is also implemented.
 - **Effort:** when a requirement is easier to implement if a related requirement is also implemented.

- Satisfy: relationship between an implementation element and the requirement(s) it is satisfying. For example, the relationship between a functional requirement and an application component that is implementing it.
- Validate: relationship between a requirement and a test case or other element that can determine whether the requirement is met.

7. Requirements Management Tools, Repository and Reporting

7.1. Requirements Tools and Repository for MMP Projects

The Requirements Management Traceability Section describes the approach for how requirements tools and architecture tools will interoperate within projects and between the State and a project.

In general, the State, or the TAS Contractor on the State's behalf, will create business, stakeholder and solution requirements in a requirements management tool. At the time of publishing this document, the State had not yet standardized on a toolset. It is expected that SI Contractors within MMP projects will import project requirements into the SI Contractor toolset and manage requirements through their full life cycle.

7.2. Tools in the Context of The EMP

The following diagram represents the current state of the Tennessee Eligibility Determination System requirements tools and repository at the time that the Request for Qualifications (RFQ) for Systems Integration (SI) Services RFQ #32101-15557 was published.

The State has gathered solution requirements into MS Excel workbooks, and has defined a series of current-state and target-state architecture artifacts within their architecture repository, Sparx Enterprise Architect. It is expected that the requirements will be loaded into the SI Contractor's requirements management tool, where they will continue to be managed through to implementation. During the process of design and testing, it is expected that further requirements will be uncovered that the SI Contractor will manage in their requirements management tool. The SI Contractor is expected to define and manage transition requirements, and trace those to solution requirements.

The SI Contractor is also expected to import the architecture artifacts from Sparx Enterprise Architect into their architecture tool, and to trace all requirements to architecture artifacts. The architecture artifacts that will be managed inside of the SI Contractor's tool include the target-state artifacts produced by the State, and the solution architecture artifacts produced during solution design.

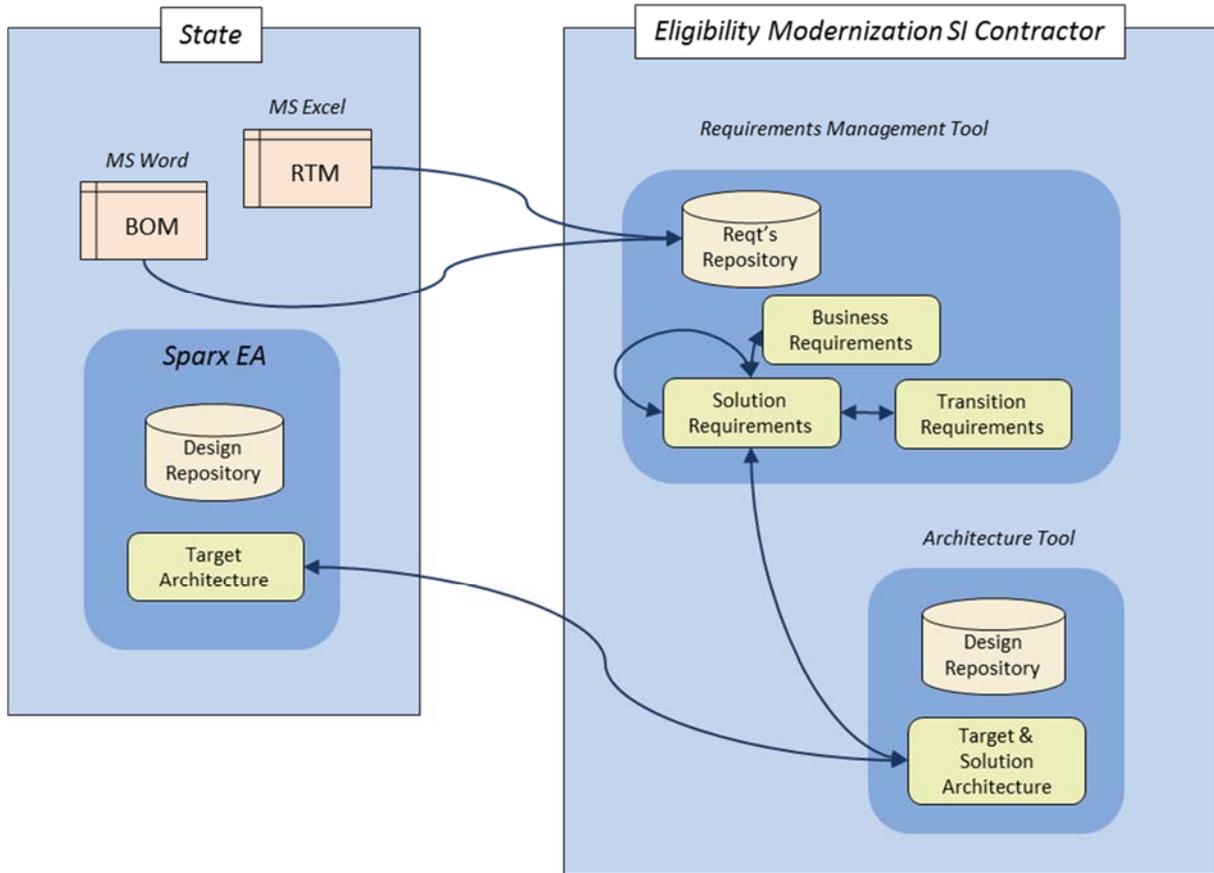


Figure 6: Requirements Context for EMP SI Contractor

The State has also captured business requirements in a Business Operating Model (BOM) Document (published in MS Word). It is expected that the SI Contractor will extract these business requirement statements, import them into their requirements management tool, and trace those requirement statements to the solution requirements.

The EMP Requirements Management Plan must confirm this approach for requirements tools and the repository within the project. It is possible that before the SI Contractor begins the EMP, that the TAS Contractor on the State's behalf will have loaded all business and solution requirements into Sparx, and traced requirements to target-state architecture artifacts.

7.3. Reporting

During projects, all stakeholders will require regular reports about the status of requirements, independent of formal publication of requirements documents. It is expected that, as part of a project's Requirements Management Plan, the reporting requirements are defined. At a minimum, it is expected that the State will be able to report the following as required, on demand:

1. Requirements Stability Index
2. Detailed requirement report or RTM by:

- a) Non-Functional Requirement to technical verification checklist (traceable to the solution design in the Solution Design Document)
 - b) Requirement mapped to business rule (only applies to Functional Requirements)
 - c) Requirement mapped to data element
 - d) Requirement mapped to application component (for Functional Requirements)
 - e) Non-Functional requirement to Build Book
 - f) Requirement mapped to owner
 - g) Requirement mapped to test case
 - h) Requirement mapped to release
3. Total number of requirements:
- a) By timeframe, owner, status
 - b) Allocation by release
 - c) Changed
 - d) Cancelled
 - e) Added
 - f) Re-assigned to a later release/sprint
4. Which requirements are:
- a) implemented in a release
 - b) still being tested
 - c) still in development
 - d) awaiting allocation to a release

8. Requirements Quality Measurement

This section describes how the quality of requirements will be measured and tracked throughout the requirements management life cycle. This section will contain the Key Performance Indicator (KPI) and metrics that can be used by the State to measure the quality of requirements.

In order to measure quality of requirements, business and technical requirement owners, with the help of MMP Contractors, need to ensure that requirements are written appropriately. This means that requirements are written in clear and concise language with good quality. Requirements do not include the details of the design or the implementation. Determining the execution and implementation of a requirement is the responsibility of the Contractor who is implementing the solution.

Once requirements are gathered and approved, the project management must understand how requirements are impacting the project. This can be accomplished through the collection of metrics and monitoring of the Requirements Stability Index KPI. Any such metrics collected must be demonstrative of a specific project problem that will need to be addressed once the acceptable threshold for that metric has been exceeded.

The presented measurements below represent a demonstrative sample of possible metrics that can be tracked to monitor the quality of requirements. Each project, as part of the project's Requirements Management Plan, must determine which metrics will be collected and reported upon during the life cycle of the project.

Table 6: Requirement KPI Measurements

KPI	Use	Project Impact	Additional Notes
Requirements Stability Index	<p>Determines the overall rate of change to requirements.</p> <p>(Total # of Requirements Baselined + # of Changed Requirements + # of Added Requirements + # of Cancelled Requirements) / Total # of Requirements Baselined</p>	<p>If this rate of change is too high, requirements are potentially impacting schedule, attributing to scope creep, or are not being written properly.</p>	<p>This metric is best used for mapping volatility over time, identifying times when volatility was introduced into the requirements process. Correlating the volatility to activities that were occurring at the time will allow for adjustments in process and activities to further avoid introducing high levels of volatility into requirements.</p>

Table 7: Requirement Quality Metrics

Metric	Use	Project Impact	Additional Notes
Total number of baselined requirements changed	Can demonstrate a project-level problem with writing or defining requirements.	This will demonstrate if there is a large amount of requirements being changed on the project.	Used as part of determining the Requirements Stability Index.
Total number of baselined requirements cancelled	Can demonstrate a project-level problem with writing and defining requirements.	This will demonstrate if there is a large number of requirements being cancelled on the project.	Used as part of determining the Requirements Stability Index.

Metric	Use	Project Impact	Additional Notes
Total number of requirements added after baselined	Can demonstrate a project-level problem with missing requirements.	This will demonstrate if there is a large number of requirements being added to the project.	Used as part of determining the Requirements Stability Index.
Number of baselined requirements being assigned to a later release/sprint	This movement can demonstrate schedule slippage.	If requirements are constantly not completed in their originally scheduled release, then this can point to a problem with schedule slippage.	This metric can be more expeditious in its usefulness with Agile, projects where there are small sprints as part of the Work Breakdown Structure. For larger, Waterfall-style projects, this metric can help in planning schedule, scope, and budget for future releases.
Total number of baselined requirements changed by functional area	Can determine if one particular functional area (security, business, technical) or sub-function (user experience, services) are having difficulty writing acceptable requirements in a clear and concise manner with no ambiguity.	If one or more functional areas are struggling with the quality of their requirements, action plans and strategy can be directed toward that function or sub-function to ensure proper requirements are collected.	If one or more functions are not providing well written requirements, there can be downstream impacts on requirements in other functional or sub-functional areas that share dependencies on the requirements.

Metric	Use	Project Impact	Additional Notes
Total number of baselined requirements cancelled by functional area	Can determine if one particular functional area (security, business, technical) or sub-function (user experience, services) are having difficulty writing acceptable requirements in a clear and concise manner or identifying the appropriate requirements.	If one or more functional areas are struggling with the identification and quality of their requirements, action plans and strategy can be directed toward that function or sub-function to ensure proper requirements are collected.	If one or more functions are not providing well written requirements, there can be downstream impacts on requirements in other functional or sub-functional areas that share dependencies on the requirements.
Total number of requirements added by functional area since baselined	Can determine if one particular functional area (security, business, technical) is having difficulty identifying and defining acceptable requirements based on the characteristics of good requirements.	If one or more functional areas are struggling with the identification and definition of their requirements, action plans and strategy can be directed toward that function or sub-function to ensure proper requirements are collected.	Characteristics of good requirements (see Writing Requirements Section): <ul style="list-style-type: none"> • written in clear and concise language with no ambiguity • testable • traceable • consistent • feasible • necessary • include no implementation specifics • do not specify design

Metric	Use	Project Impact	Additional Notes
<p>Level of Effort of baselined Requirements Cancelled versus Level of Effort of Requirements Added since baselining</p>	<p>This can demonstrate the level of scope creep.</p>	<p>This demonstrates scope creep that may lead to additional Change Requests, or Scope, Budget, and Schedule discussions.</p>	<p>Some requirement management programs capture LOE based upon time, some use a rating or complexity level of small, medium, or high. In some cases this metric will be comparing total time vs. new total time – showing how much more or less effort has been changed. Other times the number of cancelled small, medium, and highs will be compared to the new number of small, medium, highs. The levels may be assigned a weighted value to each level of complexity in order to make the measurement numerical. The measurement looks for a disproportionate amount of new mediums/highs versus in the requirements that were cancelled. If the new requirements have a much larger effort, this points to scope creep.</p>
<p>Level of effort of total number of requirements added since baselining</p>	<p>This can determine schedule and budgetary risks.</p>	<p>If there is a large level of effort being added, the schedule and budget may need to be adjusted to account for new work.</p>	<p>This is a common way projects lend themselves to overspending, especially on Time and Materials contracts. Instead of using the proper Change Control processes, oftentimes the business will change requirements that, knowingly or unknowingly, tack on additional scope.</p>

Metric	Use	Project Impact	Additional Notes
Level of effort of total number of baselined requirements cancelled	This can determine potential savings in time (schedule) and budget due to work being cancelled.	If there is a large level of effort being removed, the schedule and budget may need to be adjusted to account for the removal of scope.	Projects can also use this metric in the Change Management process, as some changes may be able to repurpose hours reduced from the cancellation of requirements.
Number of hours spent on baselined requirements cancelled	This can be used to determine if there is too much time spent on requirements that are unattainable.	This can point to time (schedule) and budget that were used with no fruitful outcome.	This will point to the need to make requirements more granular so that they are attainable.

9. Requirements Management Plan Implementation & Operations and Governance

This section describes how the Requirements Management Plan will be implemented during MMP projects, and operated as a capability within the organization, including changes and updates to the Management Plan once implemented.

During a project SDLC, if the project's Requirements Management Plan requires changes to its scope, methods, tools, stakeholders and activities, etc. it will go through the proper change management process within the project.

An instance of a project Requirements Management Plan is governed by the MMP Project Steering Committee. Issues are escalated by the SPMO to the Executive Steering Committee as and when required.

The PGMP contains the processes for establishing Requirements Management Governance and the Requirements Change Board, which will be a sub-committee of the Technical Architecture Review Board (TARB). The overall guidance (i.e., this deliverable, Requirements Management Plan) will be updated at minimum once a year and managed by the Requirements Change Board.

9.1. Change Management

A change management process must be in place to manage changes relevant to and impacting requirements activities and deliverables.

The SI Contractor will define a process that is aligned to the overall HCFA change management expectations as outlined in the Change Management Plan. This Management Plan will provide guidance for the management of changes to requirements, requirement deliverables and artifacts.

Appendix A: Definitions, Acronyms and Abbreviations

Table 8: Glossary of Terms

Acronym	Definition
CHIP	Children’s Health Insurance Program
CMS	Centers for Medicare and Medicaid Services
DED	Deliverable Expectations Document
EA	Enterprise Architecture
EA–BOM	Enterprise Architecture Business Operating Model
EMP	Eligibility Modernization Project
HCFA	Health Care Finance and Administration
IV&V	Independent Verification and Validation
KPI	Key Performance Indicator
MMP	Medicaid Modernization Program
PGMP	Program Governance Management Plan
PMO	Project Management Office
RACI	Responsible, Accountable, Shared Responsibility, Consulted, Informed
RFQ	Request for Qualifications
RTM	Requirements Traceability Matrix
SDLC	Solution Development Life Cycle
SI	Systems Integrator
SPMO	Strategic Project Management Office
STS	Strategic Technology Solutions
TARB	Technical Architecture Review Board
TAS	Technical Advisory Services
TBSM	Tennessee Business Solutions Methodology
TEDS	Tennessee Eligibility Determination System

Appendix B: SDLC RACI CHART ROLE DEFINITION

This appendix defines roles and responsibilities that key stakeholders have in the SDLC Phase activities and deliverables.

The following defines what each letter in the RACI acronym means:

(R) Responsible: Those who are primary responsible for the work to complete the task or deliverable. Only one party shall be responsible for any activity, task, or deliverable.

(SR) Shared Responsibility: Those who are charged with completing some supporting work relative to the activity or task. There may be no, one, or multiple SR parties for any activity, task, or deliverable.

(A) Accountable: Those who are accountable for ensuring the correct and thorough completion of the task or deliverable. There should be only one Accountable party for any activity, task, or deliverable.

(C) Consulted: Those whose opinions and input are sought (two-way conversation).

(I) Informed: Those who are kept up to date on progress, often only on completion of the task or deliverable (one-way conversation).

Table 9: RACI Participants Definition

RACI Participants Definitions		
State	Program and Project Management	The management team that includes the Medicaid Modernization Program (MMP) Director and assigned Project Managers.
	HCFA Business	Organizational units that oversee the policies and operations of HCFA business functions, such as member services.
	HCFA IS	HCFA IS provides support for planning, design, implementation and operation of information technologies and methodologies.
	HCFA Enterprise Security	HCFA's enterprise security, includes HCFA & contractor resources responsible for reducing the risk of unauthorized access to systems and data.
	STS (Infrastructure)	Strategic Technology Solutions provides direction, planning, resources, execution, and coordination in managing the information systems needs of the State of Tennessee. STS is a division within the Department of Finance & Administration.

RACI Participants Definitions		
MMP Contractors	TAS	Technical Advisory Services supports and advises the State in completing the Medicaid Modernization Program (MMP) by offering Organizational Change Management and Training, Operations & Maintenance Planning, System Development Life Cycle Advisory Services, Quality Management, and Enterprise Architecture services.
	SPMO	The Strategic Program Management Office provides program and project management support to the State in completing the MMP
	IV&V	Independent Verification and Validation is an independent contractor responsible for verifying that any developed systems perform as designed and will continue to operate correctly in the future. IV&V provides objective evidence that all software requirements have been implemented correctly and completely. This includes evidence that the solution produces the intended results and that all functionality is traceable to solution requirements.
	SI	The System Integrator is responsible for the design, development, testing, implementation, and the operations and maintenance (O&M) of a new system to modernize and enhance eligibility determination, redetermination, and eligibility appeals for the State of Tennessee's Medicaid program (TennCare) and Children's Health Insurance Program (CHIP, known as CoverKids in Tennessee).

Appendix C: Requirements Management Plan Template

The following template can be used by any MMP initiative to describe how requirements will be managed within an initiative. This template is intended to be adapted to the specific initiative with the approval of the State, through the process of approving the Deliverable Expectation Documents for the Requirements Management Plan.

Through the life of the project, the Requirements Management Plan must be updated to reflect changes in the requirements management process, such as changes to roles, responsibilities, stakeholders, tools, methods, etc.

1 Introduction

Instructions: Summarize the purpose of the document, the document scope, the intended audience, assumptions, risks and constraints, and a list of the referenced documents. Modify and/or add content to the boilerplate text provided below, as appropriate.

1.1 Purpose

Instructions: In this section, describe the purpose and goals of the Requirements Management Plan. Summarize what the Requirements Management Plan is, and how it will be used for this project.

1.2 Scope

Instructions: Complete in-scope and out-of-scope statements, as to what the Plan includes and does not include, such as the following:

- *The methodology for managing the requirements*
- *The roles and responsibilities of stakeholders in the requirements management process*
- *How requirements will be traced to each other and to design and architecture elements*
- *Tools that will be used to manage requirements*
- *How requirements quality will be measured and monitored*
- *By whom the requirements will be reviewed and accepted*

1.3 Intended Audience

Instructions: This section will describe the target audience and users of this document, including business, technical, governance, and project management stakeholders.

1.4 Applicability

Instructions: Describe how applying this Plan will affect project stakeholders and current operations.

1.5 Assumptions, Risks and Constraints

Assumptions

Instructions: In this section, list any assumptions that may be related to the requirements life cycle and Requirements Management Plan.

Risks

Instructions: list any risks that may be related to the requirements life cycle and the Requirements Management Plan. Explain how risks will be managed, for example through a project risk register.

Constraints

Instructions: Identify and document any known constraints or limitations in the requirements management processes.

1.6 Referenced Documents

Instructions: List the documents, both internal and external to the State, that are referenced in this document and an overview of their content.

2 Requirements Management Methodology

Instructions: If the project requires an alternate approach than what is defined in the Requirements Management Plan standard, the project must provide justification for the proposed approach as well as demonstrate how the requirements are satisfied.

2.1 Requirements Types

Instructions: Define the requirement types that the project will use (e.g., business, stakeholder, solution (functional, non-functional), and transition). For non-functional requirements, define the subtypes that the project will use.

2.2 Requirements Life Cycle

Instructions: Describe the allowed states and workflow for all requirement types. Include a State Transition Model to help describe the statuses of the requirement types, as well as the relationship of requirements to testing, release management and defect management. Relate this model to the RACI to show who can move requirements from one state to the next.

2.3 Requirements Deliverables and Artifacts

Instructions: Describe the requirement artifacts and requirement deliverables that will be generated during the life cycle of the project. Outline a table of contents for each requirement deliverable.

2.4 Requirements Attributes

Instructions: Define the attributes that will be defined for each requirement type.

2.5 Requirements Prioritization

Instructions: In this section, describe how priority will be assigned to project requirements. Priority can be assigned based on criteria such as importance to the project or cost/benefit, and is generally done through collaboration with key project stakeholders.

3 Requirements Activities and Processes

Instructions: In this section, define the set of processes and tasks that will be performed to manage and maintain requirements throughout the requirements life cycle. Align these tasks to the project's work breakdown structure.

4 Requirements Roles and Responsibilities

Instructions: In this section, provide the roles and responsibilities in the requirements life cycle. Two RACIs should be completed: one that describes who can change requirement states through the life cycle, and another RACI defining the responsibility of each role against the requirements management tasks and activities.

5 Requirements Traceability

Instructions: This section will describe the traceability strategy. Describe how the use of such artifacts as the Requirements Traceability Matrix will help ensure the deliverables meet the requirements of the project. Demonstrate how the RTM and other artifacts will show the traceability between requirements and the solution design elements, business rules, data elements, architecture artifacts, and test cases.

Describe the derived and dependent relationships between the different types of requirements.

Include a traceability model showing how the architecture artifacts are traced to requirements and requirements to each other. In addition, this section will describe how the repository of architecture artifacts and requirements will interoperate with the State's requirements and architecture management tools. Describe the methods for maintaining the requirements traceability throughout the development process.

6 Requirements Tools, Repository and Reporting

Instructions: This section will describe the tool the project will use to manage all requirement types. The Requirements Management tool must be interoperable with the Test Management tool, Business Rules Management tool, and Enterprise Architecture Tool.

This section will describe the reports the tool will generate. This section will outline the processes for obtaining access to the tool, the training required for the use of the tool, and the transfer of the artifacts to the State tools.

6.1 Tools Definition

Instructions: In this section, describe the tools that will be used for requirements management. Describe how the tool will meet the business's needs and interoperate in the project ecosystem. Prescribe how the tool will capture, standardize, classify, monitor, report, maintain, and manage requirements.

6.2 Requirements Consolidation

Instructions: In this section, describe how the requirements produced in the project will be consolidated into the State's requirements management tool. If the project requirements management toolset is different than the State's tool, provide step-by-step instructions for how requirements will be exported and consolidated. Also describe the schedule for how often the consolidation will occur.

6.3 Guide for Using the Requirements Management Tools

Instructions: In this section describe how the user will access and use the tool selected for requirements management on the project. This guide will train those responsible for managing

requirements in the appropriate requirements management procedures and the use for the requirement management tool. Include standard operating procedures for defining, maintaining, and changing requirements in the tool.

6.4 Reporting

Instructions: The reporting section will describe the requirements reports that will be generated during the project, how often, and their purpose. Include here examples of the reports that will be used to demonstrate:

- *Status of requirements – within the requirements life cycle, but also within releases, and as it relates to testing and defects*
- *Types of requirements*
- *The hierarchy to which requirements are assigned*
- *Requirements traceability – to other requirements, and to the business process/architectural feature to which requirements relate*

6.5 Requirements Repository

Instructions: In this section, describe how the requirements will be structured in the repository. Show the traceability of artifacts from the repository to the requirements management tool. Describe the repository's relationship, interface, or dependency on data with other tools (for example, the test management tool, defect management tool, release management tool, development management tool, and architecture repository tool).

7 Requirements Change Management

Instructions: In this section, define how changes to the requirements or the project will affect the requirements process. Describe the baselining process, and at what point in the requirements life cycle requirements will undergo formal change management. Describe how the changes to the requirements will be initiated, how the impacts will be analyzed, how they will be traced, tracked and reported, as well as the authorization level to approve the changes. Refer to the project's Change Management Plan and reflect these roles in the RACI section.

8 Requirements Quality Measurement

Instructions: In this section, describe how the requirements quality will be measured throughout the requirement life cycle. Include the metrics and Key Performance Indicators (KPI) that will be used to measure the quality of the requirements. As the quality standards will differ based on the requirement type being measured, the requirement type should be identified in this section.

9 Requirements Alignment to SDLC

Instructions: In this section, describe how the project will ensure that the requirements life cycle milestones will be constructed to complement the needed activities and artifacts that have a dependency on completed requirements during the MMP SDLC Phase Gate Reviews.

Appendix D: Requirements Review Checklist

The following checklist can be used to validate that an individual solution or transition requirement is properly formed and can be validated.

Table 10: Solution and Transition Requirement Review Checklist

Evaluation Criteria	Yes	No	ID	Remarks
A test case is associated with the requirement.				
The requirement can be understood by affected parties (e.g., SME, developers, and testers).				
Unacceptable words and phrases are absent (e.g., adverbs, adjectives, as appropriate, at a minimum).				
Requirement conforms to standard format as defined in the EA-BOM.				
Requirement is at the appropriate level of detail for its position in the hierarchy.				
Requirement has the associated information required by the Requirements Management Plan.				
Requirement is within scope.				
Requirement is testable.				
Requirement is terse.				
Requirement avoids specifying design.				
Requirement is feasible.				
Requirement is written in the imperative (shall).				
Cross-references are specific so the information can be easily located; the reference is located in the project document library if it is external to the requirement.				
Requirement can be traced to its parent or driver through a relationship process/diagram (relationships between business, stakeholder, and solution requirement types as depicted in Appendix E).				
Requirement is unrestrictive; it can be				

Evaluation Criteria	Yes	No	ID	Remarks
implemented by more than one solution or design.				
Assumptions and dependencies for requirements are stated.				

The following checklist can be used to ensure that the solution requirements on the aggregate are complete:

Table 11: Aggregate Solution Requirements Review Checklist

Evaluation Criteria	Yes	No	ID	Remarks
Requirements are consistent with each other.				
Requirements are complete: every case or scenario is addressed.				
Requirements address user interfaces.				
Non-functional requirements are addressed.				
Non-functional requirements can be easily mapped to related functional, solution, stakeholder, and business requirements as depicted in Appendix E				
Requirements address system and user error conditions.				
All requirements are traced to their parent or driver (no dropped traceability).				
Interfaces are specified (internal/external).				

Appendix E: Requirement Traceability Semantic Model

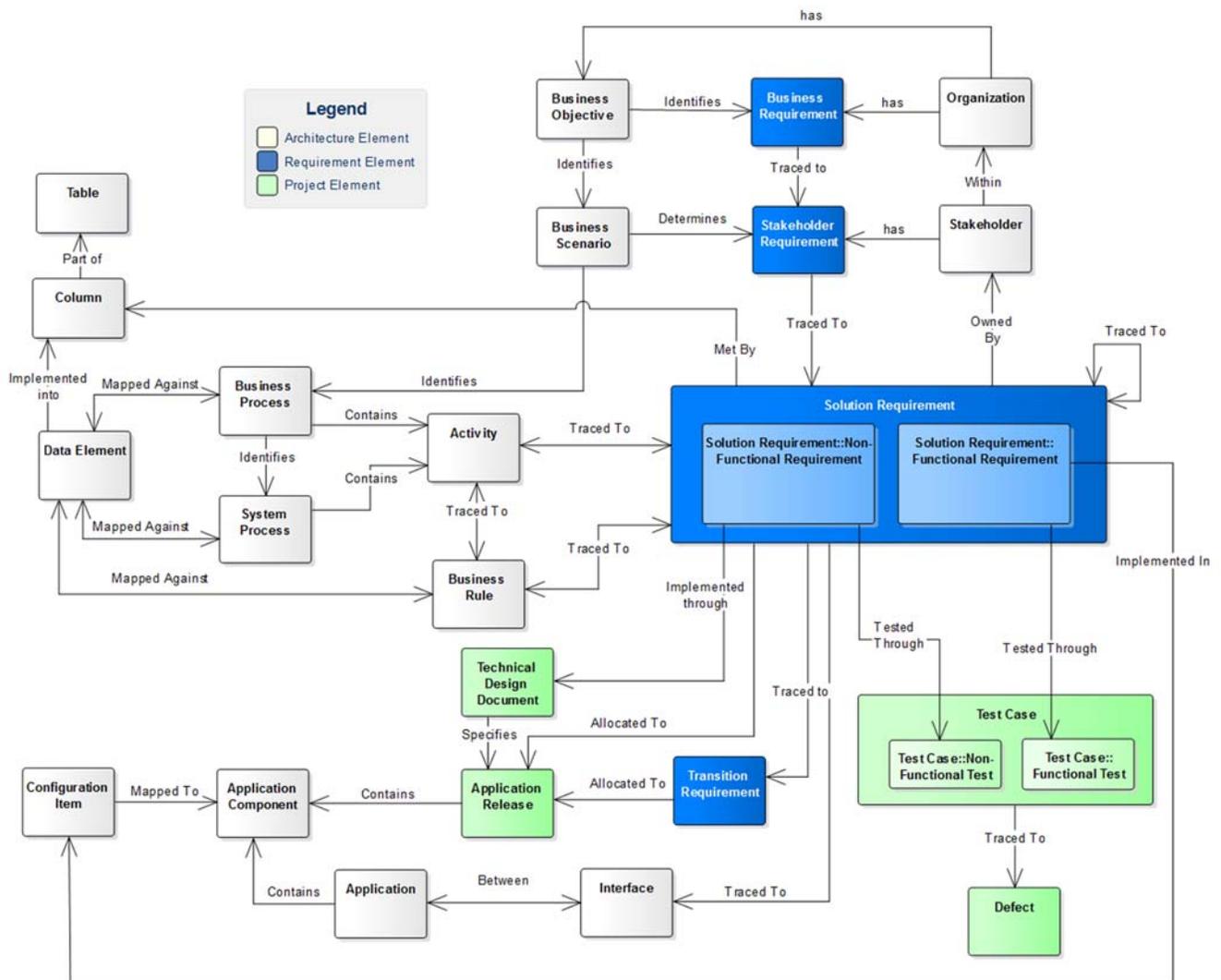


Figure 7: Requirement Traceability Semantic Model

The above diagram illustrates a logical model for how requirements traceability can be implemented into a requirements and architecture repository. This model may not apply to each individual MMP project; each project will have to define how traceability will be physically implemented in its Requirements Management Plan.

This traceability is required to prove that an implemented system aligns with achieving an organization's goals and objectives.

The above model illustrates that an Organization has Business Objectives (which are the goals and outcomes that a business is trying to achieve). Business Objectives drive writing Business Scenarios. Business Objectives also uncover Business Requirements. Business Scenarios

identify Stakeholder Requirements, which are needs expressed from the viewpoint of one Stakeholder. Business Scenarios (or User Stories) identify Business Process models, which contain Activities and decompose into System Process Models.

Business Rules, Data Elements and Activities are all mapped to each other and to Solution Requirements, both Functional and Non-Functional. Solution Requirements are owned by a Stakeholder, who is responsible for that requirement from the business perspective.

Solution Requirements are related to Stakeholder Requirements and Business Requirements in a requirements hierarchy. Transition Requirements are related to Solution Requirements. Solution Requirements are allocated to Application Releases.

A Functional Requirement is mapped to the Configuration Item that implements the functionality contained in that requirement. Because Non-Functional Requirements are not implemented by just one Configuration Item, the traceability of a Non-Functional Requirement to an implemented solution is realized through a Technical Design Document. The Technical Design Document specifies the design artifacts and architecture of an Application Release which is implemented into production.

Some Non-Functional Requirements will also have relationships to the physical Tables and Columns that implement the requirement, such as security or privacy requirements. There may also be relationships between Functional Requirements and Data Elements.

Interfaces between Applications will also have a Solution Requirements.

Therefore, a path from Business Objectives to an implemented solution can be linked as follows:

Business Objectives -> Business Requirements -> Stakeholder Requirements -> Functional Requirement -> Configuration Item -> Application Release -> Implemented Solution

Business Objectives -> Business Requirements -> Stakeholder Requirements -> Non-Functional Requirements -> Technical Design Document -> Application Release -> Implemented Solution

The SI Contractor must demonstrate traceability to solution design artifacts within the Technical Design Document in an architecture repository. The metamodel for the Solution Architecture and technical design has not been specified here except to the Configuration Item. The SI Contractor must define their Solution Architecture metamodel with the agreement of the State and show how this traces to the Configuration Item and the other metamodel artifacts in this diagram.