

Developing an ITS Technology Web Portal for Transit System Leaders

DETAILS

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Abstract

TCRP Project G -13, Developing an ITS Technology Web Portal, creates a portal for Transit System Leaders that they can use to learn about new and emerging transit systems and technologies. The Portal, designed as a one-stop resource on the APTA website, provides information not only on the technologies but also their relationship to transit business practices, technology implementation issues, and adoption challenges. Portal content will be submitted by industry experts and reviewed by designated reviewers of the Tech Portal Subcommittee of APTA's Research and Technology Committee.

EXECUTIVE SUMMARY

The ITS Web Technology Portal for Transit System Leaders is intended to be a one-stop shop for transit agency leaders to learn about ITS technologies that can be applied to transit operations. When fully implemented, the ITS Technology Portal will reside on the APTA membership portal and be highly accessible to all members of APTA. The intent of the ITS Technology Portal is to create an environment where APTA members, including transit agency leaders, can quickly find a wide array of information regarding the various technologies that are increasingly relevant to the modern day public transportation industry. Content will be loaded to the ITS Technology Portal by subject matter experts, who have the ability to communicate the details about ITS Technologies used in transit agencies in a manner that does not require detailed technical knowledge to comprehend.

TCRP Project G-13, Developing an ITS Technology Web Portal for Transit System Leaders, is intended to create a prototype of the ITS Technology Web Portal. This report provides the outputs of the project. Phase 1 included the definition of needs, requirements, and high-level design of the web portal. In Phase 2, an actual prototype of the portal was created, which will eventually be transitioned to APTA to manage as part of its membership portal. Additionally, documents that support operations of the portal were developed as part Phase 2.

The overall objective of the project is to create a web-based repository of Technology information that can be accessed by a wide array of transit professionals, keeping the needs of Transit Executives in mind. Phase 1 of the project used a systems engineering process to define the following:

- Who will use the web portal?
- What stakeholder needs drive the development of the portal?
- What are the actual requirements for the portal?
- What are the design considerations for the creation of the portal and?
- How will the portal prototype be tested?

The activities of Phase 1 resulted in six outputs, which addressed the above objectives:

1. The **Concept of Operations (ConOps)** set the stage for the rest of the design of the system, and included system goals / objectives, stakeholder roles and responsibilities, and use cases.
2. The **Systems Requirements (SysRqts)** explicitly stated what the system must do, and included standards, templates, and procedures for content management.
3. The **Technology Alternatives Analysis (TAA)** provided guidance in the selection of tools to be used for the development of the portal.
4. The **High-Level Design (HLD)** laid out the details of system design, and included wireframes and workflows, data model for information cataloging and storage, and presentation methods.
5. The **Test Plan and Procedures** provided a methodology for ensuring that each requirement of the portal is met, once it is built and operational.

6. The **Preliminary Transition Process** laid the framework for transferring the portal prototype developed for this effort over to the APTA website, where it will reside when completed.

A key output of the Concept of Operations task was to define the key stakeholders along with their roles and responsibilities in using and maintaining the web portal. The key stakeholders and their roles were defined as:

- **APTA Member:** This is a person who is registered as an APTA member, and will have full access to review and provide content to the portal. This includes both transit upper management, for whom the portal is targeted, and subject matter experts, who may have content to provide.
- **APTA Research and Technology (R&T) Committee Member:** The APTA R&T Committee serves as the champion for development of this web portal. Per its charter, “The committee’s objective is the advocacy of Research and Technology as a means of enhancing the performance of all aspects of the public transportation industry.”
- **APTA R&T Committee Tech Portal Subcommittee Member:** The members of this subcommittee will be responsible for reviewing and moderating content that is posted to the portal.
- **APTA Information Technology (IT) Staff:** Technical staff that are employed by APTA to manage its information technologies, including its web sites. This also includes any support staff outsourced by APTA to host its system. APTA IT Staff will be responsible for maintaining the portal after this project’s efforts have been completed and the portal has transitioned to APTA.

To support the stakeholders, seven user needs were identified and included in the Concept of Operations, which drove the rest of the design process:

1. Provide a one-stop resource for APTA members to learn about new and emerging technologies applied to transit ITS.
2. Ensure that the resources stored in the System:
 - Are easily discoverable by users.
 - Are current.
 - Show their applicability to transit users, including transit system leaders and non-technical transit professionals.
 - Comply with APTA content policies.
3. Provide an interactive environment for industry discussion and exchange on new and emerging technologies.
4. Provide guidance tools for APTA members to post content on ITS technologies in a standard format to the System. The tools should:
 - Support standard multimedia formats for posting to the System
 - Ensure the proper attribution and identification of the posting
 - Follow APTA policies on submittals hosted on APTA web sites
 - Provide a template for submitters to post their content
5. Enable the content to be managed by APTA R&T Committee Tech Portal Subcommittee (hereafter called the Review Committee)
 - Implement tools for the Review Committee to review submitted content.

- Allow for the Review Committee to delegate posted content to industry experts.
 - Provide event alerts to the Review Committee. Alerts may include notification when new or revised content is posted, when stored content should be reviewed periodically, and messages from users and reviewers.
 - Ensure that new Review Committee members can be assigned or removed from the Review Committee access privileges.
6. Develop a System that minimizes operations and maintenance costs and resources.
 7. Ensure compliance with APTA Tech Portal Governance Processes (as described in Appendix A).

A set of requirements for the portal was developed. The functional requirements were defined for the areas of:

- Manage Access
- Manage Storage
- Manage Content
- Manage Discovery

Additional requirements areas included Information Management, covering user interface requirements and System Performance and Life Cycle.

A Technology Alternatives Analysis (TAA) was then performed which considered several options for the underlying portal tool. The recommendation of the TAA effort was that SharePoint 2010 was the best choice for the underlying portal technology. At this point, work on the project was halted to allow APTA to upgrade its IT system. Following that upgrade the project restarted with the development of a High-Level Design (HLD) for the Portal.

The output of the HLD was the high-level architecture shown below:

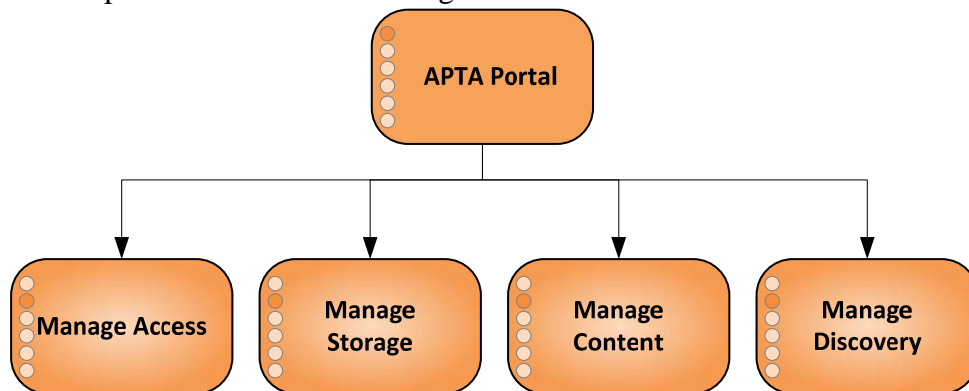


Figure ES-1: High-Level Architecture

The primary functions of each architectural component of the portal are as follows:

Table ES-1: Portal Functions

Function Name	Description
APTA Portal	The APTA portal is controlled and underpinned by the features inherent in Microsoft SharePoint which provides capabilities as an overarching capability for portal management.
Manage Access	Functions for managing access to the portal enable control, roles and privileges for downloading and interacting with the content and users of the system.
Manage Storage	The Storage function stores all the resources, artifacts, documents, and event lists that are used by the System. It stores provisional and approved content, resource status, resource identification, catalog services, user lists, and other key information needed to manage and categorize resources. The Storage features also contain functionality for Content Submitters to post resources and multimedia.
Manage Content	Content Management functions enable the Review Committee to implement the content review processes. The processes include collecting, alerting, posting reviews, and changing the status of content submitted.
Manage Discovery	Discovery Management provides features that enable portal users to browse or search for information-specific topics. The functions also include context for categorizing and tagging the resources so that they are more easily retrievable.

The documentation developed in Phase 1 was used to build the actual portal prototype during Phase 2. During the development of the portal prototype the team considered several approaches to the detailed implementation of the portal and settled on a simple structure, much like the popular internet search engines. This structure, shown in Figure ES-2 has the material on the portal organized by a type parameter, much like a library is organized by subject. The initial set of types defined for the portal were:

- Application- content primarily relates to a specific transit application (e.g. Transit Signal Priority)
- Benefit- content primarily relates to a discussion of benefits of some transit system
- Information- content primarily relates to transit data or information
- Solution- content primarily relates to a particular transit solution (e.g. Transit Enterprise Architecture)
- Standard – content primarily relates to an ITS standard
- Technology- content primarily relates to a specific technology applied to transit (e.g. automatic vehicle location)

In addition the page has a search box, allowing the portal to be search by a number of means.

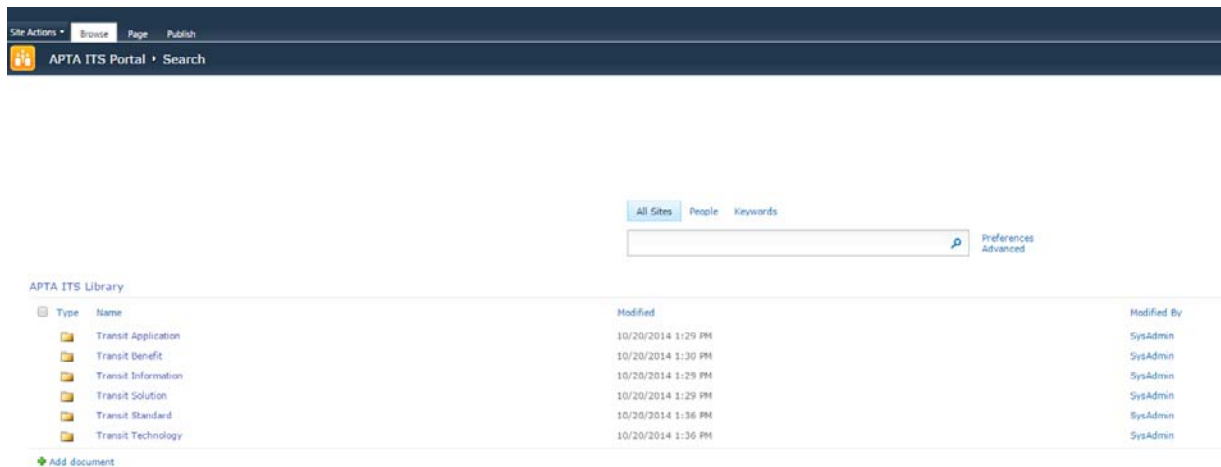


Figure ES-2: Portal Prototype

The prototype was hosted externally in a test location. Once software development was created, the portal was tested in accordance with the Test Plans and Procedures defined in Phase 1. Finally a Beta test was held to determine whether or not the user needs of portal users were met. Three additional plans were also developed as part of Phase 2 to aid the operators of the portal once it has transitioned to MyAPTA. A marketing plan was developed to provide an approach to informing potential users of the portal. A sustainability plan was created to describe the ongoing operations and maintenance requirements of the portal. Finally, an implementation plan was created to describe the integration of the portal into MyAPTA.

Chapter 1 : Background

Many transit managers, faced with increasing customer expectations, demands by oversight organizations such as boards and authorities, and diminishing resources (people and funding), are looking for strategies to increase their employee productivity and improve their operational services in the ITS arena. Some resources may be available online or at conferences where managers can talk to peers; but objective online resources related to transit are scarce, and travel to conferences is often viewed as an extravagance that cannot be supported in these austere times. As a result, for many transit managers knowledge of ITS and emerging technologies is acquired through vendors or web sites that don't connect the benefits to transit business objectives or discuss the challenges to implement, operate, and maintain the system. An ITS Technology Portal can serve as a one-stop site where transit managers can look up targeted information about new and emerging technologies, clearly see the relationship of these technologies to their business practices as well as the challenges to implementation, and easily find contacts in the industry who are dealing with similar issues.

At face value, a transit technology portal might appear unnecessary. The internet has become a comprehensive source of information for nearly any topic, including transit information. However, the accessibility of information on the internet has a downside --there is no formal vetting process to place material online. This can lead to problems, as material might be biased by vendors, out of date, or simply incorrect. Even material that is reliable also might be highly technical and have prerequisite knowledge to understand the concepts being communicated. Additionally, finding information that is fully reliable can be a time consuming process.

Transit managers have many responsibilities that require them to be familiar with every aspect of their agency's operations. Experienced and novice transit managers alike must have a breadth of knowledge to do their jobs. However, public transit agencies operate in a constantly changing environment. This may be most evident with the variety of technology options available to transit agencies. New developments in technology are frequent, and transit managers need a way to keep up to date with these developments, without expending excess time or compromising the reliability or neutrality of the information they receive. The portal can play a key role of providing a one-stop resource for information that has been vetted by a group of transit technology experts.

While the portal concept may hold high appeal to transit managers, there are many barriers to implementation that must be addressed prior to implementation. The key challenge in developing this portal is to ensure that the material provided is appropriate, up to date, and accurate. Determining the appropriateness of content submitted is particularly important, as content which is not useful or impartial to the audience undermines the purpose of the portal. Likewise, ensuring that content is up to date is necessary to maximize the benefit to the target audience of the content. Finally, content that is inaccurate is not useful if it does not properly reflect the topic it is intended to describe.

Since the portal is intended to be a primary resource for transit managers, it is necessary to ensure that it is developed properly. When developing a system, a systems engineering process

is suggested to ensure that all user needs are met. Such a process maximizes value while minimizing risk. A systems engineering process was used to develop this portal to ensure that the funds allocated to this effort are used as efficiently as possible.

The American Public Transportation Association, also known as APTA, is the national organization that serves public transit associations throughout the United States. APTA is a resource for transit employees of all levels, including managers. APTA already contains a comprehensive web portal and knowledge base, known as *MyAPTA*. As such, the web portal described by this research effort is intended to be integrated with MyAPTA after the conclusion of this project, as this is already a prominent resource for transit managers.

Chapter 2 : Research Approach

This effort involved performing the research required to develop the technology portal for transit executives from initial planning through the user testing of a prototype. In order to do this, a systems engineering process was utilized. Research was divided into two phases. The first phase focused on the planning work for the portal, whereas the second phase focused on developing and testing the portal, as well as developing supporting documentation for the portal.

Systems Engineering Approach

A systems engineering process (SEP) was used to develop the draft documents for the portal. According to the International Council on System Engineering (INCOSE), Systems Engineering is an interdisciplinary approach and means to enable the realization of successful systems. It focuses on defining customer needs and required functionality early in the development cycle, documenting requirements, then proceeding with design synthesis and system validation while considering the complete problem. [1]

Use of the Systems Engineering process was appropriate for this research effort because of the need to manage risk in a largely undefined system. Upon initiation of this research effort, all that was known was that the intent of this project was to develop a web portal that was to provide up to date and reliable information about technology to transit managers, and that the final portal would be integrated to MyAPTA. The systems engineering process was used to ensure that a good set of user needs for the system were identified and that a complete set of requirements were defined so that the prototype system could be built to meet these needs and requirements.

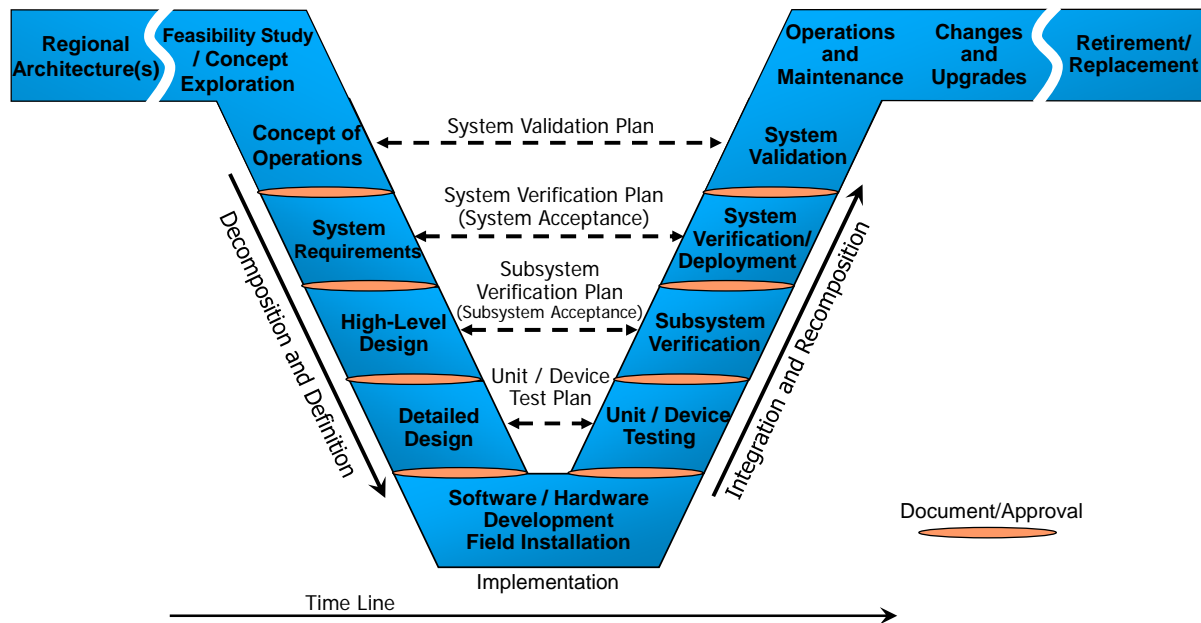


Figure 2-1. Systems Engineering Process

Figure 2-1 above shows the systems engineering process tailored by FHWA for ITS projects, called the “Vee Diagram”. The process shown in the diagram can be applied to large to small projects with appropriate tailoring of the scope of the effort in each step. The initial two steps of the systems engineering process (starting at the upper left of the diagram) are related to planning activities that occur before the beginning of project development. The first step in the development of a project is the Concept of Operations step where user needs are defined. These user needs are further translated into system requirements, and then to the design. At the bottom of the diagram, the system is built. Moving up, the right side of the diagram is related to testing the system. This determines if the system was built correctly (verification steps) and if the correct system was built (validation step).

For this research effort, the Phase 1 effort involved definition activities on the left side of the Vee. Phase 2 primarily involved building and testing the system (the bottom and right side of the Vee diagram).

Phase 1 Research Activities

In Phase 1, the team, using the Systems Engineering (SE) process, worked with the panel to develop the following SE components:

- Concept of Operations (ConOps), including system goals / objectives, stakeholder roles and responsibilities, and use cases.
- Systems Requirements (SysRqts), including standards, templates, and procedures for content management.
- Technology Alternatives Analysis (TAA) / Selection of Tools.
- High-Level Design (HLD), including wireframes and workflow, data model for information cataloging and storage, and presentation methods.
- Test plan and procedures.
- Preliminary definition of the process to transfer the prototype to APTA.

Phase 1 was initiated with a kickoff webinar between the panel and consultants to refine the goals and define the needs of the portal. Subsequently, we requested that the panel reconvene via webinar to walk through and review the first four outputs of the SE – ConOps, SysRqts, TAA, and HLD. Documents were sent out a week before the proposed walkthrough, and a 90-minute review was held with the panel. The results of all these activities have been incorporated into this Final Report.

The six SE components developed in Phase 1 are described below.

The *Concept of Operations* (ConOps) was composed of the objectives, goals, and needs of the stakeholders who will view, contribute to, participate in, and administer the Technology Portal. Their roles and responsibilities were clearly delineated and how they interact with the site was documented (using use case scenarios) and reviewed with the panel to validate the approach. These use case scenarios provided the input to identify the approach for information submission, storage, and participant discovery. The Stakeholder Roles, Responsibilities, and Use Case

scenarios reflected user authentication and content governance procedures for the portal. To that end, the following issues were resolved prior to the completion of this task:

- Development of user access privileges (e.g., will committee or APTA membership be a pre-condition for accessing the site?)
- Development of content governance rules for submitting (and validating submission requirements), managing, and removing content.

Although these tasks are outside the scope of the project, the consultant team developed a set of questions that supported development of governance procedures for the site. These led to a draft Portal Governance Policy that was used as a guideline for development of the portal.

With respect to content, the ConOps dealt with the process by which stakeholders source and access resources and also addressed the issue of content and how to catalog the content to include areas of concern to the panel, including:

- Higher End Technologies
- Emerging Technologies
- ITS Standards
- Use of Technology (e.g., AVL)
- Core data issues
- Role and participation in regional ITS architecture
- Resource and sustainability planning issues related to Information, Control and Technology deployment

The *System Requirements* (SysRqts) drove the standards, templates, and procedures for content submissions and specified the rules for maintaining, updating, and removing content from the ITS Technology Web Portal. Up to this point, all of the activities were technology-independent.

The *Technology Alternatives Analysis* (TAA) occurred after further discussions with APTA to ensure that the tools selected for this task could be operated and maintained by APTA staff. Selection of tools and media, compatibility with SharePoint, APTA committee governance policies, and impact on APTA internet policies were part of this step. Following delivery of the TAA report, the project went on hold for approximately one year while APTA performed an IT update that resulted in the deployment of 2010 SharePoint Enterprise tools.

Following selection of the tool and design approach, a *High-Level Design* (HLD) was developed which was composed of (1) wireframes for the data submission and approval workflow, (2) the data model for information cataloging and storage, and (3) presentation methods. The wireframes were documented in a formal template. The wireframes were based on designs, which will be further customized in Phase 2 to meet the needs of the project but which are constrained by the functional elements available in 2010 SharePoint Server Enterprise (the updated APTA environment).

The *test plan and procedures* documented the types of tests that should be conducted on the prototype. Testing procedures tracked to the requirements and high-level design documents in order to ensure that user needs and requirements were met. The test plan documented different

types of problems as either severe, warning, or enhancement. Severe problems are those that must be fixed in order for the tool to operate. Warnings are problems that deal with functionality or data issues that are errors but do not disrupt operations – these will be fixed as resources allow. Enhancements are comments that recommend addition or revision to data or function. These enhancement “problems” will be reviewed during the final phase and incorporated into the systems engineering documentation as appropriate.

Finally, the preliminary *formal transition process* describing the technical transfer of the portal to APTA was developed to ensure a smooth transition from the prototype to operations. Prior to initiation of the contract, APTA and consultant team members met to discuss technical issues related to the technology transfer. It was agreed that APTA staff would be included in all technology discussions to ensure compatibility with APTA needs and lay the groundwork for a smooth technology transfer.

Phase 2 Research Activities

While Phase 1 of this effort was focused on developing the initial systems engineering work and preparing the major systems engineering documents, Phase 2 was primarily focused on building and testing the prototype portal. The following key activities occurred:

- Software Development
- Verification (Alpha Testing)
- Validation (Beta Testing)

The *Software Development* process was conducted by the consultant team. This process was initiated with procurement of a web hosting service. After this, development of the portal prototype was performed. Development involved configuration of a Microsoft SharePoint 2010 environment, including custom workflows, lists, and processes.

As part of the Software Development work, a *Portal Operating Procedures* document was developed to instruct users of the portal prototype on its use. These portal operating procedures are specific to the prototype, and while they will be of use in defining the final operation of the portal on MyAPTA, some revisions of the operating procedures will be necessary.

Verification, also known as *alpha testing* involved ensuring that the portal met the requirements outlined in the System Requirements document. Verification was conducted using the Test Plan and Procedures document as a guideline. When problems were discovered, the team went back to the portal to isolate and fix the problem. Therefore, until verification was completed, the timeframe of the software development and verification phases did overlap.

Validation, also known as *beta testing* was conducted to validate the user needs identified in the Concept of Operations document. For the beta testing process, a representative group of system users were given access to the portal prototype and ask to use it. Feedback was obtained to determine how well the portal met their needs.

Prior to the beta test, initial seed content was loaded to the portal. This was intended to provide an example of the type of material that could be on the portal in the long run. This was also done to promote loading of additional content on the portal by beta testers.

In addition to the development and testing activities of this research phase, the following additional documents were also developed as part of Phase 2. These are documents that are intended to be used after the conclusion of this research effort, during and after the portal is integrated to MyAPTA:

- One Year Marketing Plan
- Portal Sustainability Plan
- Portal Implementation Plan

The *One Year Marketing Plan* provides a framework to attract users to the portal. It provides marketing strategies to spread awareness of the portal during the first year that it is integrated as part of MyAPTA.

The *Portal Sustainability Plan* is a high-level document describing the long-term operations and maintenance of the portal. This plan describes the resources required for the full life cycle of the portal, as well as planning for future versions of the portal. Additionally, performance measures for the portal are identified.

The *Portal Implementation Plan* provides a one-year plan to outline the resources, steps, and dependencies required for transitioning to full-scale portal implementation on MyAPTA.

Chapter 3 : Findings and Applications (Phase 1)

This chapter discusses the findings for the following outputs of the Phase 1 effort:

- Concept of Operations (ConOps) including system goals / objectives, stakeholder roles and responsibilities, and operational scenarios
- Systems Requirements (SysRqts) including standards, templates, and procedures for content management
- Technology Alternatives Analysis (TAA) / Selection of Tools
- High-Level Design (HLD) including wireframes and workflow, data model for information cataloging and storage, and presentation methods
- Test plan and procedures
- Preliminary development of a formal transition process describing technology transfer methods (in collaboration with APTA)
- Recommendations for Prototype Development

Concept of Operations

Current Environment

This section describes the stakeholders who will use the Portal and the environment for which the System will be developed. The stakeholders will be exclusively APTA members or staff, and the System will be hosted on APTA's web environment. The details of the current environment are described below.

Stakeholders

The stakeholders who will interact with this System include APTA members and staff. Specific stakeholder categories are described in Table 3-1.

Table 3-1. Current Stakeholder Category Descriptions

Stakeholder	Stakeholder Description
APTA Member	Person who is a registered APTA member.
APTA Research and Technology (R&T) Committee Member	“The committee’s objective is the advocacy of Research and Technology as a means of enhancing the performance of all aspects of the public transportation industry.” [2]
APTA R&T Tech Committee Portal Subcommittee Member	The R&T Committee Tech Portal Subcommittee members who are responsible for reviewing content posted to the System.
APTA Information Technology (IT) staff	Technical staff that are employed by APTA to manage their information technologies including their web sites. This also includes any support staff outsourced by APTA to host their system.

APTA SharePoint Environment

The web portal was designed and tested to operate in the APTA SharePoint environment. This environment was updated in 2012-13 and is currently composed of the following:

- Cloud hosting of 2010 SharePoint Enterprise including backup, security and support services
- SQL Server 2008
- Expandable storage capacity
- Web Server (for web site)
- Use of multiple browser types compatible with Internet Explorer 7 to current IE version; and current versions of Chrome and Firefox
- Coding capability: C++, SQL and Visual Basic
- Adherence to APTA policies including Security and Intellectual Property
- APTA User Security functionality (through APTA's existing application – AMS) administered by APTA

User Needs

The user needs provide an expression of the end users' operational needs that can be met by the system functionality and information flow into and out of the system. The needs express what the system needs to do from the user perspective. These users are described by the stakeholder descriptions above.

The user needs are:

- Provide one-stop resource for APTA members to learn about new and emerging technologies applied to transit ITS.
- Ensure that the resources stored in the System:
 - Are easily discoverable by users
 - Are current
 - Show their applicability to transit users including transit system leaders and non-technical transit professionals
 - Comply with APTA content policies (TBD)
- Provide an interactive environment for industry discussion and exchange on new and emerging technologies
- Provide guidance tools for APTA members to post content on ITS technologies in a standard format to the System. The tools should:
 - Support standard multimedia formats for posting to the System
 - Ensure the proper attribution and identification of the posting
 - Follow APTA policies on submittals hosted on APTA web sites
 - Provide a template for submitters to post their content
- Enable the content to be managed by APTA R&T Committee Tech Portal Subcommittee (hereafter called the Review Committee)
 - Implement tools for the Review Committee to review submitted content.
 - Allow for the Review Committee to delegate posted content to industry experts.

- Provide event alerts to the Review Committee. Alerts may include when new or revised content is posted, when stored content should be reviewed periodically, and messages from users and reviewers.
- Ensure that new Review Committee members can be assigned or removed from the Review Committee access privileges.
- Develop a System that minimizes operations and maintenance costs and resources.
- Ensure compliance with APTA Tech Portal Governance Processes (as described in Appendix A).

Stakeholder Actor Roles & Responsibilities

The roles and responsibilities of the key stakeholders who interact with the portal are described below. The table includes a short description of the stakeholder roles and a bulleted list of their responsibilities.

Table 3-2. ITS Tech Portal Actor Roles & Responsibilities

Roles	Responsibilities
Content Contributor (CC)	Portal user who creates and submits content to the portal. <ul style="list-style-type: none"> ● APTA member ● Submits content to System ● Complies with and signs on with Portal Policies form ● Owns or has the rights to submit content ● Completes Portal “template” ● Revises content per Review Committee request ● Accesses content on the portal
Review Committee Member (RCM)	Members of the APTA R&T Committee Tech Portal Subcommittee who are responsible for approving or rejecting content (and may review content from time to time). <ul style="list-style-type: none"> ● APTA R&T Tech Portal Subcommittee Member ● Participates in review process per Governance Rules
Content Reviewer (CR)	Person designated by the Review Committee to review content on a technical and/or quality basis. Multiple reviewers may be assigned to review one piece of content. <ul style="list-style-type: none"> ● APTA Member (may or may not be a member of the Review Committee) ● Reviews and completes reviewer assessment form for designated post.
Content Reader/ User (USR)	Person who uses the portal to gain information. Searches for a given topic. <ul style="list-style-type: none"> ● APTA member
Content Administrator (CA)	Individual with technical control over portal content. <ul style="list-style-type: none"> ● Review Committee-designated content administrator (e.g., chair) or APTA IT Staff ● Removes or changes the status of a posted resource ● Provides (or removes) access/privileges to Content

Roles	Responsibilities
	Reviewers and/or Review Committee Members.
System Administrator (SA)	APTA staff person(s) who administers the System. <ul style="list-style-type: none"> • Administers system control over the Portal including creating, revising and updating SharePoint configuration • Implements system lifecycle changes to SharePoint and associated presentation and back office systems.

Each role is assigned certain privileges. The privileges are granted by the system and maintained by the system administrator. The privileges are defined as follows:

- Content Reader: Read
- Content Contributor: Edit
- Content Administrator: Full Control

For example a *Content Administrator* will have “full control” of the *content management* area whereas other roles would be limited privileges in the content management area as listed above.

Operational Scenarios / Use Cases

The Portal needs will be driven by the lifecycle processes for sourcing, managing content, discovering, accessing, and collaborating on the content of the System. To this end, a series of Use Cases were developed to identify the key operational scenarios and high-level functional requirements of the System. A Use Case is a set of descriptive scenarios that cover the range of services in which a user interacts with the System. The operational scenarios are told in a narrative format in order for the reviewer to understand how a specific user might interact with the system. The lifecycle flow is illustrated in Figure 3-1 and the Use Cases that describe the lifecycle are listed in. These Use Cases are described below.

Table 3-3. Use Case Descriptions

Use Case	Description
Content Submission	How content is created/contributed and uploaded
Content Review and Acceptance	How content is reviewed, including the conditionally approved process
Content Publication	How content is published
Content Discovery	How content is searched and used
Content Access	How content is accessed (presented and downloaded) from the system
Content Administration	How content is updated and removed or archived

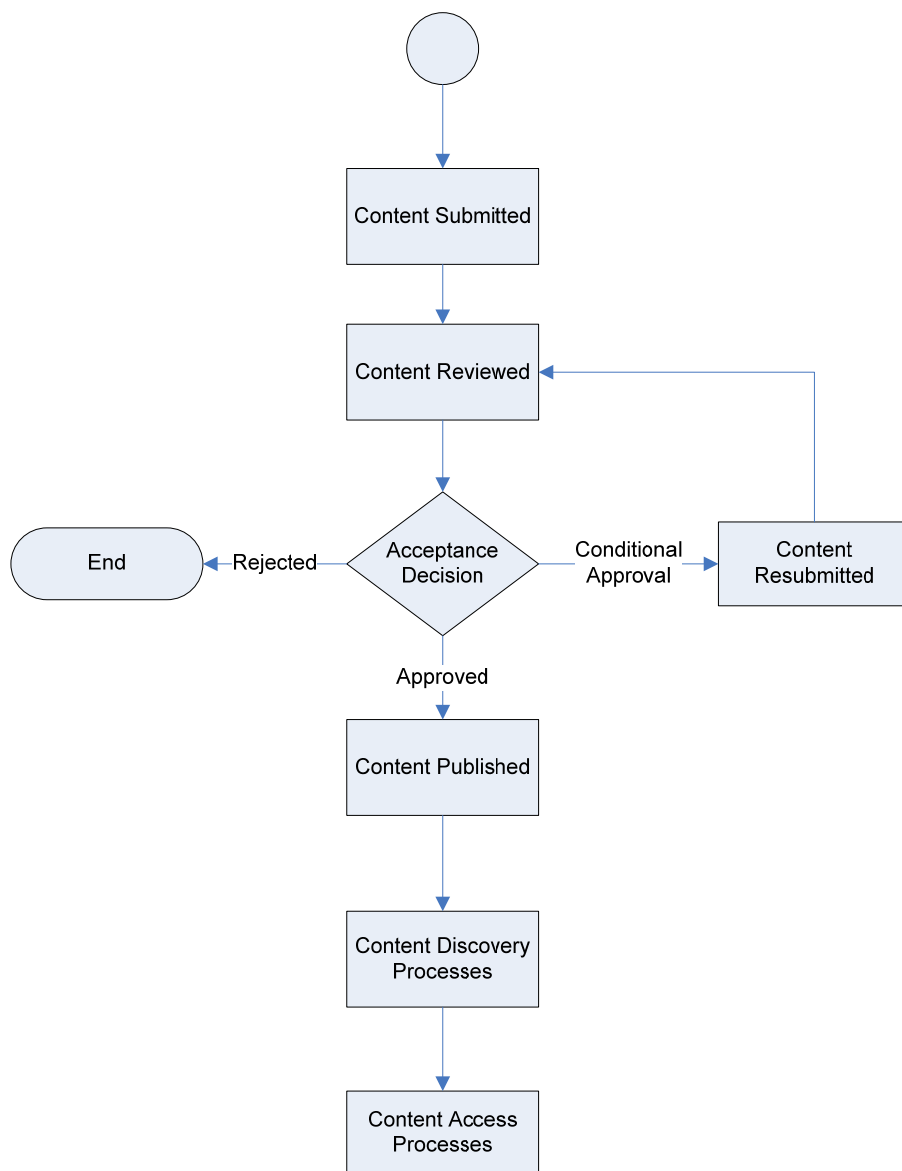


Figure 3-1. Flow of Content

Use Case: Content Submission

This use case describes how content is created/contributed and uploaded by the Content Contributor. Several alternative scenarios are described for this use case. They include content postings that are approved, conditionally approved, and rejected by the Review Committee. The scenario also includes a scenario where the committee has reviewed “dated” content that is still relevant, but may need updating (e.g., a paper on mobile technology).

Table 3-4. Scenario List: Content Submission

Scenario Title	Description
Approved Content	Content which is approved for publishing
Conditionally Approved Content	Content which is only approved for publishing after changes are made
Rejected Content	Content which is not published
Update Content	Approved and published content that is dated and needs updating by its author or another contributor

Preconditions

Person accessing Content Post page must be an APTA member.
Person posting content must own or have rights to submit content.
Person logs on to APTA site and navigates to Portal pages.

Scenario: Approved Content***Perspective: Content Contributor***

Michael is a Senior Project Manager at a large transit agency who presented information to his senior managers on Connected Vehicle technology to support transit signal priority. Because of his success in clearly presenting the materials, the General Manager suggested that Michael submit the materials to the APTA ITS Tech Portal. Using his APTA logon, he accesses the Tech Portal by logging on to APTA's web site. Navigating to the Portal content submission area, he follows the step-by-step instructions to submit his content. He fills out the Submitter Identification information (name, title, organization). Then he completes the Content Identification information (Topic Type, short summary, keywords). He then agrees to APTA's terms and conditions for posting content, which includes that the submitter has the rights to distribute the content being submitted, and is told he will receive notification within 60 days if his content is approved. In 45 days, Michael receives an email saying the content was approved. Content is then published and can be discovered and accessed (e.g., downloaded).

Scenario: Conditionally Approved Content***Perspective: Content Contributor***

Jessica works for a transit agency and is an expert on transit signal priority. She would like to post a brief paper on the topic. She creates a document without first visiting the Portal. Using her APTA logon, she accesses the Tech Portal by logging on to APTA's web site. Navigating to the Portal content submission area, she follows the step-by-step instructions to submit her content. She fills out the Submitter Identification information (name, title, organization). Then she completes the Content Identification information (Topic Type, short summary, keywords). Finally she agrees to APTA's terms and conditions for posting content, and is told she will receive notification within 60 days if her content is approved. Two weeks later, Jessica receives an email from the Review Committee saying that her content contained too many references endorsing a specific technology vendor. Per their instructions, she makes the necessary changes and resubmits her content via the same web process as before, with her original form data prefilled. One month later, she receives an email saying her content has been approved. Content is then published and can be discovered and viewed or downloaded (accessed).

Scenario: Rejected Content***Perspective: Content Contributor***

Chuck works for a transit consulting firm that does systems engineering and he wants to post content about real-time information for transit to the Portal. Using the Portal template, he prepares a presentation that mostly discusses his Real Time application. With his APTA logon, he accesses the Tech Portal by logging onto APTA's web site. Navigating to the Portal content submission area, he follows the step-by-step instructions to submit his content. He fills out the

Submitter Identification information (name, title, organization). Then he completes the Content Identification information (Topic Type, short summary, keywords). He then agrees to APTA’s terms and conditions for posting content, and is told he will receive notification within 60 days if his content is approved. In 45 days, Chuck receives an email saying his content was rejected and the reason for the rejection.

Scenario: Update Content

Perspective: Content Contributor

Jennifer has agreed to update a resource on Mobility Technology for the Portal. She is sent a link to the source information contained in the Portal on the subject, as well as related information that is referenced by the source information. She logs in with the access information provided by the Content Administrator, and although this was a requested assignment by the Review Committee, she must follow the same procedures as someone submitting new content. After completing her Identification and Content Identification information, including approving the APTA Terms and Conditions, Jennifer edits the content and submits the updated information. She receives the standard email indicating that she will receive notification within 60 days if the content is approved. In two weeks, Jennifer receives an email saying that the content was approved, instructions for updating the content, and a date when the update is due.

Use Case: Content Review and Approval Processes

The Content Review and Approval Processes are outlined by the APTA R&T ITS Tech Portal Review Committee Governance procedures. The scenarios for the use case include:

- Assign content and change status of content (provide access)
- Content assessment review (new postings)

Table 3-5. Scenario List: Content Review and Approval Process

Scenario Title	Description
Assign Content Review	The Content Administrator changes the status of content (e.g., review, accept, provisional accept, reject, update) and provides access of content to others (e.g., reviewers).
Content Assessment Review	The Content Reviewer receives a request to review Portal submittal, reviews and submits recommendations on the content.

Preconditions

Content was submitted and is pending assessment.

Scenario: Assign Content Review and Change Status of Content

Perspective: Content Administrator (and Review Committee)

Linda, the Review Committee chair, convenes a meeting for the ITS Tech Portal Review Committee after receiving five alerts that people posted resources to the Portal. She logs into the *Content Administration* page and sees a list of five posts. After reviewing the identification and content information, and determining that all five submissions are complete, she provides access to her committee members. They receive an alert with a link to the documents that they will review at their next meeting.

During the meeting, the committee decides that three of the submittals are either not complete or too vendor specific. Allison, a Review Committee member, volunteers to review one of the documents, and the remaining document is assigned to Tracy, a current member of the R&T committee. The Committee determines the next meeting date and the date by which the assessments are due. After the meeting Linda logs onto her Administrator account and assigns reviewer status for the first paper to Allison and includes a due date to the assessment; next to the second paper, Linda browses through the email addresses of APTA members to assign to the paper. Linda finds and assigns Tracy's email to the paper along with the proposed due date. An email is sent to Allison and Tracy with a link to the document and an assessment form that they need to complete.

After the assessments are received, Linda, the Content Administrator, again receives alerts that the assessments are completed. She logs into the Content Administrator page and sees the completed assessment forms. She provides access to these forms to the Review Committee members to review for the next meeting. The first paper that Allison reviewed on Surveillance Technologies was deemed "brilliant." Allison checked the box that the resource should be approved and also recommended (on the assessment form) that the resource should contain additional keywords and topic types (as listed in the Content Identification Information submitted by the Content Contributor). On the other hand, although the resource was technically relevant, Tracy only "provisionally accepted" the second paper on "Here I Am" aftermarket Connected Vehicle devices, indicating that it needed a quality review.

After the meeting, Linda asks her deputy, Henry, to change the status of the documents. Henry also has content administrator status, so he logs on to the administrator's page and pulls up the list with the pending submittals (Pending Content page). He checks the box that indicates the Surveillance resource has been approved. When he checks the "provisionally approved" box next to the Connect Vehicles paper, an email is generated to the Content Contributor. The email includes references to the paper and formal language on the status of the paper. Tracy's comments on his recommendations for acceptance are automatically pasted into the email. In addition, he is provided instructions about how to update his paper as well as the due date by which the updates must be made. Henry has a chance to review the email before it is sent to the Content Contributor. He does so and then sends the email.

Scenario: Content Assessment Review

Perspective: Content Reviewer

[Approved] Linda, the chair of the review committee, asked Allison to review Michael's submission. Allison receives a formal email inviting her to assess the paper with a link. She could also log on to APTA site and access the *Content Assessment* page. She logs in to the portal and navigates to the Assessment page. Although a committee member, Allison can only access Michael's content for her assessment. She views the content, and completes the feedback form. The feedback form may be saved before it is completed, but it must be completed prior to it being submitted. The paper is brilliant, so she writes her assessment using the assessment criteria on the form and checks the approved radio button. The feedback form may be saved before it is completed, but it must be completed prior to it being submitted. The assessment form also has a section that asks whether additional keywords or topic types should be added to the ones checked by the Contributor. After reviewing the list, Allison determines that the

technology could be used for additional transit-related solutions and that additional keywords should be added to tag the technology. After completing the assessment, she submits it and it is available at the Administrator's page. In addition, the Content Administrators are informed via email that an assessment was submitted.

[Rejected] Linda, the chair of the review committee, asked Frank to review Gabe's submission. Frank receives a formal email inviting him to assess the paper (a link to the paper is included in the email message). He could also log on to APTA site and access the assessment page. He logs in to the portal and navigates to the Assessment page. Even though he is a committee member, he can only access Gabe's content for his assessment. He views the content and completes the feedback form. Frank doesn't have time to complete the assessment form in one sitting, so he saves the form and later in the day logs back in to complete it. The content is not complete, nor is it well written. So Frank decides to reject the content. He completes the assessment form and flags it as a rejection. In addition, he writes a summary statement that will be sent to the Content Contributor. After completing the form, he submits it. An alert is sent to the Content Administrator that an assessment was submitted and the assessment is made available to the Content Administrator through the Administrator's page. In addition, the Content Administrator is informed that an assessment via email was submitted.

Use Case: Content Publication

The Content Publication Use Case describes how the content, once accepted, is stored and categorized to allow for user access.

Table 3-6. Scenario List: Content Publication

Scenario Title	Description
Publish Content	How content is stored and included in a catalog (e.g., made ready for discovery)

Preconditions

Content is assigned the status of "Approved" but does not yet have the status of "Published."
Content includes one or more "topic type(s)" and "keyword(s)" to allow for cataloging.

Scenario: Publish Content

Perspective: Content Administrator

Dave is designated a Content Administrator with the responsibility of publishing approved content. After the Review Committee votes to approve Michael's content submission, Dave logs in to the portal using his APTA account. He pulls up the Pending Content page, and clicks on Michael's submission. He clicks on the "publish content" button and is brought to a confirmation screen, where he has the option to set parameters including an expiration date when the content should be automatically archived, an alert date to remind the Committee to review the document, and a comments section for any comments the Committee may have made to be publically displayed. He then submits the form; keywords and topic types are processed and a concept map of the technology is now displayed. Dave has a chance to accept or edit the concept

map and links on the page. Once he reviews the resulting page, he can publish the results to the site. The resource is now discoverable and viewable by Content Readers (users).

Use Case: Content Discovery

The discovery use case includes scenarios for Content Readers (users) to use a drop-down menu to access an alphabetical list of publications, browse a list of topics, or search for predefined keywords (or topics) that are included in the System. When submitted, a concept map with available resources is displayed which can be viewed by the Content Reader.

Table 3-7. Scenario List: Content Discovery

Scenario Title	Description
Browse Topic	Displays a list of resources and publications available on the System.
Search for Keyword	Provides a search capability of the resources associated with a keyword available to view. Result displays the resources available to view related to the keyword. Since a resource may be assigned more than one keyword, multiple keywords may be included to drill down into finer detail.

Preconditions

Content is “Published”.

Content “topic type”(s) and “keyword(s)” are cataloged.

Scenario: Browse Publication List

Perspective: Content Reader

Kim just heard about the ITS Tech Portal and signs into to her APTA account, finds the Portal page, and quickly opens the Discovery page. She views two main ways of finding information – a search bar and a set of criteria to query available resources. She decides to look through the criteria and sees that she can refine the list of resources by several criteria, such as publication date, title, author, or a pull-down list of keywords. When she selects the topic “Connected Vehicles,” the screen displays one or more links to resources. Several resources identify Connected Vehicles as a topic. The information shows her the Portal content by topic. The result displayed on her screen is a list grouping links by connected vehicle technologies that are on a transit vehicle. When the User clicks on the “Here I Am” (HIA) Device link, information appears that explains the technology and its use by transit vehicles, transit solutions/systems that can use the technology and existing and emerging standards that apply to the technology. Kim sees a brief description in the technology frame on the website that summarizes the technology. In addition, there is a link to a page on HIA devices. The technology frame includes information that summarizes the standard developed for the HIA device. More links are provided to further explore related information that may include other devices (such as lateral, forward, and rear-facing detection sensors, GPS, odometer, and gyroscope) that are connected to the HIA on board the transit vehicle.

Scenario: Search for Keyword (and requesting additional content)

Perspective: Content Reader

Tom logs onto the APTA web site because wants to know more about the next generation GPS and how it might improve transit operations. He goes directly to the search menu and searches topics for bus operations; he refines his search by listing GPS under keywords. No content is posted for the portal on this topic, but he sees that there is a link to an article that was posted on the site related to the next generation of GPS satellites. The article indicates that the next generation GPS accuracy and reception will improve. He submits a question to the site requesting information on how the improvement to next generation GPS will help transit operations. The question is posted to a “request” list for the R&T Committee Tech Portal Subcommittee to use to solicit content.

Use Case: Content Administration

This use case describes how content is maintained over its lifecycle including archiving, updating and removing content.

Table 3-8. Scenario List: Content Administration

Scenario Title	Description
Content Archiving	How dated content is marked as out of date while still remaining on the portal
Content Removal	How content is removed from the portal
Content Updating	How content that needs updating is updated

Preconditions

Content is stored in the Portal and may become outdated.

Scenario: Content Archiving

Perspective: Content Administrator

Dave is the chair of the Review Committee. Every month his Committee receives notification of all content to be reviewed, typically one year after posting. A Content Administrator may view the flagged content from the Content Administrator’s page. An entry on AVL systems is flagged for review. At its next meeting, the Committee decides this content reflects old technology and decides to archive the content. Dave goes to the Content List and clicks the “archive” button. He is asked to confirm that he wishes to archive the item, which he does. The content is no longer viewable to Content Readers via Discovery, but can be viewed as archived material by the Content Administrators.

Scenario: Content Removal

Perspective: Content Administrator

APTA receives an email stating that some recently submitted material contains copyright violations, which they were unaware of during the review. The matter is forwarded to the Review Committee chair for the Committee to verify. Dave, the chair, uses the Content List to view the content. He clicks the “remove” button, which brings up a short form to confirm this. The content is deleted from the portal and a record of this transaction is logged.

Scenario: Content Updating

Perspective: Content Administrator

Every month Dave receives notification of all older content to be reviewed, typically one year after posting. Content on Mesh Networks for Transit Signal Priority (TSP) systems is flagged for review, as it is now one year old. The content refers to a project that is being implemented; at this point, the project should be completed and the content updated to reflect the change. At the last meeting, the Committee directed Dave to request that the Contributor update the content. Dave opens the Content List, clicks on the “Email Contributor” button and generates an email on behalf of the committee requesting that he update the content. He also enables the content to be updated (e.g., view and write enabled) by the Contributor. By the next meeting, the contributor has made updates to the Content. Dave brings the content to the Review Committee, someone is assigned to review the content, and it is approved. When Dave goes to publish the content, first he archives the old content, and then he publishes the updated content. (Note: archived content is saved and may be viewed by a content administrator.)

Perspective: Content Contributor

Steve receives an email from the Review Committee requesting an update to content he posted on the Mesh Network TSP last year. He logs on to the portal, clicks on the “Submitted Content” menu, and clicks the article. He sees the “post an update” button is enabled, so he clicks on the button where he can edit the existing descriptions or upload new ones. He completes his update and submits the content. He receives an email confirming his submission. After six weeks (after it is reviewed by the Portal Committee), he receives an email that his content update was accepted.

System Requirements

This section describes the detailed requirements for the ITS Technology Web Portal for Transit System Leaders

General System Description

System Overview

The ITS Technology Web Portal is a one-stop environment that stores resources about new and emerging technologies applied to transit. Portal content is reviewed, approved, and managed by the Review Committee members. When approved, the content is published and made discoverable to any APTA member who can then view, comment on, or download the content. The operations of the portal will occur through four distinct functions, which are summarized in the table below.

Table 3-9. Portal Function Overview

Function Name	Description
Manage Storage	<p>The Storage function stores all the resources, artifacts, documents, and event lists that are used by the System. It stores provisional and approved content, resource status, resource identification, catalog services, user lists, and other key information needed to manage and categorize resources.</p> <p>The Storage function also contains functionality for Content Contributors to post resources and multimedia using a guided tool.</p>

Function Name	Description
Manage Content	Content Management functions enable the Review Committee to implement the content review processes. The processes include collecting, alerting, posting reviews (and delegating reviews to experts), and changing the status of content submitted.
Manage Discovery	Discovery Management provides features that enable Portal users to browse or search for information-specific topics. The functions also include context for categorizing and tagging the resources so they are more easily retrievable.
Manage Access	Functions for Managing Access to the portal enable control, roles, and privileges for downloading, interacting with the content, and users of the system.
APTA Portal	The APTA portal is controlled and underpinned by the features inherent in Microsoft SharePoint, which provides overarching administrative capability for portal management.

The Portal provides the framework for the features described in the four primary functions.

System Context

The portal will operate as part of the existing APTA website.

Major System Capabilities, Conditions, and Constraints

SharePoint Environment

The current APTA SharePoint environment consists of a server farm – one or more back-end database servers and one or more front-end servers that provide Web services and Microsoft 2010 SharePoint Enterprise Server, including search, Excel Services, and indexing.

Hardware and Software Infrastructure

Prior to installation and configuration of Microsoft SharePoint 2010, servers should have the recommended hardware and software. For a server farm, there must be at least two computers. One computer must serve as a web server and application server, and one computer must serve as a database server. The servers must meet the following hardware and software requirements:

Hardware requirements

Front-end Web server and application server computers: a quad-processor computer with processor clock speeds of 2.5-gigahertz (GHz) or higher and a minimum of 8 gigabytes (GB) of RAM.

Back-end database server: a quad-processor computer with processor clock speeds of 3.0 GHz or higher and a minimum of 8 GB of RAM.

Software requirements for Web and Application Server

Microsoft Windows Server 2008 Enterprise (or later)

Microsoft .Net Framework 3.0

The Web server and application server computers must be configured as Web servers running Microsoft Internet Information Services (IIS) in IIS shared services mode.

Back-End Database Server

The back-end database server computer must be running Microsoft SQL Server 2008 or later.

User Characteristics

This subsection describes the general characteristics of the intended Users of the Portal. There are six (6) types of primary users summarized in the table below.

Table 3-10. Portal User Roles

User Role	Description / Responsibilities
Content Contributor	<p>Portal user who creates/contributes and adds content to the portal (hereafter referred to as submittal or post).</p> <ul style="list-style-type: none"> • APTA member • Submits content to System • Complies with and signs on with Portal Policies form • Owns or has the rights to submit content • Completes Portal “template” • Revises content per Review Committee request
Review Committee Member	<p>Members of the APTA R&T Committee Tech Portal Subcommittee who are responsible for approving or rejecting content, (and may review content from time to time).</p> <ul style="list-style-type: none"> • APTA R&T ITS Tech Portal Committee Member • Participates in review process per Governance Rules
Content Reviewer	<p>Person designated by the Review Committee to review content on a technical and/or quality basis. Multiple reviewers may be assigned to review one piece of content.</p> <ul style="list-style-type: none"> • APTA Member (may or may not be a member of the Review Committee) • Reviews and completes reviewer assessment form for designated submittal
Content Reader (User)	<p>Person who uses the portal to seek answers to basic transit technology questions</p> <ul style="list-style-type: none"> • APTA member
Content Administrator	<p>Individual with technical control over portal content.</p> <ul style="list-style-type: none"> • Review Committee-designated content administrator (e.g., chair) or APTA IT Staff • Removes or changes the status of a posting or resource • Provides (removes) access/privileges of Content Reviewers and/ or Review Committee Members
System Administrator	<p>APTA staff person(s) who administers the System.</p> <ul style="list-style-type: none"> • Administers system control over the Portal including creating, revising, and updating SharePoint configuration

User Role	Description / Responsibilities
	<ul style="list-style-type: none"> Implements system lifecycle changes to SharePoint and associated presentation and back office systems

Assumptions

Prototype Implementation

This project will implement a working prototype for the ITS Technology Portal. Long-term operations and maintenance are outside the scope of this project.

Relationship to Other APTA Programs

This project will serve as an extension of the APTA website, which uses SharePoint as part of its backend. The portal will be fully integrated into MyAPTA for use by members who already have access to this service.

Policies and Regulations

The portal will follow all APTA policies for web content and the Governance Policy set forth by the APTA R&T ITS Tech Portal Subcommittee.

System Requirements

Requirement 1: Functional Requirements

This section defines the functional requirements for the ITS Tech Portal.

Requirement 1.1: Manage Access

The system shall provide the functional elements to control user access and permissions to ensure content is properly managed.

Requirement 1.1.1: Manage Portal Login

The System shall grant access to users through MyAPTA. Users who do not have access to MyAPTA shall not have access to the system.

Requirement 1.1.2: Manage Roles

The System shall provide the ability for a System Administrator to change the role of a user to any of the User Roles described in Table 3-11. SharePoint manages these roles as three separate groups:

Table 3-11. User Roles

Portal Role	SharePoint Role	Privilege Granted in SharePoint
Content Reader	Visitors	Read
Content Contributor	Members	Edit
Content	Owners	Full Control

Administrator		
Content Reviewer	Members	Edit
System Administrator	Owners	Full Control

Requirement 1.1.2.1: Assign User Role

The system shall grant specific privileges to a user by assigning a user to a specific user role.

Requirement 1.1.2.2: Assign User to Multiple Roles

The system shall permit a user to be assigned to multiple roles. The user shall have all the rights and privileges of all user roles to which the user is assigned.

Requirement 1.1.2.3: Manage Role Privileges

The system shall provide the ability to manage roles created and the privileges associated with them in accordance with SharePoint security groups and permissions.

Requirement 1.1.2.3.1: Manage System Administrator Privileges

The System shall include a role entitled System Administrator. The System Administrator shall control access to the system and its functions. The system administrator role will be a SharePoint administrator and have overall authority to create, update, or delete all other roles.

Requirement 1.1.2.3.2: Manage Content Administrator Privileges

The System shall include a role entitled Content Administrator. The role shall have privileges as outlined in Appendix B.

Requirement 1.1.2.3.3: Manage Content Reviewer Privileges

The system shall include a role entitled Content Reviewer.

Requirement 1.1.2.3.4: Manage Content Contributor Privileges

The system shall include a role entitled Content Contributor

Requirement 1.1.2.3.5: Manage Content Reader Privileges

The system shall include a role entitled Content Reader.

Requirement 1.1.3: Automate Role Grant

The System shall automatically grant the roles of Content Contributor to any MyAPTA registered user

Requirement 1.1.4: Manage Content Access

The system shall provide functions to ensure access to content is available for users with correct roles and permissions to download and view content stored in the system.

Requirement 1.1.5: Manage User Access

All list data that supports the roles outlined in Table 3-11 must be editable and updatable by the system administrator.

Requirement 1.1.5.1: Manage Reviewer List

The system shall allow an authorized user the ability to view, add, remove, or edit users from the reviewer list. Designation on this list enables a person to be assigned to review content.

Requirement 1.1.5.2: Manage Committee Member List

The system shall allow an authorized user the ability to view, add, remove, or edit users from the committee member list. Designation on this list bestows access rights to certain system lists as described in Appendix B.

Requirement 1.2: Manage Storage

The Manage Storage function stores all the resources, artifacts, documents, and event lists that are used by the System. The function provides for the storage of provisional and approved content, resource status, resource identification, catalog services, user lists, and other key information needed to manage and categorize resources.

The Manage Storage function also contains functionality for Content Contributors to post resources and multimedia using a guided tool or template.

Requirement 1.2.1: Populate List

The system shall incorporate the results of a validated form to be inserted into an appropriate list.

Requirement 1.2.2: Validate List Entry

The system shall validate a form submitted by a user based on the criteria set by the form (e.g., mandatory entries shall be completed, syntax shall be checked, etc.).

Requirement 1.2.3: Manage Provisional Content

The system shall store content that has been posted but not yet approved in storage. Content not yet approved shall be designated as provisional.

Requirement 1.2.3.1: Restrict Access to Provisional Content

The system shall restrict only authorized users to view provisional content.

Requirement 1.2.4: Manage Content Catalog

The system shall assign only approved content to the Content Catalog. The Content Catalog will include only a subset of the Content List fields (Requirement 1.5.1.3).

Requirement 1.3: Manage Content

Content management provides the functionality for the Review Committee to implement the content review processes. The processes include collecting, alerting, posting reviews (and delegating reviews to experts), and changing the status of content submitted.

Requirement 1.3.1: Manage Content Status

The system shall provide the ability to designate status automatically as well as enable authorized users to manipulate status based on role permissions.

Requirement 1.3.1.1: Designate Status

The system shall assign a status designation to content as it flows from state to state in the Managed Content process. The designations shall be defined as in Table 3-12.

Table 3-12. Content Status Definitions

Status Name	Status Description	Next Status (condition)	Responsible Role
Post-Complete	Status assigned to submitted content.	Pending Review	Content Contributor
Pending Review	Status assigned to content that is assigned to a reviewer.	Review Complete	Content Administrator
Review Complete	Status assigned after a reviewer submits the content criteria record.	To be reviewed by Review Committee: Approved (if approved) Rejected (if rejected) Revision Request (if provisionally accepted)	Reviewer
Approved	Status assigned to content after it is approved by the Review Committee.	Pending Re-review (after specific period of time)	Content Administrator
Revision-Request	Status assigned to content after it is reviewed by the Review Committee with comments for revision.	Pending Re-review	Content Administrator
Rejected	Status assigned to content after the Review Committee rejects the content.	<return to Landing Page>	Content Administrator

Requirement 1.3.2: Manage Status Change

The system shall alert appropriate users when a change of status occurs. The alert shall include the following information:

- Type of Status Change
- Trigger (person or automated process)
- Date and time

Requirement 1.3.2.1: Document Status Changes

The system shall log all status changes and the target user who receives the status change.

Requirement 1.3.2.2: Publish Status Change

The system shall publish all status changes in a table on a targeted user's personalized web page.

Requirement 1.3.2.3: Manage Content Approval

The system shall allow the Content Administrator (and authorized users) to change a Content record in the Content List to Accepted, Rejected, or Provisionally Accepted.

Requirement 1.3.3: Manage Content Registration

The system shall provide guided directions to register and post content.

Requirement 1.3.3.1: Manage Registration Process

The system shall enable a Content Contributor to save and retrieve incomplete submittals that only they have submitted.

Requirement 1.3.3.2: Validate and Store Content

Upon submission by the user, the system shall validate that the Content Contributor completes all mandatory fields (topic types and keyword associations, personal identification, content description) and checks the validity of each field. The Content List describes the fields (see Section 0).

Requirement 1.3.3.3: Manage Content Upload

The system shall allow the user to upload a file and upon submission shall check that the file is a valid file format.

Requirement 1.3.3.4: Manage Content Agreement

The system shall allow the user to accept or reject the terms and conditions related to the content. The terms and conditions are described in the APTA ITS Tech Portal Governance document.

Requirement 1.3.3.4.1: View Terms and Conditions

The system shall allow a user to view the terms and conditions.

Requirement 1.3.3.4.2: Print Terms and Conditions

The system shall allow a user to print the terms and conditions.

Requirement 1.3.3.4.3: Reject Terms and Conditions

If the user rejects the terms and conditions, the system shall provide the user with a message confirming rejection. If the user rejects the terms and conditions, manage content registration process is stopped (i.e., the page reverts to the “landing page”).

Requirement 1.3.3.5: Submit Content for Review

The system shall include a trigger for a Content Contributor to submit his content for review. The action shall trigger a change in status to *post-complete* and distribute an alert to respective authorized users.

Requirement 1.3.3.6: Manage Incomplete Content Submission

The system shall allow a Content Contributor who starts to submit content to save his work and retrieve it at a later date and time. Note: this requirement should also be used for a Content Contributor who resubmits a revised file for review.

Requirement 1.3.3.7: Manage Revised Content

The system shall provide a Content Contributor the ability to select an existing content submission that has a status of *revision-request*. For the revision process, the system will implement a streamlined version of the Manage Content Registration process.

Requirement 1.3.4: Administer Content Review

The system shall provide the content administrator and review committee members with a page that shows the current status for all pending content, review assignments, committee review agendas, and pending approval items.

Requirement 1.3.4.1: Manage Pending Content

The system shall display a summary of the content pending status items (*post-complete*) on the Content Administration page. The summary shall include a link to more detailed information associated with the summary data. The summary data shall include the following information from the Content List:

- Content name
- Posted date
- Abstract or description
- Multimedia format

Requirement 1.3.4.2: Manage Content Review Assignment

The system shall display a summary of the content with *pending* status from the Review Scoring List on the Content Administration page. The summary shall include a link to more detailed information associated with the summary data. The summary data shall include the following mandatory information from the Review Scoring List:

- Reviewer Name (link to list of reviewer)
- Reviewer Assignment (link to posted content)
- Reviewer Assignment date

- Reviewer Due date

Requirement 1.3.4.3: Review Content by Selection Criteria

The System shall allow an authorized user to select one or more fields from the Content List (Requirement 1.5.1.3) and view the results.

Requirement 1.3.4.4: Manage Content Committee Review

The system shall display a summary of the content to be reviewed at the next meeting. The summary shall include a link to more detailed information associated with the summary data. The content shall be grouped by status:

- Post to be assigned to a reviewer (status): *post-complete, post re-submitted*
- Posts pending, assigned to reviewer (status): *pending-review, pending re-review*
- Posts to dispose of (status): *review-complete*
- Outstanding Post (status): *revision-requested*

The *Posts to dispose of* grouping shall link to appropriate Review Scoring List items.

Requirement 1.3.4.4.1: Edit Review Agenda

The system shall allow an authorized user to edit, save, and submit a Committee Review Agenda. The action shall trigger an alert with the Review Meeting Agenda to be distributed to the Portal Review Committee.

Requirement 1.3.4.5: Provisional Acceptance Alert

The system shall trigger an alert to the Content Contributor upon approval of the Content Administrator when content is provisionally accepted. The alert shall include information on the reason for revision and the recommendations for what should be revised.

Requirement 1.3.5: Manage Content Quality Review

The Manage Content Quality Review describes the requirements associated with a reviewer evaluating and scoring content.

Requirement 1.3.5.1: Reviewer Summary Page

The system shall provide a reviewer with a summary page showing his assigned pending, incomplete, and completed reviews. The summary shall include a link to more detailed information associated with the summary data. The summary data shall include the following mandatory information from the Review Scoring List:

- Reviewer Assignment (link to posted content)
- Reviewer Assignment date
- Reviewer Due date
- Reviewer Status (pending, incomplete, completed)

Requirement 1.3.5.2: View Assigned Content

The system shall allow a reviewer to view assigned content.

Requirement 1.3.5.3: Manage Review Scoring

Upon request, the system shall display a review scoring record that is associated with the content. The scoring record shall include at a minimum the following questions to be completed:

Document Title

Review Name *Insert review name here*

Review Date

Assigned e.g. 3/1/2014

Review Date Due e3/30/2014

Review Date

Complete 3/1/2014

Review Type technical quality

Review Score 0 (Unacceptable) 1 (Poor) 2 (Fair) 3 (Acceptable)

Review

Recommendation accept reject pending comments

Review Comments

Submission *Insert review comments here*

Review Keywords *Insert any additional keyword inputs here*

Requirement 1.3.5.4: Manage Incomplete Scoring

The system shall allow a Reviewer who starts to review content to save his work and retrieve it at a later date and time.

Requirement 1.4: Manage Discovery

The system shall allow a user to search for content by several methods. Methods include by free-text, predefined topics, keywords, and other methods such as metadata (author, publication date, etc.), and most viewed content.

Requirement 1.4.1: Manage Content Availability

The system shall allow a user to search and discover only available published (approved) content.

Requirement 1.4.2: Manage Free Text Search

The system shall allow a user to search for content by free text.

Requirement 1.4.3: Manage Keyword Search

The system shall allow a user to search for content by predefined topics and refine his search by using a related set of keywords.

Requirement 1.4.4: Manage Most Viewed Search

The system shall allow a user to search the most viewed content.

Requirement 1.4.5: Manage New Content Search

The system shall allow a user to search the most recently uploaded published content.

Requirement 1.4.6: Manage Content Catalog Search

The system shall allow a use to search content by reviewing a catalog of published content.

Requirement 1.4.6.1: Sort Content Catalog

The system shall allow a user to sort the content catalog by any column.

Requirement 1.4.7: View Multimedia Formats

The system shall offer services to view standard multimedia formats including:

- Pdf, jpeg, mpeg

Requirement 1.4.8: Print Multimedia Formats

The system shall allow a user to print the content in document formats including:

- Pdf, Microsoft (MS) PowerPoint, MS Word, MS Excel

Requirement 1.5: Administer the System

Administer the System describes functions provided by SharePoint to create lists, update list formats, and manage user access.

Requirement 1.5.1: Create Lists

The system shall allow an authorized user to create a list and to associate these lists to each other.

Requirement 1.5.1.1: Create Topic Type List

The System shall allow an authorized user to create a list of topic types. The initial set of topic types include:

- Technology
- Standard
- Solution (System)
- Business Process
- Benefit
- Application
- Information
- Human Resource

Requirement 1.5.1.2: Create Keyword Lists

The System shall allow an authorized user to create a list of keywords.

Requirement 1.5.1.3: Create Content List

The System shall allow an authorized user to create a list of files. The list shall include mandatory fields, including:

- File name
- File extension (multimedia format)
- Posted date
- Current Status [post-incomplete, post-complete, post-resubmitted, revision-requested, pending-review, pending-re-review, review-completed, approved]
- Next Status [post-complete, post-resubmitted, revision-requested, pending-review, pending-re-review, review-completed, approved]
- Next Status date
- Content Description / Abstract
- Content Author(s)
- Content Contributor
- Terms of Submission Agreement [yes/no]
- Publication Status [provision, accepted, rejected]

Optional fields may include:

- Reviewer name
- Last Review date
- Approved date
- Published date
- Next Review date
- Reposted date

Requirement 1.5.1.4: Create a Reviewer List

The system shall allow for an authorized user to create a list of content reviewers. The list shall include the following mandatory information:

- Name
- Email address
- Affiliation
- Expertise (one or more keywords)

Optional information may include:

- Work phone
- Mobile phone
- Alternate email address
- Other comment

Requirement 1.5.1.5: Create a Review Scoring List

The system shall allow for an authorized user to create a list that reviews posted content by a reviewer. The mandatory information shall include:

- Reviewer Name (link to list of reviewer)
- Reviewer Assignment (link to posted content)
- Reviewer Assignment date
- Reviewer Due date
- Status (pending, incomplete, complete)

- List of criteria for review
- Quality Score
- Recommendation for Acceptance (accept, reject, pending comments)

Optional fields shall include:

- List of additional keywords to associate with Content
- Comments to Content Contributor
- Comments to Review Committee

Requirement 1.5.1.6: Create Supplementary Resources List

The System shall allow for an authorized user to create a list of supplementary resources. The resources may include a link to a stored document or a URL. Each supplementary resource shall include the following mandatory information:

- Resource Name
- Posted Date
- Hyperlink or uploaded file (with an approved file extension)

The following optional fields shall be inserted:

- Author(s)
- Person posting resource
- Resource Content Description or Abstract
- Publication date
- Other pertinent information

Requirement 1.5.1.7: Create Association between Lists

The System shall allow an authorized user to create a list that associates lists. In particular, the following types of associations shall be described:

- Topic types and Keywords
- Content and Topics (and Keywords)
- Resource and Topics (and Keywords)
- Topic Types to each other (see Appendix B for relationship descriptions)

Requirement 1.5.1.8: Create a Lookup List

The System shall allow an authorized user to create a list of related terms for keywords. The list shall include the following fields:

- Keyword
- Related term

Note: a keyword may have more than one related term. For example, AVL may have the following related terms: automatic vehicle location, automated vehicle location, location tracking.

Requirement 1.5.2: Update List Format

The system shall allow authorized users to view, add, revise, and delete fields in a list.

Requirement 2: System Security Requirements

Requirement 2.1: Security Policy Compliance

The system shall comply with all security policies of the APTA website. The system will use the default SharePoint Role permissions

Requirement 3: Information Management Requirements

Requirement 3.1: User Interface

The system shall support several versions of web browsers, including:

- Internet Explorer (version 8 and above)
- Firefox (current version)
- Chrome (current version)

Requirement 3.2: System Performance and Life Cycle Requirements

The system shall follow APTA's IT performance and lifecycle policies.

Technology Alternatives Analysis

This section describes a Technology Analysis undertaken in 2012. Subsequent to this analysis APTA updated their system to SharePoint 2010.

Alternatives Analysis Methodology and Tools

Several technologies are available to implement the ITS Technology Portal. Three technologies were originally proposed:

- SharePoint 2007
- SharePoint 2010, and
- WordPress and Buddy Press

SharePoint 2007 and SharePoint 2010 are products of Microsoft; APTA's web site used Version 2007 with custom web parts. The alternative analysis was originally designed to measure the functionality of the various tools against the requirements versus the cost and risk factors. However, APTA has migrated to SharePoint 2010 and has stated that it does not have the resources to manage a technology other than SharePoint 2010. To that end, only one alternative will be analyzed, and the analysis will identify the estimated costs, schedule, and risks for implementing the high priority requirements.

The analysis incorporated supporting technologies that are either used by the current APTA web site environment or that support the requirements in the analysis. A brief summary of these tools are listed below:

- NetForum – manages access and authentication of APTA members (and MyAPTA functionality).
- Web Pages and Branding – these include the presentation of information in a browser. The technologies will be developed using SharePoint in developing Custom Master Pages, Custom stylesheets, Web Parts, HTML, Javascript and other web development standards.
- Browsers – these belong to users. The web pages will support the versions defined by requirement 3.1.
- Web Analytics – tool to analyze how users navigate through the site.

- SharePoint FAST – a native SharePoint add-on that provides advanced search capabilities based on customer queries and analytics.

Alternatives Analysis Summary

The System Requirements, driven by stakeholder needs, were developed and allocated to the various tools under consideration. The results of the analysis are listed in Table 3-13. The analysis assigns the requirements to the most appropriate, available tools. High priority requirements that are assigned to a current APTA-supported tool, such as NetForum and web analytics, will be implemented after the prototype demonstration by APTA, although the prototype may need to simulate these requirements. Other tools, such as SharePoint FAST, will be determined by this analysis.

The results show that most of the requirements may be implemented using native tools already supported by SharePoint 2010.

Access, Authentication, and Security Requirements

All access, authentication, and security requirements will be implemented by APTA using its NetForum application. In order to test the alerts, the prototype may need to simulate user roles using native SharePoint functionality. This functionality will be removed when the prototype is transferred to APTA.

SharePoint Web Parts and Customization

All the functionality needed by the requirements may be met either by native SharePoint functions / web parts or software development tools supplied by SharePoint. However, even with the available SharePoint tools, any custom development will consume much of the available Phase 2 resources. In particular, in discussions with APTA IT staff, it was determined that a special template and work flow for Content Reviewers requires significant changes to the existing APTA SharePoint / NetForum configuration. To that end, a new workflow will be proposed that provides that an ITS Tech Portal committee member oversee the work of reviewers and insert the results into the Review Scoring Template. These changes will impact the operational scenarios and systems requirements. The updates will be developed and proposed to the Panel.

Branding and Web Page Design

Branding of the site will be based on APTA Branding Policy with recommendations from TCRP staff on special branding solutions for the ITS Tech Portal implementation. The web page designs will be based on a simple design (Custom Master page and custom stylesheets) using standard best practices and tools.

FAST

FAST is a specialized tool that provides the ability for the system to manage keywords used by the system, automatically analyze a document and extract their keywords, and direct the user to appropriate literature and multimedia. The tool has additional operations and maintenance costs and resource needs that will impact its long range use. However, APTA is also looking at this tool for needs beyond this project.

Cost

Costs are divided into two categories – prototype development and impacts on APTA (transition, operations, and maintenance). The estimated prototype costs are in line with the costs included on the original proposal. The ongoing costs following the prototype are still under review by APTA, the contents of which have been provisionally reviewed and approved by APTA IT staff.

Prototype Development Costs

- Setup of SPS2010 and FAST for SharePoint - \$750 vs. SPS2010 (without FAST) - \$600
- Monthly host of SPS2010 and FAST for SharePoint - \$500/month
- ISP Technical Support 20 support hours - \$2700
- Web Page/Branding and Custom SharePoint Development: approximately 100 hrs.
- Content Development: approximately 60 hrs.

Impacts on Transition, Operations, and Maintenance Costs

- FAST license cost (Setup and Ongoing) Note that APTA currently does not have FAST implemented, so this cost will not figure in.
- Transition costs (tbd)
- Additional development costs:
 - Interfacing prototype with NetForum
 - Integration of web parts and web pages with APTA site
 - Analytics and analytics reporting
 - Migration costs to APTA's web server
- Operations / Maintenance Costs: other impacts will be noted in the Implementation and Sustainability Plans (see Phase 2) including user training.

Risk

The following is a short description of anticipated risks based on the tradeoff review.

Use of FAST

FAST provides the taxonomy and keyword management necessary to enable the ontology and back-end structure that is desired. It can also enrich and enhance the experience of users, particularly those who are not technically knowledgeable. However, APTA does not have the experience with the tool and the ongoing license costs are not known. Although the prototype used this feature, currently APTA does not have it implemented.

Manual vs. Automated Processes

There are several aspects to applying manual versus automated processes. Several comments were raised during the requirements walkthrough about adopting manual processes versus the automated workflows described by the requirements document. The impacts fall upon system administration staff as well as special user roles – reviewers, review committee, content administrators. A brief discussion of these risks and tradeoffs follows.

Impact on System Administration Staff

Manual processes will require a layer of quality control and verification on the Administration staff for all transactions conducted by reviewers, review committee, and content administrative users. They will need to train the users about how SharePoint processes, lists, and tools work. The manual process will require resources from APTA staff.

Impact on Reviewer, Review Committee and Content Administrator

Automation guides the user through the work processes with only limited user documentation (already included in subsequent documentation). Although there is less programming work required for manual processes, users will need to be conversant in how to manage lists if a manual process is implemented, will need to undergo training by “super users” of SharePoint and the review processes, and will need to implement a step-by-step process to ensure that all related stakeholders receive the proper notification. This will add a significant burden on volunteer staff.

Technology Alternatives Analysis Matrix

Table 3-13 shows each requirement, its priority, and the proposed technology that is identified to implement the technology. The alternatives are driven by current APTA IT policies and resources. The “Requirements” column contains the requirements described in the System Requirements document. The “Priority” column represents whether the requirement is rated as High, Medium, or Low for the prototype. The final column, “TAA,” lists the tool that will implement the requirement. The tools are described above. The reference to SharePoint is further divided into functions that are configured for this effort from native SharePoint versus ones that must be custom programs. In addition, a lighter highlight is used to show the process that will be changed to comply with APTA’s security policy.

Table 3-13. Requirements, Priorities, and Tools

Reqmt ID	Requirement Title	Priority	TAA Tool
1.1	Manage Access	H	netforum
1.1.1	Manage Portal Login	H	netforum
1.1.2	Manage Roles	M	SharePoint configured
1.1.2.1	Assign User Role	M	SharePoint configured
1.1.2.2	Assign User to Multiple Roles	M	SharePoint configured
1.1.2.3	Manage Role Privileges	M	SharePoint configured
1.1.2.3.1	Manage System Administrator Privileges	M	SharePoint configured
1.1.2.3.2	Manage Content Administrator Privileges	M	SharePoint configured
1.1.2.3.3	Manage Review Committee Member Privileges	M	SharePoint configured
1.1.2.3.4	Manage Content Contributor Privileges	M	SharePoint configured
1.1.2.3.5	Manage Content Reader Privileges	M	SharePoint configured
1.1.3	Automate Role Grant	M	SharePoint configured
1.1.4	Manage Content Access	M	SharePoint

Reqmt ID	Requirement Title	Priority	TAA Tool
			configured
1.1.5	Manage User Access	M	SharePoint configured
1.1.5.1	Manage Reviewer List	M	SharePoint configured
1.1.5.2	Manage Committee Member List	M	SharePoint configured
1.2	Manage Storage	H	SharePoint configured
1.2.1	Populate List	H	SharePoint configured
1.2.2	Validate List Entry	H	SharePoint configured
1.2.3	Manage Provisional Content	H	SharePoint configured
1.2.3.1	Restrict Access to Provisional Content	H	SharePoint configured
1.2.4	Manage Content Catalog	H	SharePoint custom
1.3	Manage Content		
1.3.1	Manage Content Status	H	SharePoint custom
1.3.1.1	Designate Status	H	SharePoint custom
1.3.2	Manage Status Change	H	SharePoint custom
1.3.2.1	Document Status Change	H	SharePoint configured
1.3.2.2	Publish Status Change	M	SharePoint custom/ netforum
1.3.2.3	Manage Content Approval	H	SharePoint configured
1.3.3	Manage Content Registration	H	SharePoint configured
1.3.3.1	Manage Registration Process	H	SharePoint configured
1.3.3.2	Validate and Store Content	H	SharePoint configured
1.3.3.3	Manage Content Upload	H	SharePoint configured
1.3.3.4	Manage Content Agreement	H	SharePoint configured
1.3.3.4.1	View Terms and Conditions	H	SharePoint configured
1.3.3.4.2	Print Terms and Conditions	L	Browser native
1.3.3.4.3	Reject Terms and Conditions	M	Browser native
1.3.3.5	Submit Content for Review	H	SharePoint workflow

Reqmt ID	Requirement Title	Priority	TAA Tool
1.3.3.6	Manage Incomplete Content Submission	H	SharePoint workflow
1.3.3.7	Manage Revised Content	H	SharePoint workflow
1.3.4	Administer Content Review	H	SharePoint workflow
1.3.4.1	Manage Pending Content	H	SharePoint workflow
1.3.4.2	Manage Content Review Assignment	H	SharePoint workflow
1.3.4.3	Review Content by Selection Criteria	H	SharePoint configured
1.3.4.4	Manage Content Committee Review	M	SharePoint custom
1.3.4.4.1	Edit Review Agenda	M	SharePoint custom
1.3.4.5	Provisional Acceptance Alert	M	SharePoint workflow
1.3.5	Manage Content Quality Review	H	SharePoint configured
1.3.5.1	Reviewer Summary Page	H	SharePoint configured/ netforum
1.3.5.2	View Assigned Content	H	SharePoint configured/ netforum
1.3.5.3	Manage Review Scoring	H	SharePoint configured
1.3.5.4	Manage Incomplete Scoring	H	SharePoint configured
1.4	Manage Discovery	H	
1.4.1	Manage Content Availability	H	SharePoint configured
1.4.2	Manage Free Text Search	H	SharePoint configured
1.4.3	Manage Keyword Search	H	SharePoint FAST
1.4.4	Manage Most Viewed Search	M	SharePoint custom/ FAST
1.4.5	Manage New Content Search	M	SharePoint configured
1.4.6	Manage Content Catalog Search	H	SharePoint configured
1.4.6.1	Sort Catalog Content	H	SharePoint configured
1.4.7	View Multimedia Formats	M	Web page
1.4.8	Print Multimedia Formats	L	Web page

Reqmt ID	Requirement Title	Priority	TAA Tool
1.5	Administer the System	H	SharePoint configured
1.5.1	Create Lists	H	SharePoint configured
1.5.1.1	Create Topic Type List	H	SharePoint configured
1.5.1.2	Create Keyword Lists	H	SharePoint configured
1.5.1.3	Create Content List	H	SharePoint configured
1.5.1.4	Create a Reviewer List	H	SharePoint configured
1.5.1.5	Create a Review Scoring List	H	SharePoint configured
1.5.1.6	Create Supplementary Resources List	H	SharePoint configured
1.5.1.7	Create Association between Lists	H	SharePoint configured
1.5.1.8	Create a Lookup List	H	SharePoint configured
1.5.2	Update List Format	H	SharePoint configured

High-Level Design

This section describes the high-level design (HLD) of the ITS Technology Web Portal for Transit System Leaders.

Introduction

The high-level design includes the functions, navigation, and data that will be included in the Portal. The design is driven by the user needs documented in the Concept of Operations and functional requirements driven by the System Requirements. The organization of this section is:

- *Portal Functions* describe the primary functions of the portal – Access, Storage, Content, and Discovery. These primary functions are further described with functional flow diagrams that show the information and roles required to enable the functions.
- *Information and Data Model* describes the informational elements and their relationship to each other in a data model.
- *Navigation and Wireframes* describes the screens and navigation among screens in the Portal. Since the portal will include links to the main APTA web site, those links are included as “stubs” in the design.

This HLD sets the framework for developing the ITS Technology Web Portal in Microsoft SharePoint 2010. From the design elements in this document, a SharePoint developer will be

able to build the portal using SharePoint. Once the portal is built, it can be populated with content and list details.

Limitation

Implementation of the design is subject to the environment configuration and the branding requirements of the host website, APTA’s SharePoint-based membership portal, which was recently updated from SharePoint 2007 to SharePoint 2010. Because of this, it is possible that the final configuration will differ slightly from that described in this section

Portal Functions

Functional Flow

This section contains the functions that will be implemented in the portal. The functions are illustrated using functional flow diagrams and are further described by related tables.

There are four major functions for the management of Access, Storage, Content, and Discovery.

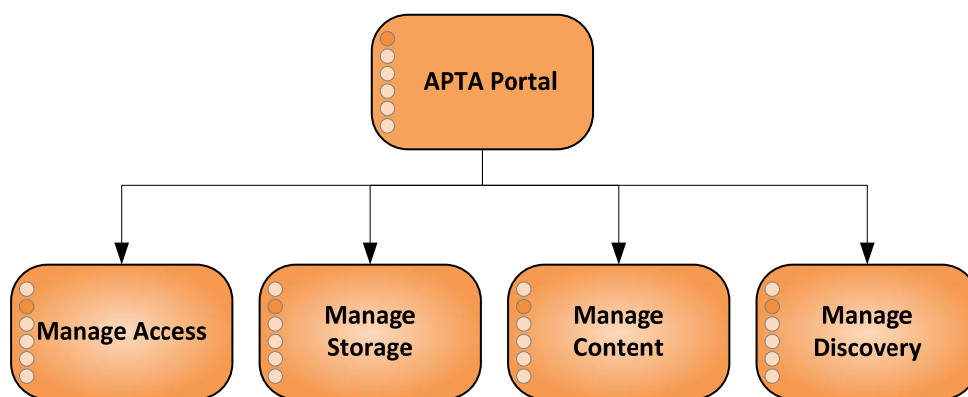


Figure 3-2. High-Level Portal Architecture

Table 3-14. Primary Portal Function Descriptions

Function Name	Description
APTA Portal	The APTA portal is controlled and supported by the features inherent in Microsoft SharePoint, which provides capabilities in its overarching capacity for portal management.
Manage Access	Functions for managing access to the portal enable control, roles, and privileges for downloading and interacting with the content and users of the system.
Manage Storage	The Storage function handles all the resources, artifacts, documents, and event lists that are used by the System. It stores provisional and approved content, resource status, resource identification, catalog services, user lists, and other key information needed to manage and categorize resources.

Function Name	Description
	The Storage features also contain functionality for Content Contributors to post resources and multimedia.
Manage Content	Content Management functions enable the Review Committee to implement the content review processes. The processes include collecting, alerting, posting reviews, and changing the status of submitted content.
Manage Discovery	Discovery Management provides features that enable portal users to browse or search for information-specific topics. The functions also include context for categorizing and tagging the resources so they are more easily retrievable.

Manage Access

Functions for Managing Access to the portal enable control, roles, and privileges for downloading, interacting with the content and users of the system. The relationship of the functions, and their descriptions, are shown below:

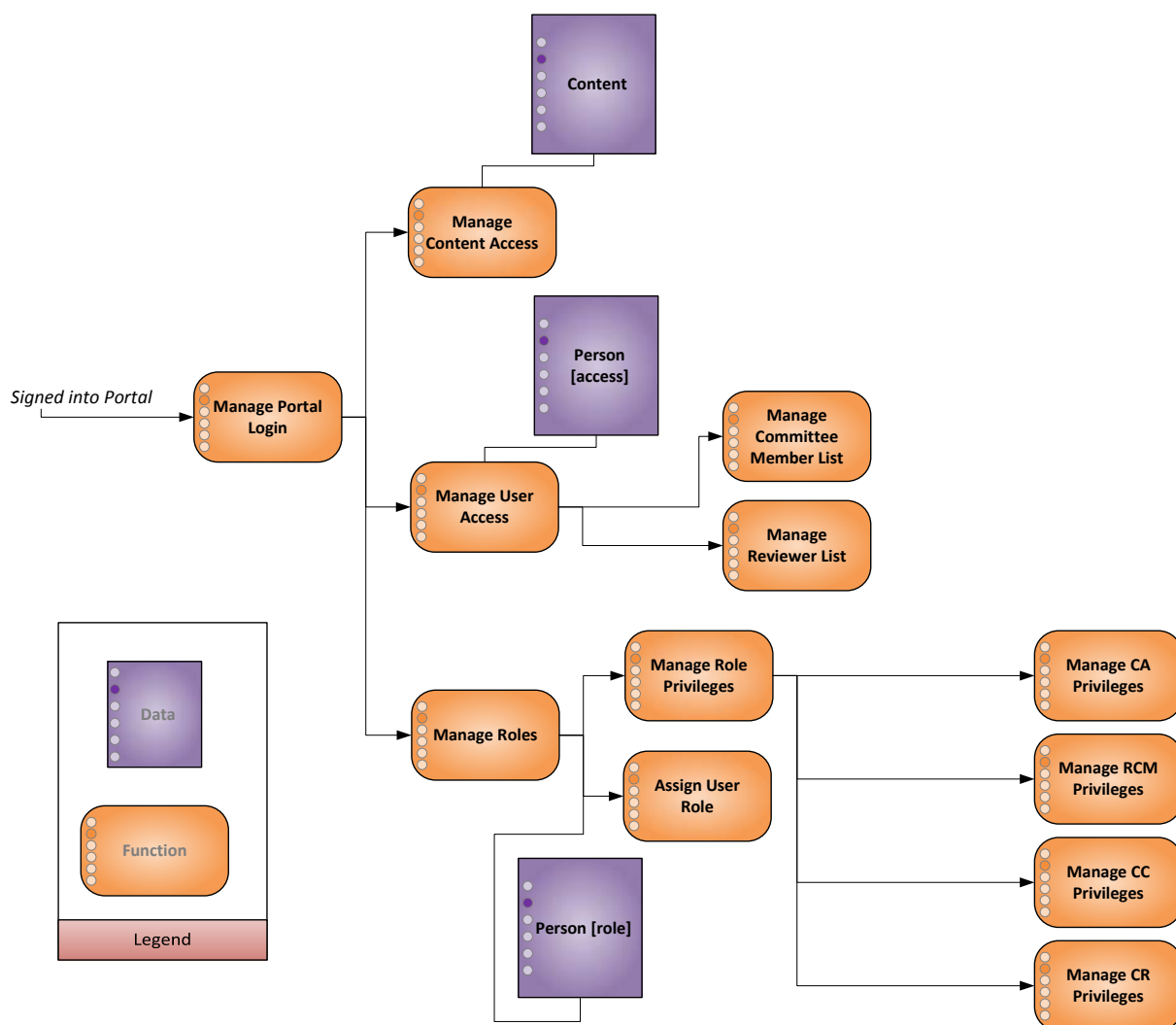


Figure 3-3. Manage Access Functional Flow Diagram

Table 3-15. Manage Access Function Descriptions

Function	Description
Manage Portal Login	Access to the portal provide through the APTA Website
Manage Content Access	Controls access to content stored on the portal
Manage User Access	Controls assignment of portal users to lists of users getting special access privileges to the portal (e.g. committee members)
Manage Committee Member List	Manages the list of members of the review committee which oversees the portal
Manage Reviewer List	Manages the list of content reviewers
Manage Roles	Controls the assignment of user roles for the portal
Manage Role Privileges	Controls the privileges available to each of the roles defined for the portal
Manage CA Privileges	Controls the privileges available to Content Administrators
Manage RCM Privileges	Controls the privileges available to Review Committee Members
Manage CC Privileges	Controls the privileges available to Content Contributors
Manage CR Privileges	Controls the privileges available to Content Readers
Assign User Role	Manages assignment of a specific user to specific roles within the portal

Manage Storage

The Storage function stores all the resources, artifacts, documents, and event lists that are used by the System. It stores provisional and approved content, resource status, resource identification, catalog services, user lists, and other key information needed to manage and categorize resources. The relationship of the functions, and descriptions of the functions, are shown below:

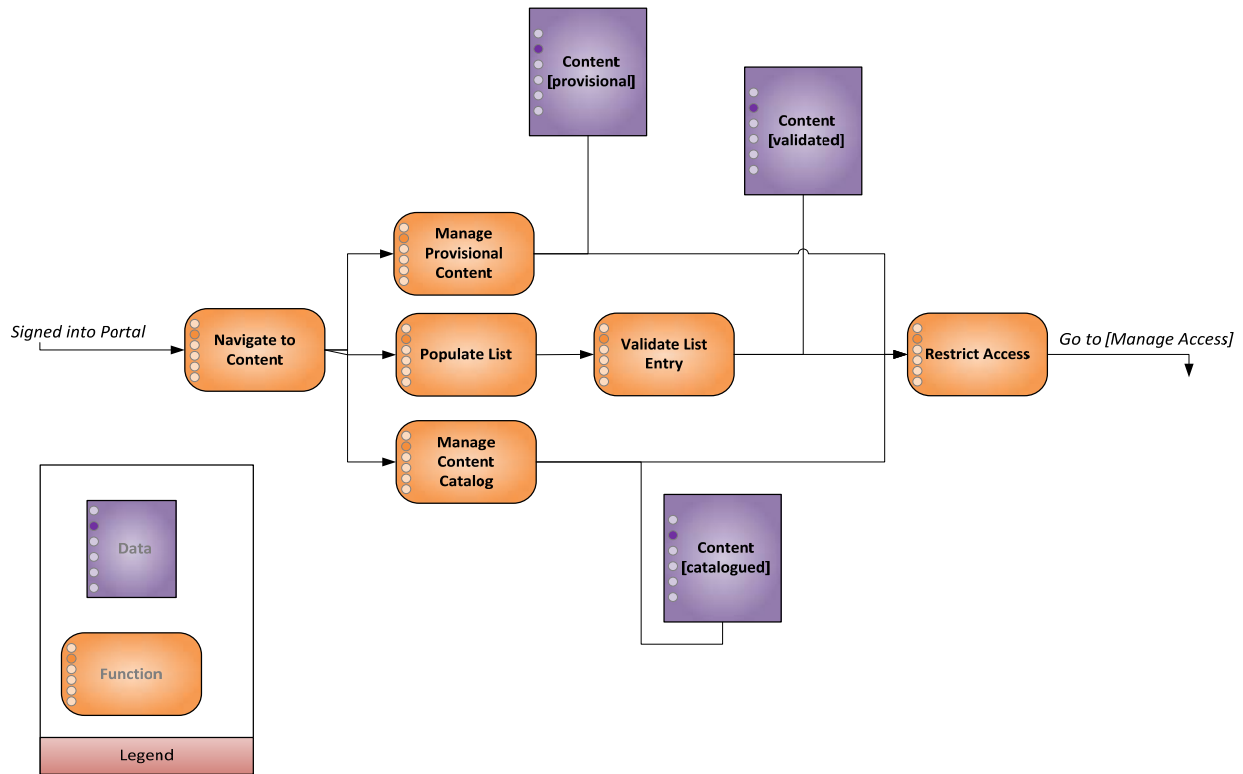


Figure 3-4. Manage Storage Functional Flow Diagram

Table 3-16. Manage Storage Function Descriptions

Function	Description
Navigate to Content	Provides access to the functionality for managing content
Manage Provisional Content	Provides tools to manage content which has been uploaded but not formally published
Populate List	Provides ability to add records to the content list
Validate List Entry	Validates entries to the content list
Manage Content Catalog	Provides ability to manage the content catalog
Restrict Access	Allows access to specific items of content to be restricted

Manage Content

Content Management functions enable the Review Committee to implement the content review processes. The processes include collecting, alerting, posting reviews and changing the status of content submitted. The relationships between functions, and the descriptions of the functions, are below.

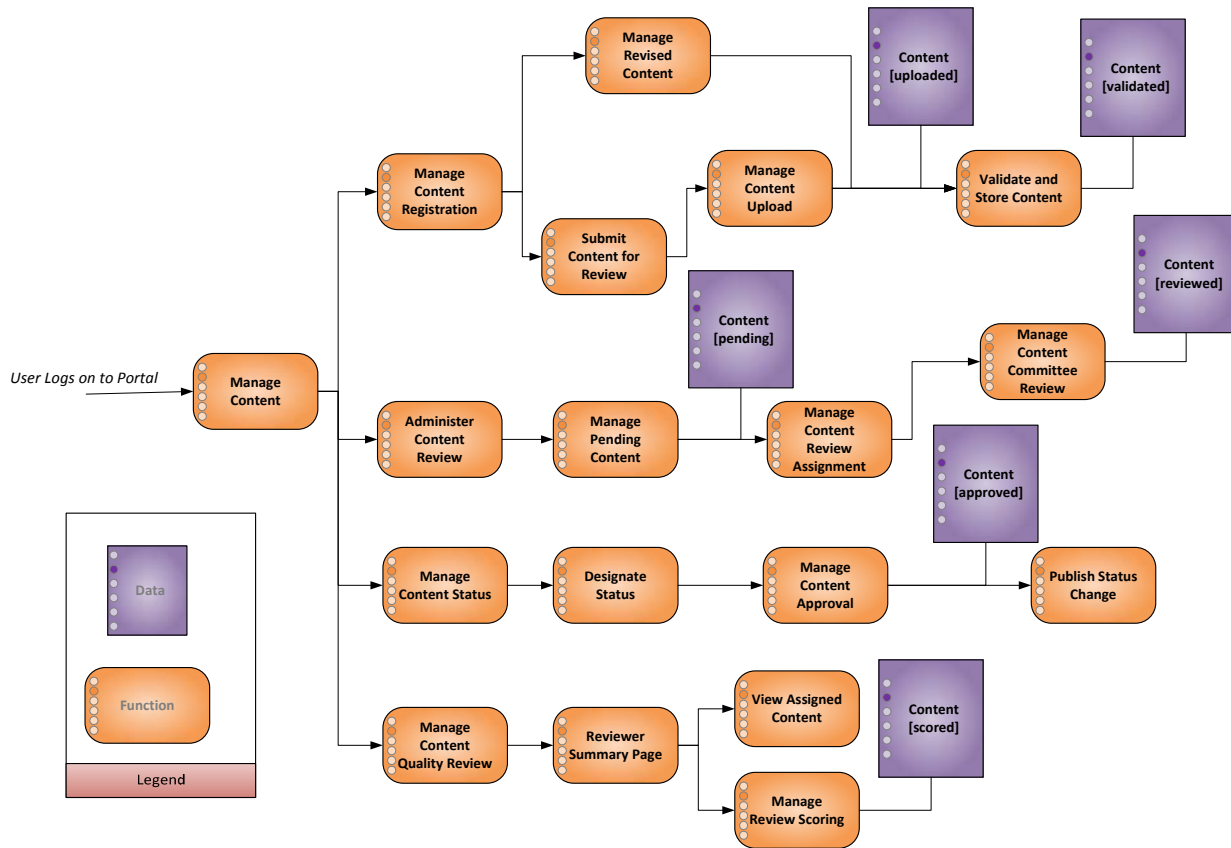


Figure 3-5. Manage Content Functional Flow Diagram

Table 3-17. Manage Content Function Descriptions

Function	Description
Manage Content	Provides access to the content management functionality of the portal
Manage Content Registration	Controls the submission of new and revised content to the portal
Manage Revised Content	Controls the submission of content which has been revised and resubmitted
Submit Content for Review	Controls the initial submission of content
Manage Content Upload	Manages the process to upload content to the portal
Validate and Store Content	Validates the format of content and stores it within the portal
Administer Content Review	Manages the content review process
Manage Pending Content	Manages content which has been submitted to the portal but not yet approved
Manage Content Review Assignment	Manages the assignment of a Content Reviewer to review specific content
Manage Content Committee Review	Manages the process for approving content for publication
Manage Content Status	Manages the process for assigning publication status to content
Designate Status	Allows a specific status to be assigned to submitted content

Function	Description
Manage Content Approval	Manages the approval or rejection of content
Publish Status Change	Designates the official status of content
Manage Content Quality Review	Manages the process of reviewing content
Reviewer Summary Page	Allows Content Reviewers to receive a dashboard of assigned content
View Assigned Content	Allows Content Reviewers to view content which has been assigned to them
Manage Review Scoring	Allows Content Reviewers to formally assess submitted content

Manage Discovery

The search functions will allow a user to discover the most recently uploaded published content. There will be two ways to search in addition to the default SharePoint search that the team is enabling for this effort. The relationships between discovery functions, and the descriptions of functions, are shown below.

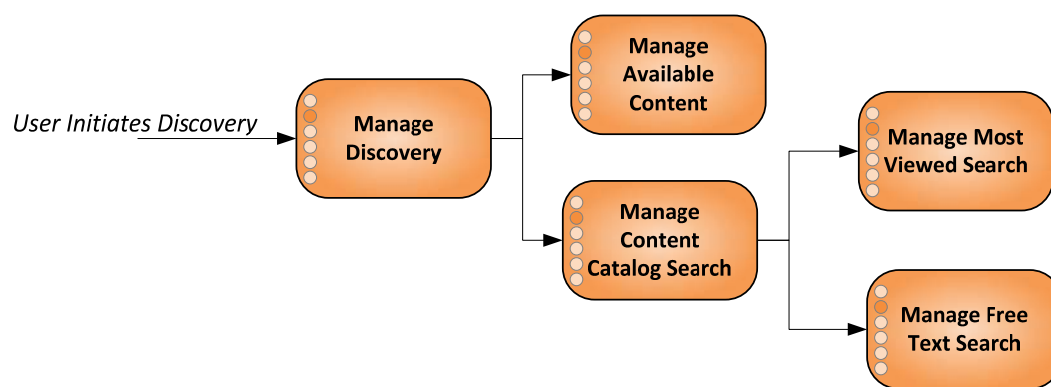


Figure 3-6. Manage Discovery Functional Flow Diagram

Table 3-18. Manage Discovery Function Descriptions

Function	Description
Manage Discovery	Provides access to the content discovery features of the portal, and the library for viewing content by topic type
Manage Available Content	Controls content that is available to users
Manage Content Catalog Search	Allows a user to search for content
Manage Most Viewed Search	Allows a user to search for popular content
Manage Free Text Search	Allows a user to search for specific content

Information and Data Model

SharePoint provides information management through a functional element called a *list*. A list is similar to a Microsoft Excel spreadsheet or a table in a Microsoft Access database. Unlike a spreadsheet that is blank when you first start working with it, SharePoint provides several predefined lists. These lists have columns and forms that make it possible for you to track everything from contacts to tasks.

SharePoint provides three basic types of lists:

- Communications lists are used to track announcements, contacts, and discussion boards.
- Tracking lists are used to track information such as links, calendars, tasks, issues, and surveys.
- Custom lists provide a starting template that you can build on to create a list with the exact columns you need.

The portal will leverage *all* of these types of lists.

Another special kind of SharePoint list is a “library.” This is used to store files, in addition to tracking them and the metadata about them. The portal content will be stored in a library and use the library features to manage the content provided therein.

The list structure does not allow complex, relational connections among elements; however, list instances can be related through lookup columns. As such, the data model that will store information is simple, with a minimum number of relationships. The information and its relationships are depicted in the conceptual model below. This information model will provide the foundational elements to enable the functional inputs and outputs through the portal.

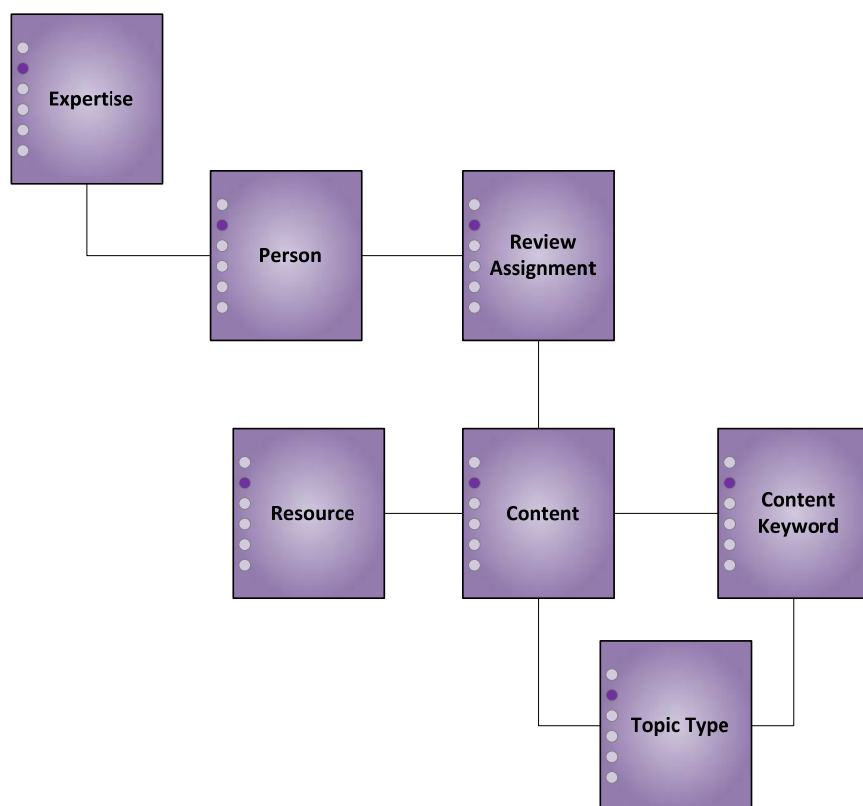


Figure 3-7. Portal Conceptual Information Model

An additional set of lists (represented as objects in the information model) that need to be developed to store information are listed in Table 3-19. The definition for standard transit business processes, application types,

and other transit domain artifacts are derived from the TCRP Project 84 (volume 9): Transit Enterprise Architecture and Planning Framework (TEAP).

Table 3-19. SharePoint Solutions Lists

List Name	Description
Application	Lists applications and software that are used to address transit business solutions. For example, a customer relationship management system and maintenance management systems are applications
Benefit	Lists benefits for transit
Business Process	Lists transit business processes (from TEAP)
Human Resource	Lists the human resources needed to support a solution or technology
Information	Lists the data and information needs (input or output data) to support a solution or technology
Solution	Lists systems, service packages, or collection of applications, technologies, information, and business processes used by transit to address a need
Standard	Lists formal standards developed by a standards development organization or recognized open specification that supports a technology
Technology	Lists specific technologies that are highlighted in the portal

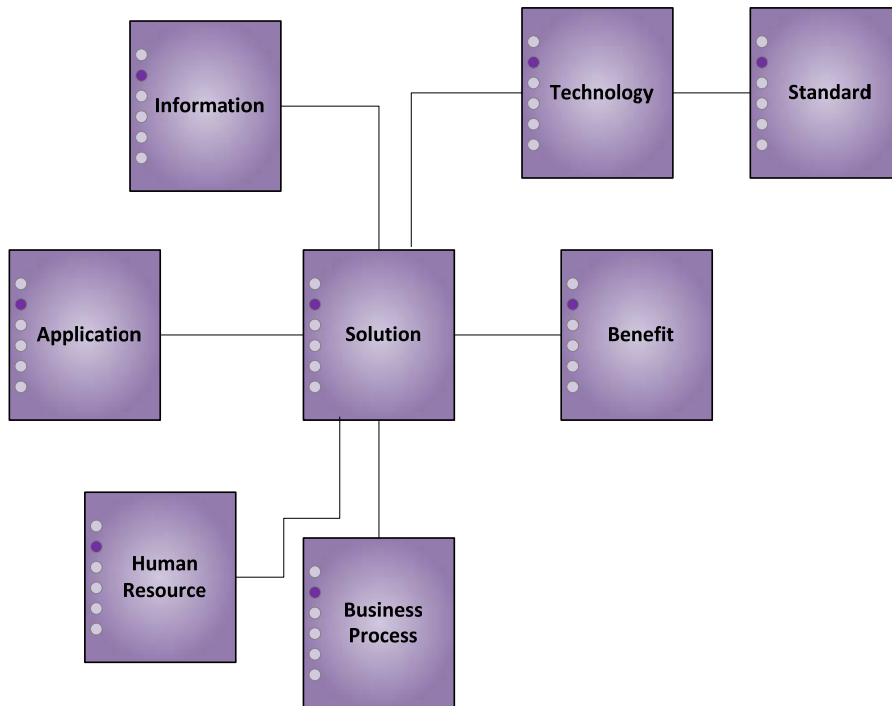


Figure 3-8. Portal Solution Information Model

Content Keyword List

A keyword is used to catalog the multimedia content stored in the Portal. The keyword list is described below.

Table 3-20. Content Keyword List

Field	Mandatory/ Optional	Type	Description
Name	M	string	The reference name used for the keyword.
Description	M	memo	The definition of the keyword.

Topic Type List

A topic type is a classification of a keyword. The topic type is a high-level taxonomy that provides drill-down capability for the user. The set of topic types includes:

- Technology
- Standard
- Transit Solution (or System)
- Transit Business Process
- Transit Benefit
- Application
- Transit Information
- Human Resource

The topic types are also contained in the Keyword List.

Table 3-21. Topic Type List

Field	Mandatory/ Optional	Type	Description
Topic Type	M	string	Restricted reference to a Keyword – <ul style="list-style-type: none"> • Technology • Standard • Solution • Business Process • Benefit • Application • Information • Human Resource
Related Keyword	M	string	Reference to the Keyword List. For example, Technology is related to “communications,” “navigation,” and “Mobile Device”

Business Rules: There is a one-to-many relationship between a topic type and keyword. In addition, the Topic Type and Related Keyword must form a unique pair.

Content List

The Content List contains the fields that store information about all the content (pending and published) in the Portal. The fields in the Content List are described below.

Table 3-22. Content List

Field Name	Mandatory/ Optional	Type	Description
File name	M	string	The title or name of the file. <i>The Content Contributor inserts this field during the Registration Workflow.</i>
File extension	M	string	The type of multimedia format assigned to the file. <i>The Content Contributor inserts this field during the</i>

Field Name	Mandatory/ Optional	Type	Description
			<i>Registration Workflow.</i>
Posted date	M	date	The initial date the file was uploaded to the portal. <i>This date is automatically inserted when a new record is created.</i>
Current Status	M	string	An automated designation related to the stage in the workflow assigned to the record (i.e., content). Valid values include: [pending-review, review-completed, revision requested, approved, rejected] The status definitions are described in Table 3-23 below. <i>The workflow process automatically inserts this field.</i>
Next Status	M	string	Based on the status of the “Current State,” this field is automatically loaded with the next status based on the workflow as illustrated in Figure 3-9. [pending-review, review-completed, revision requested, approved, rejected]. <i>The workflow process automatically inserts this field.</i>
Next Status date	O	date	The date at which the next possible change of status may occur. The next status date is inserted automatically based on the conditions identified in Table 3-23 by the provisions cited in “Duration until next status” column.
Content Description	M	memo	An abstract of the content in the file. <i>The Content Contributor inserts this field during the Registration Workflow.</i>
Content Author(s)	M	memo	One or more names of the authors of the content. A sublist should be included in this field that separates author (first, last names) and email for each author. <i>The Content Contributor inserts this field.</i>
Content Contributor First Name	M	string	The first and middle names of the person submitting the content is inserted here. <i>The Content Contributor inserts this field.</i>
Content Contributor Last Name	M	string	The last name of the person submitting the content is inserted here. <i>The Content Contributor inserts this field.</i>
Content Contributor Email	M	string	The email address of the person submitting the content is inserted here. <i>The Content Contributor inserts this field.</i>
Terms of Submission Agreement	M	boolean	This field indicates that the author agrees to the terms for submitting and posting content. The only state at which this field is not included is post-incomplete. <i>The Content Contributor inserts this field.</i>
Publication Status	M	string	The status assigned by the Review Committee to the document. Valid values include: [provision, accepted, rejected]. “Provision” is the default status. Provision is designated when the content is pending review or revision of the document.

Field Name	Mandatory/ Optional	Type	Description
			Acceptance is designated when the Review Committee agrees to post the document on the Portal. Rejection is designated after the Review Committee rejects the submission. <i>An authorized Review Committee member inserts this field.</i>
Reviewer name	O	string	A reference to a name in the Reviewer List. The review list includes all the credentials of each reviewer that may be assigned to review content.
Review Assignment Date	O	date	The date when the reviewer accepted the assignment. An authorized Review Committee member inserts this field.
Last Review date	O	date	The date when the reviewer submitted the review. An authorized Review Committee member inserts this field.
Approved date	O	date	The date when the Publication Status was changed to “accepted”. This field is automatically inserted when the publication status is changed to “accepted.”
Published date	O	date	Date when the content is published. An authorized review committee member inserts this field.
Next Review date	O	date	The date when the next possible review of content may occur. An authorized review committee member inserts this field.
Reposted date	O	date	Date when content is reposted. This field is automatically inserted when the status of previously rejected content is changed to “accepted.”

The status definitions and designations are described below:

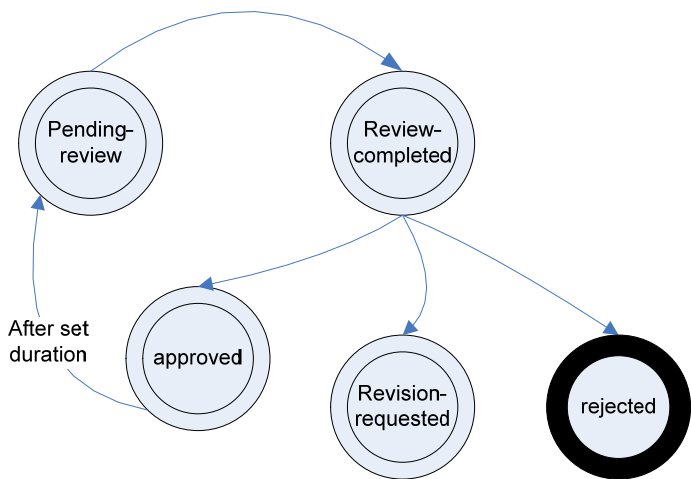


Figure 3-9. Content Status Designation

Table 3-23. Content Status Designations

Status Name	Status Description	Next Status (condition)	Duration Until Next Status (based on Content List fields)	Responsible User
Post-Complete	Status assigned to submitted content.	Pending Review	Until Review Assigned Date is inserted	Content Contributor
Pending Review	Status assigned to content that is assigned to a reviewer.	Review Complete	Until Last Review Date is inserted	Content Administrator
Review Complete	Status assigned after a reviewer submits the content criteria record.	To be reviewed by Review Committee: Approved (if approved) Rejected (if rejected) Revision-Request (if provisionally accepted)	Until Publication Status is inserted	Reviewer
Approved	Status assigned to content after it is approved by the Review Committee	Pending-Re-review (after specific period of time)		Content Administrator
Revision Request	Status assigned to content after review by the Review Committee generates comments for revision.	Pending-Re-review		Content Administrator
Rejected	Status assigned to content after the Review Committee rejects the content.	<return to First Page>		Content Administrator

Person List

The system shall allow an authorized user to create a list of personnel that will include content reviewers, contacts and committee members. The list shall contain the following information as related in the table below.

Table 3-24. Person List

Field Name	Mandatory-Optional	Type	Description
Name Last	M	string	Last name of the person

Field Name	Mandatory-Optional	Type	Description
Name First	M	string	First name of the person
Name Nick	M	string	Nickname of person
Email Primary	M	string	Primary email address of the person
Email Secondary	O	string	Secondary email address of the person
Phone Work	M	string	Primary phone number of the person
Phone Mobile	O	string	Primary mobile phone number of the person
Phone Fax	O	string	Primary fax number of the person
Person Notes	O	string	Additional notes on the person
Person Expertise	M	memo	One or many expertise keywords
Committee Position	M	string	Position from pick-list of committee member types
Committee Date	O	date	Date joined committee
Reviewer	M	yes or No	Is the person a reviewer? Yes or no
Contributor	M	yes or No	Is the person a Contributor? Yes or no
Person Affiliation	O	string	Person's affiliation to or with
Person Organization	O	string	Person's primary organization

Review Assignment List

The system shall allow for an authorized user to create a list that reviews posted content by a reviewer. The list shall contain the following information as related in the table below.

Table 3-25. Review Assignment List

Field Name	Mandatory-Optional	Type	Description
Review Name	M	string	Link to person list of reviewers
Review Assignment	M	string	Link to posted content
Review Date Assigned	M	string	Date review assigned
Review Date Due	M	string	Date review due
Review Date Complete	M	string	Date review completed
Review Status	M	string	Status of review as [pending, incomplete, complete]
Review Criteria	M	string	List of criteria for review
Review Score	M	string	Quality Score
Review Recommendation	M	string	Recommendation for Acceptance (accept, reject, pending comments)
Review Comments Submission	O	string	Comments to Content Contributor
Review Comments Committee	O	string	Comments to Review Committee
Review Keywords	O	string	List of additional keywords to associate with Content

Resource List

The System shall allow for an authorized user to create a list of supplementary resources. The resources may include a link to a stored document or a URL. The list shall contain the following information as related in the table below.

Table 3-26. Resource List

Field Name	Mandatory-Optional	Type	Description
Resource Name	M	String	Resource Name
Resource Date	M	date	Posted Date
Resource Link	M	String	Hyperlink or uploaded file (with an approved file extension)
Resource Author	O	String	Author(s)
Resource Person Post	O	String	Person posting resource
Resource Content Description	O	String	Resource Content Description or Abstract
Resource Publication date	O	date	Publication date
Resource Notes	O	memo	Other pertinent information

Keyword List

The System shall allow an authorized user to create a list of related terms for keywords. The list shall include the following fields:

Table 3-27. Keyword List

Field Name	Mandatory-Optional	Type	Description
Keyword Name	M	String	Keyword Name
Keyword Related	M	string	Keyword related term
Keyword Notes	O	memo	Other pertinent information

Note: a keyword may have more than one related term. For example, AVL may have the following related terms: automatic vehicle location, automated vehicle location, location tracking.

Navigation and Screen Drafts

SharePoint provides the core elements for navigation and the default navigation will be leveraged to the maximum extent possible. Wireframes are also provided as visual guides to represent the structural framework of the portal.

Site Map

The primary site APTA.com will be the starting point for Navigation with a hyperlink to the portal for content management.

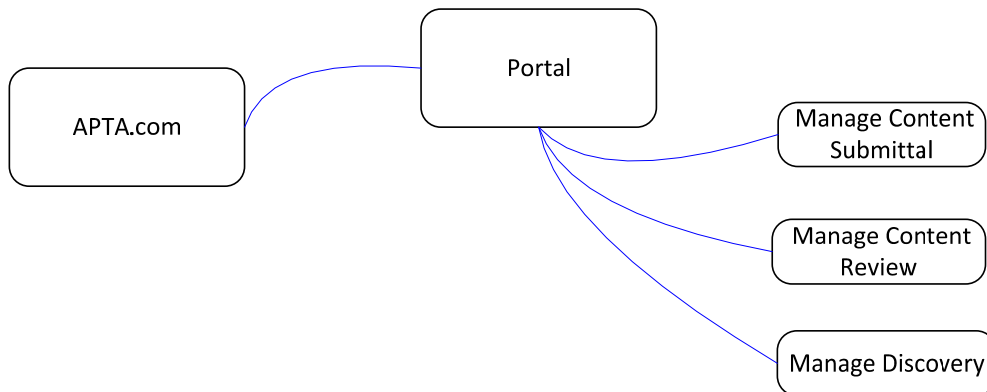


Figure 3-10. Site Map

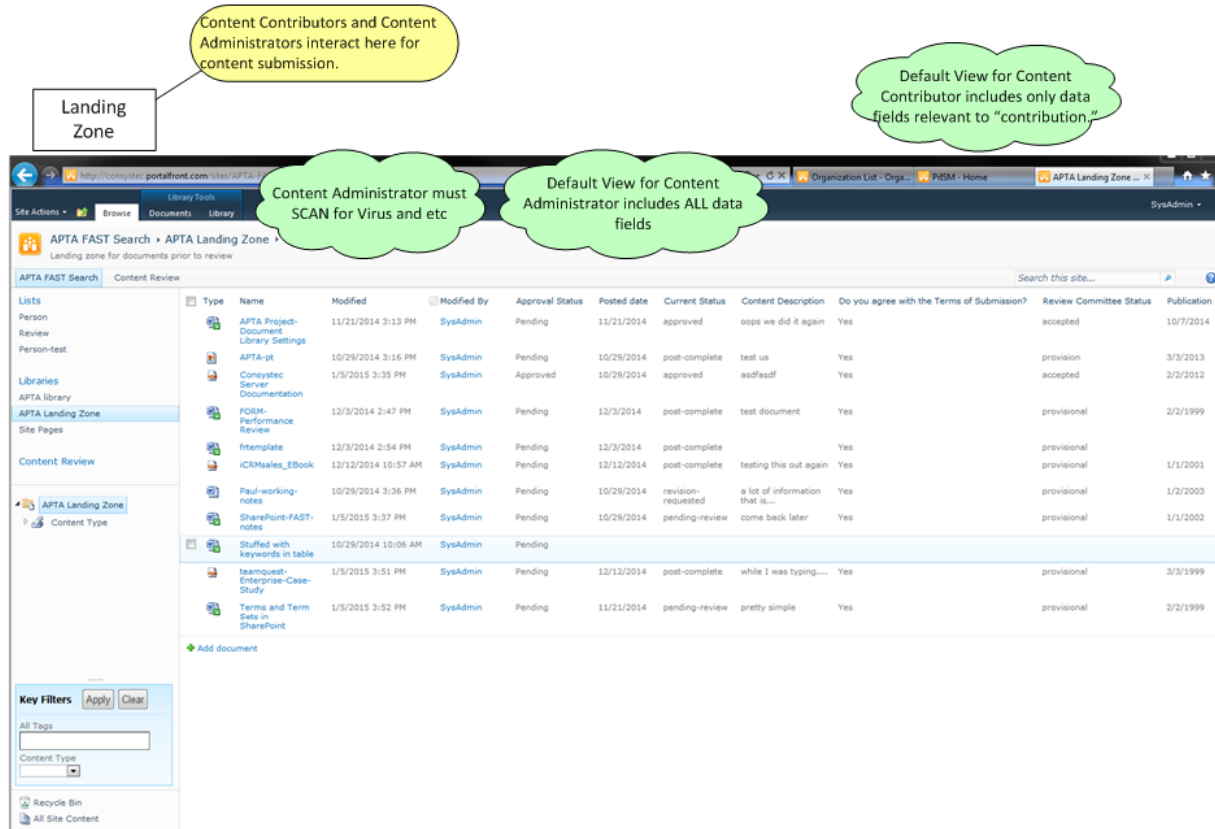
Screen Drafts

The screen drafts provide a general draft concept and will likely change as the site is further refined from a prototype to a full-featured release.

Manage Content Submittal

The Manage Content Submission draft concept provides the structure to support the submission of new content to the portal.

Figure 3-11. Manage Content Submittal



Manage Content Review

The Manage Content Review draft design provides the structure to support the content review.

Figure 3-12. Manage Content Review

The screenshot shows the 'Content Review' page in the APTA FAST Search system. The interface includes a navigation sidebar on the left, a main content table, and a 'Key Filters' section at the bottom left. Callouts provide context for various elements:

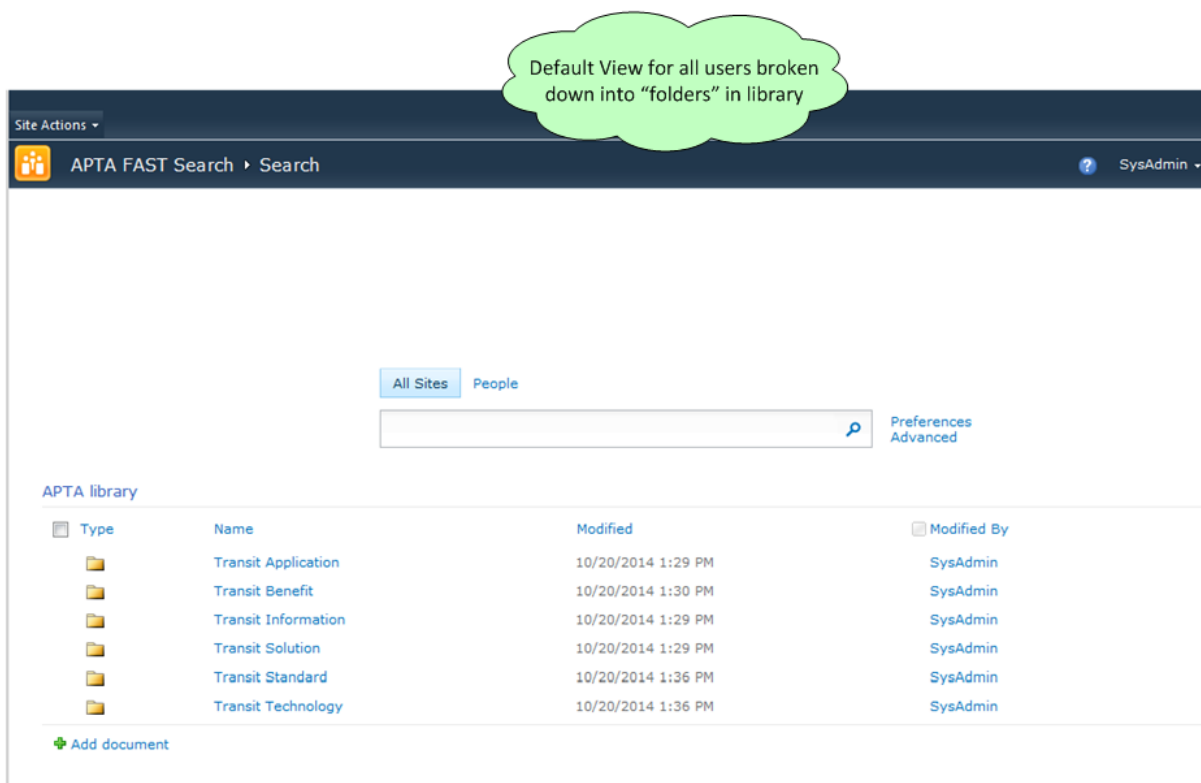
- Landing Zone:** Points to the breadcrumb navigation at the top of the page.
- Content Contributors and Content Administrators interact here for content submission:** Points to the 'Content Review' section in the sidebar.
- Content Administrator must SCAN for Virus and etc:** Points to the 'Content Review' section in the sidebar.
- Default View for Content Administrator includes ALL data fields:** Points to the main content table.
- Default View for Content Contributor includes only data fields relevant to "contribution,":** Points to the main content table.

Type	Name	Modified	Modified By	Approval Status	Posted date	Current Status	Content Description	Do you agree with the Terms of Submission?	Review Committee Status	Publication C
Document	APTA Project-Document Library Settings	11/21/2014 3:13 PM	SysAdmin	Pending	11/21/2014	approved	oops we did it again	Yes	accepted	10/7/2014
Document	APTA-pt	10/29/2014 3:16 PM	SysAdmin	Pending	10/29/2014	post-complete	test us	Yes	provision	3/3/2013
Document	Consystec Server Documentation	1/5/2015 3:35 PM	SysAdmin	Approved	10/28/2014	approved	asdfasdf	Yes	accepted	2/2/2012
Document	FORN-Performance Review	12/3/2014 2:47 PM	SysAdmin	Pending	12/3/2014	post-complete	test document	Yes	provisional	2/2/1999
Document	ftemplate	12/3/2014 2:54 PM	SysAdmin	Pending	12/3/2014	post-complete		Yes	provisional	
Document	iCRMsales_EBook	12/12/2014 10:57 AM	SysAdmin	Pending	12/12/2014	post-complete	testing this out again	Yes	provisional	1/1/2001
Document	Pajj-working-notes	10/29/2014 3:36 PM	SysAdmin	Pending	10/29/2014	revision-requested	a lot of information that is...	Yes	provisional	1/2/2003
Document	SharePoint-FAST-notes	1/5/2015 3:37 PM	SysAdmin	Pending	10/29/2014	pending-review	come back later	Yes	provisional	1/1/2002
Document	Stuffed with keywords in table	10/29/2014 10:06 AM	SysAdmin	Pending						
Document	teamquest-Enterprise-Case-Study	1/5/2015 3:51 PM	SysAdmin	Pending	12/12/2014	post-complete	while I was typing....	Yes	provisional	3/3/1999
Document	Terms and Term Site in SharePoint	1/5/2015 3:52 PM	SysAdmin	Pending	11/21/2014	pending-review	pretty simple	Yes	provisional	2/2/1999

Manage Discovery Wireframe

The Manage Discovery draft design provides the structure to support the navigation of topics and their related content elements as well as the ability for a user to perform a free-form search for content.

Figure 3-13. Manage Discovery Wireframe



Test Plan and Procedures

Introduction

This section describes the Test Plan and Procedures, for TCRP Project G-13, “Developing an ITS Technology Web Portal for Transit System Leaders.” The test plans and procedures are the key inputs to the Verification Stage of the Systems Engineering Process being used to develop the web portal. The verification stage is necessary, as it ensures that the web portal is built exactly as specified by the System Requirements document. Meeting each functional requirement is necessary to ensure that the user needs are met, and that the overall system purpose is achieved.

Test Conduct

Test Items

The item to be tested is the ITS Technology Web Portal for Transit System Leaders. The features to be tested are all of those that are listed as functional requirements in the System Requirements document developed as part of this effort. All system requirements have been classified as High, Medium, or Low Priority in the System Requirements document. The specific requirements to be included in testing are as follows:

- All system requirements identified as high priority.
- All system requirements identified as medium or low priority that are selected for implementation.

Prior to the commencement of testing, the medium and low priority requirements that have been selected for implemented shall be formally stated in the testing documentation. Test cases are included in the test procedures for all medium and low priority items, even if they are not currently identified for testing, in case they are ever designated for future implementation.

Testing Roles and Responsibilities

The roles and responsibilities for the testing process are listed below. Note that one individual may serve in multiple roles.

- **Principal Investigator:** The Principal Investigator is responsible for supervising the entire testing process, including preparation of all documentation (test plans/procedures and test reports), observing the testing procedures, and making the final decisions on acceptance of the test results.
- **Test Analyst:** The Test Analyst is responsible for preparing the test plans and procedures, performing the tests in conjunction with the Lead Developer, and preparing the test report.
- **Lead Developer:** The Lead Developer is responsible for reviewing the test plans and procedures, preparing the system for testing, providing assistance during

testing, reviewing the test report, and suggesting resolutions to any testing failures.

Testing Time and Location

Testing shall be conducted after the web portal is built and the lead developer considers it to be operational. Testing shall be concluded prior to any beta testing performed by individuals outside the development team.

Since this is a web portal, testing need not be conducted in a specific physical location. Testing shall be conducted virtually, with the members of the identified testing team present via web conference.

Testing Approach

Test Methods

For the purpose of testing the web portal, the team shall use “demonstration” as the test method. Demonstration is described as observing a requirement being explicitly met by the web portal. In case of any ambiguity, the Test Analyst shall apply judgment to determine if the requirement is met.

In order to accomplish testing, several test cases are specified, each testing a defined set of system requirements. Each test has a set of procedures to be followed, which will ensure that all requirements specified by that test case are tested. Test cases are categorized by the four major areas of functionality for the web portal, plus the overlapping area involving System Administration:

- Manage Access
- Manage Storage
- Manage Content
- Manage Discovery
- Administer the System

Each test case includes a series of steps to be followed. Two types of steps will be used:

- **Configuration Steps:** These steps set up the conditions required to test a requirement, or series of requirements, but do not explicitly test the ability of the system to meet a requirement.
- **Demonstration Steps:** These steps will test explicit requirements.

The results of each demonstration step will be recorded as follows:

- **Pass:** The actual output of the step matches the output as stated in the test procedures, and the Test Analyst determines the stated requirement to be satisfactorily demonstrated.
- **Fail:** The actual output of the step does not match the expected output of the step. A step that fails shall be classified in one of three ways:
 - **Severe:** This is a failure that, in the judgment of the Test Analyst, will impact overall operations of the web portal, and must be repaired in order for proper operation of the web portal to occur.
 - **Warning:** This is a failure that produces an error but does not fully impact portal operations in the judgment of the Test Analyst.

- **Enhancement:** This is a failure that does not significantly impact portal operations, and requires additional implementation in order to resolve.
- **Not Applicable:** This procedure being tested is for a feature that has not been selected for implementation and therefore does not impact the results of testing.

Test Acceptance/Rejection

A test will be accepted if one of the following conditions is met:

- All demonstration steps of the test are classified as either “Pass” OR “Not Applicable.”
- All demonstration steps of the test are classified as either “Pass” OR “Fail” OR “Not Applicable,” AND all steps that are classified as “Fail” are further classified as an “Enhancement” Failure.
- All demonstration steps of the test are classified as either “Pass” OR “Fail,” OR “Not Applicable” AND all demonstration steps that are classified as “Fail” are further classified as either a “Warning” OR “Enhancement” Failure, and the aggregate of all “Warning” Failures will not impact web portal operations at the same level as a “Severe” Failure.

If one of these three conditions is not met for a given test case, the test is considered to be rejected.

The full system is considered to be verified if, and only if, all tests are considered to be accepted. If any test has been rejected, retesting can occur once the Lead Developer has determined that all necessary repairs are made.

Official acceptance of a test, and of system verification, shall be given only by the Principal Investigator, in consultation with the Test Analyst and, if necessary, the Lead Developer.

Test Documentation/Reporting

The test analyst shall document the output of each step of testing in the format prescribed in the test methods section. At the conclusion of testing, the Test Analyst shall prepare a test report that states test acceptance or rejection results and whether the system is verified. In the event of failure of any procedure, or rejection of any test, the report shall provide recommendations necessary to rectify the problem. The report shall also state whether the full system must be retested or only affected aspects of the system must be retested in order for test acceptance to occur.

Test Procedures

The test procedures contain 15 different test cases, or sets of tests, to test the complete set of functional requirements for the system. Table 3-28 below shows which test cases are used to test each requirement.

Table 3-28. Test Case Summary

New ID	Requirement Title	Group	Test Case(s)
---------------	--------------------------	--------------	---------------------

New ID	Requirement Title	Group	Test Case(s)
1.1	Manage Access	Access	1.1, 1.2, 1.3, 1.4
1.1.1	Manage Portal Login	Access	1.1
1.1.2	Manage Roles	Access	1.2
1.1.2.1	Assign User Role	Access	1.2
1.1.2.2	Assign User to Multiple Roles	Access	1.2
1.1.2.3	Manage Role Privileges	Access	1.3
1.1.2.3.1	Manage System Administrator Privileges	Access	1.3
1.1.2.3.2	Manage Content Administrator Privileges	Access	1.3
1.1.2.3.3	Manage Review Committee Member Privileges	Access	1.3
1.1.2.3.4	Manage Content Contributor Privileges	Access	1.3
1.1.2.3.5	Manage Content Reader Privileges	Access	1.3
1.1.3	Automate Role Grant	Access	1.2
1.1.4	Manage Content Access	Access	1.4
1.1.5	Manage User Access	Access	1.4
1.1.5.1	Manage Reviewer List	Access	1.4
1.1.5.2	Manage Committee Member List	Access	1.4
1.2	Manage Storage	Storage	2.1, 2.2
1.2.1	Populate List	Storage	2.1
1.2.2	Validate List Entry	Storage	2.1
1.2.3	Manage Provisional Content	Storage	2.1, 2.2
1.2.3.1	Restrict Access to Provisional Content	Storage	2.2
1.2.4	Manage Content Catalog	Storage	2.2
1.3	Manage Content	Content	3.1, 3.2
1.3.1	Manage Content Status	Content	3.1
1.3.1.1	Designate Status	Content	3.1
1.3.2	Manage Status Change	Content	3.1
1.3.2.1	Document Status Change	Content	3.1
1.3.2.2	Publish Status Change	Content	3.1
1.3.2.3	Manage Content Approval	Content	3.2
1.3.3	Manage Content Registration	Content	3.1
1.3.3.1	Manage Registration Process	Content	3.1
1.3.3.2	Validate and Store Content	Content	3.1
1.3.3.3	Manage Content Upload	Content	3.1
1.3.3.4	Manage Content Agreement	Content	3.1
1.3.3.4.1	View Terms and Conditions	Content	3.1
1.3.3.4.2	Print Terms and Conditions	Content	3.1

New ID	Requirement Title	Group	Test Case(s)
1.3.3.4.3	Reject Terms and Conditions	Content	3.1
1.3.3.5	Submit Content for Review	Content	3.1
1.3.3.6	Manage Incomplete Content Submission	Content	3.1
1.3.3.7	Manage Revised Content	Content	3.1
1.3.4	Administer Content Review	Content	3.2
1.3.4.1	Manage Pending Content	Content	3.2
1.3.4.2	Manage Content Review Assignment	Content	3.1
1.3.4.3	Review Content by Selection Criteria	Content	3.2
1.3.4.4	Manage Content Committee Review	Content	3.2
1.3.4.4.1	Edit Review Agenda	Content	3.2
1.3.4.5	Provisional Acceptance Alert	Content	3.2
1.3.5	Manage Content Quality Review	Content	3.3
1.3.5.1	Reviewer Summary Page	Content	3.3
1.3.5.2	View Assigned Content	Content	3.3
1.3.5.3	Manage Review Scoring	Content	3.3
1.3.5.4	Manage Incomplete Scoring	Content	3.3
1.4	Manage Discovery	Discovery	4.1, 4.2, 4.3, 4.4, 4.5
1.4.1	Manage Content Availability	Discovery	4.1
1.4.2	Manage Free Text Search	Discovery	4.1
1.4.3	Manage Keyword Search	Discovery	4.2
1.4.4	Manage Most Viewed Search	Discovery	4.3
1.4.5	Manage New Content Search	Discovery	4.4
1.4.6	Manage Content Catalog Search	Discovery	4.5
1.4.6.1	Sort Catalog Content	Discovery	4.5
1.4.7	View Multimedia Formats	Discovery	4.5
1.4.8	Print Multimedia Formats	Discovery	4.5
1.5	Administer the System	Administration	5.1
1.5.1	Create Lists	Administration	5.1
1.5.1.1	Create Topic Type List	Administration	5.1
1.5.1.2	Create Keyword Lists	Administration	5.1
1.5.1.3	Create Content List	Administration	5.1
1.5.1.4	Create a Reviewer List	Administration	5.1
1.5.1.5	Create a Review Scoring List	Administration	5.1
1.5.1.6	Create Supplementary Resources List	Administration	5.1
1.5.1.7	Create Association between Lists	Administration	5.1
1.5.1.8	Create a Lookup List	Administration	5.1
1.5.2	Update List Format	Administration	5.1

Test cases, and the associated test procedures, are divided by the overall portal function (e.g. Manage Access, Manage Storage, Manage Content, Manage Discovery, Administer the System). Detailed test procedures can be found in Appendix C.

Chapter 4 : Findings and Applications (Phase 2)

This section discusses the second phase of research. This phase involved building and testing a prototype of the portal that was specified in Phase 1. In addition, several supporting documents were developed to describe the operation and maintenance of the portal. These supporting documents included:

- Implementation Plan
- One-Year Marketing Plan
- Sustainability Plan

Portal Development

As part of the second phase of this research effort, the portal prototype was developed using a third party hosting service. The portal prototype was built by creating custom lists and workflows in Microsoft SharePoint 2010 as defined by the High-Level Design.

The design for the portal was laid out by the work performed in Phase 1 of this research effort. The key documents developed in phase 1 all play a role in development of the portal. The concept of operations defines the user needs, and defines the overall use of the portal that must be met for the prototype to be successful. The functional requirements describe exactly what it is that the system must do. The technology alternatives analysis describes the technical requirements for the portal. Finally, the high-level design defines the lists and architecture of the system that must be implemented.

In any system designed using the systems engineering process, the functional requirements are the critical document to describe the system. This is because the functional requirements provide the explicit definition of what the system must do to meet the ultimate needs of the users. All of the documents, including the functional requirements, were written with the intent of the portal eventually being hosted as part of MyAPTA. However, the goal of the research effort is to create a prototype of the portal, which can be used to validate the user needs of the Concept of Operations. Therefore, for the prototype, not all requirements were implemented. The requirements are prioritized, and it is anticipated that all high and medium priority requirements will eventually be implemented as part of the portal after the conclusion of this effort.

Table 4-1 below shows the full set of functional requirements defined as part of Phase 1 and whether or not the requirements was included in the prototype are also shown.

Table 4-1. Requirements Implemented in Prototype

Reqmt ID	Requirement Title	Implemented in Prototype
1.1	Manage Access	
1.1.1	Manage Portal Login	Y*
1.1.2	Manage Roles	Y
1.1.2.1	Assign User Role	Y
1.1.2.2	Assign User to Multiple Roles	N
1.1.2.3	Manage Role Privileges	Y
1.1.2.3.1	Manage System Administrator Privileges	Y
1.1.2.3.2	Manage Content Administrator Privileges	Y
1.1.2.3.3	Manage Review Committee Member Privileges	Y
1.1.2.3.4	Manage Content Contributor Privileges	Y
1.1.2.3.5	Manage Content Reader Privileges	N
1.1.3	Automate Role Grant	Y
1.1.4	Manage Content Access	Y
1.1.5	Manage User Access	N
1.1.5.1	Manage Reviewer List	N
1.1.5.2	Manage Committee Member List	N
1.2	Manage Storage	
1.2.1	Populate List	Y
1.2.2	Validate List Entry	Y
1.2.3	Manage Provisional Content	Y
1.2.3.1	Restrict Access to Provisional Content	Y
1.2.4	Manage Content Catalog	Y
1.3	Manage Content	
1.3.1	Manage Content Status	Y
1.3.1.1	Designate Status	Y
1.3.2	Manage Status Change	Y
1.3.2.1	Document Status Change	Y
1.3.2.2	Publish Status Change	N
1.3.2.3	Manage Content Approval	Y
1.3.3	Manage Content Registration	Y
1.3.3.1	Manage Registration Process	Y
1.3.3.2	Validate and Store Content	Y
1.3.3.3	Manage Content Upload	Y
1.3.3.4	Manage Content Agreement	N
1.3.3.4.1	View Terms and Conditions	N
1.3.3.4.2	Print Terms and Conditions	N
1.3.3.4.3	Reject Terms and Conditions	N
1.3.3.5	Submit Content for Review	Y

Reqmt ID	Requirement Title	Implemented in Prototype
1.3.3.6	Manage Incomplete Content Submission	Y
1.3.3.7	Manage Revised Content	N
1.3.4	Administer Content Review	Y
1.3.4.1	Manage Pending Content	Y
1.3.4.2	Manage Content Review Assignment	Y
1.3.4.3	Review Content by Selection Criteria	N
1.3.4.4	Manage Content Committee Review	Y
1.3.4.4.1	Edit Review Agenda	Y
1.3.4.5	Provisional Acceptance Alert	N
1.3.5	Manage Content Quality Review	Y
1.3.5.1	Reviewer Summary Page	Y
1.3.5.2	View Assigned Content	Y
1.3.5.3	Manage Review Scoring	Y
1.3.5.4	Manage Incomplete Scoring	Y
1.4	Manage Discovery	
1.4.1	Manage Content Availability	Y
1.4.2	Manage Free Text Search	Y
1.4.3	Manage Keyword Search	Y
1.4.4	Manage Most Viewed Search	N
1.4.5	Manage New Content Search	N
1.4.6	Manage Content Catalog Search	Y
1.4.6.1	Sort Catalog Content	Y
1.4.7	View Multimedia Formats	N
1.4.8	Print Multimedia Formats	N
1.5	Administer the System	Y
1.5.1	Create Lists	Y
1.5.1.1	Create Topic Type List	Y
1.5.1.2	Create Keyword Lists	Y
1.5.1.3	Create Content List	Y
1.5.1.4	Create a Reviewer List	N
1.5.1.5	Create a Review Scoring List	Y
1.5.1.6	Create Supplementary Resources List	N
1.5.1.7	Create Association between Lists	Y
1.5.1.8	Create a Lookup List	Y
1.5.2	Update List Format	Y

(*) denotes that final portal login will be exclusively managed by MyAPTA, however is separate for the purposes of the prototype test.

The portal environment was designed to provide an environment where the logical operations of the portal could be tested by users. It was not designed to have the final

appearance that it will have once installed. It is possible that the final implementation will look and act differently from the prototype created as part of this research effort.

Portal Design

The portal was designed using Microsoft SharePoint 2010. The structure of the portal can be found in Figure 4-1.

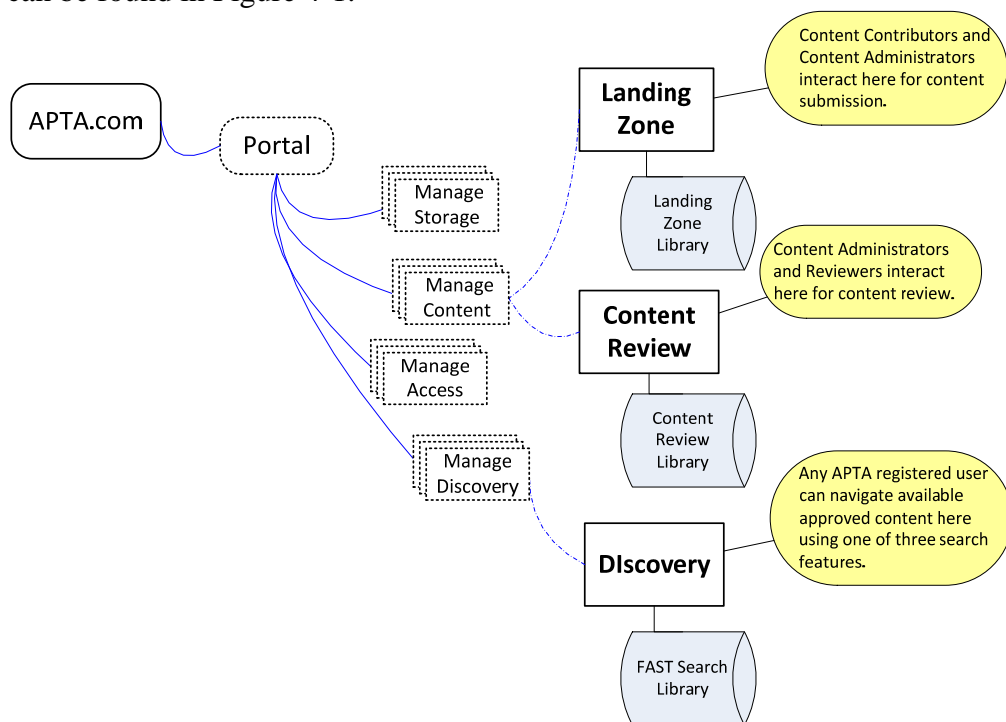


Figure 4-1. Portal Prototype

Upon entering the portal, users are presented with the main home screen, which provides access to the content library. During the development of the portal prototype the team considered several approaches to the detailed implementation of the portal and settled on a simple structure, much like the popular internet search engines. This structure, shown in Figure 4-2 has the material on the portal organized by a type parameter, much like a library is organized by subject. The initial set of types defined for the portal were:

- Application- content primarily relates to a specific transit application (e.g. Transit Signal Priority)
- Benefit- content primarily relates to a discussion of benefits of some transit system
- Information- content primarily relates to transit data or information
- Solution- content primarily relates to a particular transit solution (e.g. Transit Enterprise Architecture)
- Standard – content primarily relates to an ITS standard
- Technology- content primarily relates to a specific technology applied to transit (e.g. automatic vehicle location)

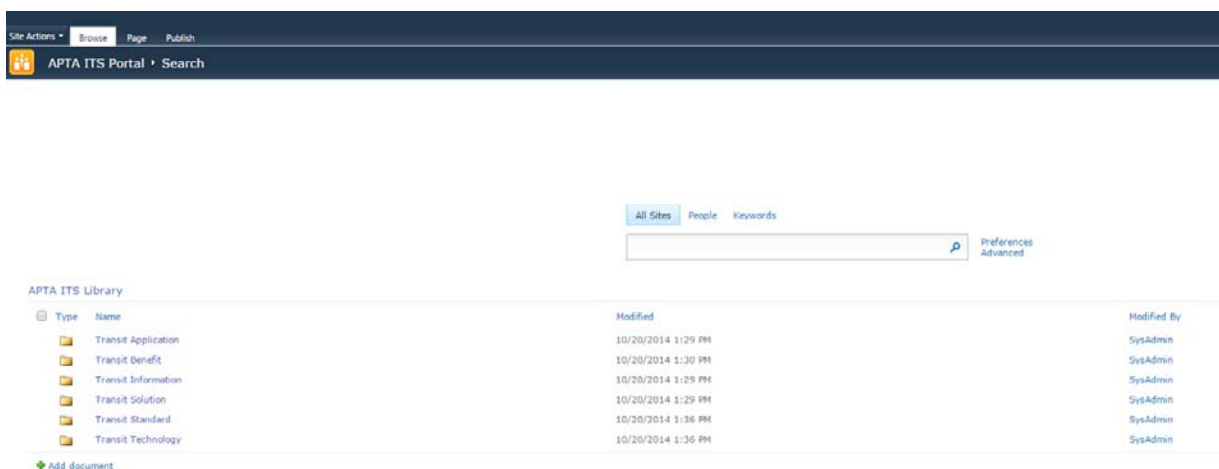


Figure 4-2 Portal Library

Users can search for content by searching, keyword, or by browsing the library, which is organized by content types.

Users who wish submit content can do so on the portal. After uploading the content, the user is provided with a form, shown in Figure 4-3, so that the content can be appropriately described and classified. As part of the content submittal, the submitter provides information about the content including:

- Title
- Keywords
- Description
- Date Published
- Content Author
- Topic Type

APTALanding Zone - Enterprise_maturity_method_Aessment-DRAFT-2015-02-11.xlsx...

Edit

Check In Cancel Paste Cut Copy Delete Item

Commit Clipboard Actions

i The document was uploaded successfully and is checked out to you. Check that the fields below are correct and that all required fields are filled out. The file will not be accessible to other users until you check in.

i Items on this list require content approval. Your submission will not appear in public views until approved by someone with proper rights. [More information on content approval.](#)

Name * Enterprise_maturity_method_Aessmen.xlsx

Title PrISM Enterprise Maturity Capture

Enterprise Keywords enterprise; Capture; Maturity; PrISM; assessment; EMM;
Enterprise Keywords are shared with other users and applications to allow for ease of search and filtering, as well as metadata consistency and reuse

Posted date * 3/1/2015
The initial date the file was uploaded to the portal. This date is automatically inserted when a new record is created.

Current Status * post-complete

Content Description *
An abstract of the content in the file. This field is inserted by the Content Contributor during the Registration Workflow.

Do you agree with the Terms of Submission? * Yes No
This field indicates that the author agreed to the terms for submitting and posting content.

Review Committee Status * provisional
The status assigned by the Review Committee to the document.

Publication Date *
Date content was published

Date Approved
The date when the Content Status was changed to "accepted".

Content Author (None)
One or more names of the authors of the content.

Topic Type * Application

Figure 4-3 Content Submission Form

Content that has been submitted is stored in the “Landing Zone”, shown in Figure 4-4, which is an area of the portal for content which has not yet been designated for review.

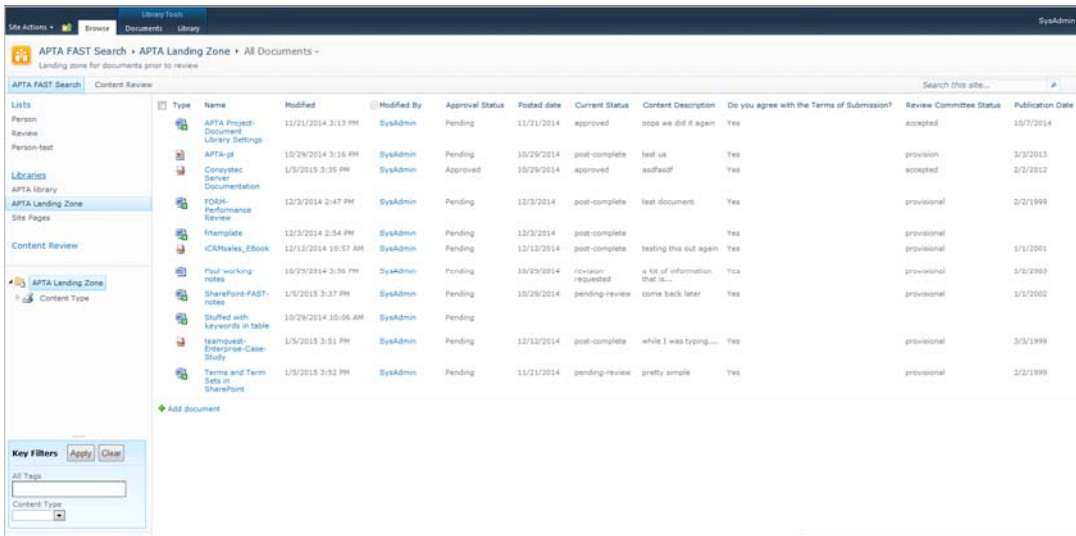


Figure 4-4 Landing Zone

Content in the landing zone is accessed by the content administrator on the portal. The content administrator has the option to perform a security check for viruses or malware at this point. After this point, content can be placed in the review area, where it is assigned for review. The content administrator has the ability to assign the content for review. After content is reviewed, the content administrator can designate the content to be discussed by the full review committee for approval.

Figure 4-5 Content Review Committee Assignment

Once content has been reviewed by the review committee, it is published to the library and made available for all approved users to view.

Verification Testing

After the portal was developed, the research team performed the verification tests defined in the Test Plan and Procedures document defined in Phase 1. Any deficiencies found in the prototype were rectified. Once the verification tests were deemed completed, the validation tests (beta tests) were performed.

Validation Testing (Beta Tests)

In order to validate that user needs for the portal were met, validation tests were performed. A group of seventeen representative users of the portal was assembled. These beta testers were assigned to one of four roles:

- System Administrator (2 testers)
- Content Administrator (3 testers)
- Content Reviewer (9 testers)
- Content Contributor (3 testers)

Note that the system administrator role was assigned to APTA staff, as they will be the system administrators when the portal is implemented in its final location. Also note that the content reader role was used as part of the beta test. This was because any user (reader) of the portal can also be a content contributor.

The portal was available for user testing for a two month period. Overall, six sets of comments were received. The remainder of testers provided no comments. The comments received indicated a general satisfaction with portal operations. Most issues were reported were technical in nature, and will be accounted for during the transition to the final portal location. A summary of comments is in the table below.

Table 4-2. Comments Received from Beta Testing

Comment	Response
Check in screen disappeared when I closed a pop-up that was prompting me to consider Add-ons for my browser, IE 11 (which worked, by the way).	Portal hosting site had some access issues. Should not be an issue when integrated into MyAPTA.
I was able to login and access the portal as a reviewer smoothly. The response time seemed to be longer than expected (20-30 seconds?) from a user perspective.	Portal is currently hosted in a temporary location. Speeds will be different when integrated into MyAPTA.
Tester “wasn’t able to load the document as a contributor intuitively”. Got an error message.	We have loaded documents without issues, so likely an issue of upload to temporary site.
There is a 255 character limit on the Content Description field.	Agree this should be changed to allow longer Content Description.
Content submitters may need to revise their work after they see the results. Need to clarify how to go back and edit previously written entries	Agree that some indication of how to edit entries should be added.
The “keywords” link on the landing page doesn’t work	This is likely an error that would be fixed.
The Content Administrator, Content Contributor, and Content Reviewer all appear to have the same permission level – contribute. That doesn’t seem correct. What should they be? It would be ideal if we could use OOB security permission levels.	Permission levels were limited due to simplified setup of beta site. Production version would have separate security permission levels.
Description of roles and responsibilities inadequate	These descriptions were for the Beta Test only. Roles should be clarified on the final implementation. The majority of people accessing the portal in the long run will be a contributor only.
System worked as expected - no issues, but it did take me a few minutes to figure out what the desired action was in my packet. A summary of what the intent of the action and expected result would have been helpful.	Beta Test Operating Procedures were meant to provide step-by-step instructions, but in some cases weren’t as detailed as they could have been.

Based on the results of validation test, the portal prototype is considered to meet the user needs described in the Concept of Operations developed in Phase 1 of this research effort.

Operations and Maintenance Documents

Three documents were developed to describe how the portal should be implemented following the conclusion of this research, how the portal should be marketed to ensure its success, and sustainability issues associated with the portal, which provided considerations for maintenance of the portal.

Portal Implementation Plan

As part of this research project, a test version of the Portal was developed and beta tested. Following the completion of this project that test version will need to be transitioned to MyAPTA for its final implementation. The purpose of this Implementation Plan is to identify the resources and issues relating to this transition.

Portal Operations

The Portal will become a part of the current MyAPTA environment that is owned and operated by APTA. The Portal and its contents will be under the control of the Technical Portal Subcommittee of the APTA Research and Technology (R&T) Committee. In its operation, the Portal will have the following types of users:

- **Content Contributor:** The content contributor can be any APTA member and is responsible uploading content to the portal. Note the original Concept of Operations included a Content Reader class of user, who can search and view content on the sites. As the Test site was developed, it was determined that Reader and Contributor were really the same class of user and so they were combined into a single class on the Test Portal. Any APTA member can view the Portal and can contribute to the portal. The recommendation is that this be continued in the final implementation.
- **Content Reviewer:** The content reviewer is responsible for reviewing content that is submitted to the portal. Theirs is the key role of vetting material submitted to the portal so that only material meeting Subcommittee criteria of relevance and quality is included in the portal. The Content Reviews also can perform the functions of Content Contributor (or Reader).
- **Content Administrator:** The content administrator role is responsible for guiding content through the review/approval process. This includes assigning content for review and managing the final approval process including publication of the material to the final site. The Content Administrator can also act as a Content Reviewer or Content Contributor if desired.
- **System Administrator:** The system administrator role is responsible for the technical maintenance of the portal. This role involves a detailed knowledge of SharePoint, and is intended for APTA staff who will be maintaining the final version of the portal.

The policies and procedures to be used for the operation of the Tech Portal are defined by a Tech Portal Governance Policy. A draft version of the Governance Policy developed as part of the research project is contained in Appendix A.

Portal Rollout Plan

In order to implement the Technology Portal on the MyAPTA site, the following Rollout Plan steps are suggested:

- Scoping the transition- APTA/Team discussion
- Transitioning from Beta Test Site to Operational Site
- Testing of Operational Site
- Initial Operations
- Operations through end of Year 1

The discussion below elaborates on this suggested set of steps.

Scoping the Transition

The team suggests a meeting with APTA to scope the issues that will be associated with the transition. The beta test yielded a few issues that must be addressed prior to implementation in the APTA environment as described below.

Transitioning from Beta Site to Operational Site

The Portal Beta Test Site has been designed without the use of custom code, rather it is based on customization features that exist in the capabilities of SharePoint 2010. The result of this design is captured in the Portal Beta Test screenshots that are contained in Chapter 4 of this document. These, augmented with work flow diagrams developed to create the Beta Test Portal will be the key outputs used to transfer design of the Portal Beta Test Site to APTA for creation of the Operational Site. The following are key issues that will need to be resolved in making this transition:

- **SharePoint FAST Search Capability:** The Portal Beta Test Site uses the FAST capability of SharePoint 2010. This allows quicker searching of the documents on the site. It was our understanding that the APTA SharePoint site had this capability. Once the Portal Beta Test Site had been developed, we learned that, while the APTA system could implement this, they do not currently have it implemented. Some revision of the site design will be needed to transition from the Beta Test Site with FAST search to the APTA site without it.
- **Permissions by User Class:** The Portal Beta Test Site did not have the capability to define unique class permissions for the three areas of the site: Landing Zone Library, Review Zone Library, and FAST Search Library. The APTA site will need to be configured to allow different classes of users to have different permissions in these three Library areas.
- **Setup of the metadata or keywords** may require turning that feature on within the APTA instance of SharePoint. There should be agreement on what level of detail is available to what level (roles and permissions) of user at that point.

The labor cost to transition from the Beta Site to the Operational Site is not a part of the current research project. The amount of labor required to work with APTA IT Staff to effect the transition can be more precisely estimated once the developer of the Beta Test Site meets with APTA to better scope the transition.

Testing of Operational Site

Once the initial Operational Site has been developed, it should be tested prior to commencing operations. Testing of the site could be done in two steps. First the set of test procedures (or an appropriate subset of them) shown in Chapter 3 should be performed to verify the basic functionality of the site. As part of this testing a set of documents (and other content as available) should be loaded onto the site. The documents used to seed the Portal Beta Test Site could be used for this purpose.

Once the site verification is complete, then a short beta test performed by members of the Tech Portal Subcommittee should be held to ensure that the initial operations flow of the site is working.

Initial Operations

Prior to beginning initial operations, it is recommended that the Tech Portal Subcommittee meet at least once to decide on a few site specifics prior to beginning the Operations:

- Agreement on the list of Topics (essentially the “shelves” around which the Library is organized. The Beta Test Site had 5 topics, partly driven by the seed material used.
- Solicit additional material from subcommittee members so that when first going operational there is a critical mass of material present to interest the general user.

Once the initial content has been loaded the recommendation is that the Marketing Plan below be consulted on the approach to announcing the availability of the Portal.

Operations Through End of Year 1

During the first year of operations, it is recommended that the Tech Portal Subcommittee meet at least monthly to review the status of the Portal.

One Year Marketing Plan

Developing this important tool will build knowledge and collaboration in the ITS area. Promoting the APTA ITS Portal will be valuable in two ways. First, the more participation there is - the more robust and useful the site will be. Second, promotion reinforces APTA’s leadership position in the ITS area.

The goal of the marketing plan is twofold:

- Increase awareness of the APTA ITS Portal

- Encourage participation in the APTA ITS Portal

This preliminary marketing plan focuses on attracting users to the site to meet both marketing goals.

Marketing Strategy

Target Audience

The primary target audience for the APTA ITS Portal consists of current and prospective transit ITS middle and senior managers, practitioners, executives, and students. The secondary target audience is potential members who will see the site as an incentive to join APTA.

APTA may also want to consider whether it is viable and worthwhile to expand the portal concept with two levels of access. The first level would be open to all transit professionals and researchers to promote the awareness and encourage submittal of ITS-related articles. It would have limited functionality that would still provide additional value for APTA members, who could access a “members only” version of the site.

Message Development

Selecting and focusing on a key message point will help APTA cut through the immense clutter everyone faces and help create a clear benefit message and compelling reason to try the APTA ITS Portal. The key attributes to emphasize in communications are:

- This is an innovative concept from a trusted source
- This is a collaborative site where you can gain knowledge about technology in the industry
- This is where to go to get the best information
- This is an opportunity to find up to date information for members who can rarely attend conferences or trade shows
- Submissions are encouraged on a continuing basis

Message Distribution

As this will be a member-only portal, the message should be distributed through APTA communications, including general membership and committees. We recommend engaging agency board members, CEO’s, and VP’s, many of whom are highly involved with APTA already, to become champions for the ITS Tech Portal and promote the site through their organization and internal distribution channels.

Measurement

The first year program will be used to establish a benchmark for future promotional efforts. We recommend that we track activity that follows from outreach efforts to gain knowledge about which techniques are working the best.

Throughout the year, visits to the website will be tracked and compared with the timing of the launch of each promotional activity to determine which effort yielded the greatest

results. At the end of the measurement period, a summary of the activity will be presented and used to develop future marketing plans.

Creative Strategy

Brand Management

We recommend development of a distinct branding identity for the APTA ITS Portal consisting of a name and visual elements. This will help to create a memorable, easily recalled mark that can be incorporated into communication materials. It will also position the Portal in a similar vein to an application, something that people can relate to as a stand-alone tool. This will set the stage for APTA to further develop the portal as a stand-alone app if that is desired in the future.

Creative Execution

Messaging should position the ITS portal as a fresh, approachable tool for use by technical and non-technical audiences. As the most likely early adopters will be transit-oriented individuals who really care about leveraging technology to serve transit customers, we recommend a creative campaign that incorporates an educational element (to take the fear out of learning new technology) with edgy, cheeky, non-traditional marketing to reinforce that this is a new type of offering. Complementing this would be testimonials, such as endorsements, from highly regarded transportation C-level personnel and other substantiating information to support the business case for using the Portal.

Media

To reach the primary target market, we recommend using a mix of traditional and social media with the intention of building a community through social marketing and word of mouth promotion. APTA could begin with its own membership list, sending blast emails as well as messaging to all committee chairs. Facebook and Twitter accounts should be set up and used to foster a conversation around the portal. Resources will have to be dedicated to manage and monitor these social media sites.

Using viral social marketing techniques to build “buzz” will draw viewers to the portal. APTA could also consider the use of contests or awards (e.g., “most innovative technology”) to build value for participating in the site. Members, especially agency members, could be encouraged to share information about the site with their staff through their internal communication mechanisms.

APTA should also consider booth displays at APTA events. A branded giveaway item, such as a flash drive, would help reinforce the portal identity and provide a way to remember the site.

In addition, APTA should incorporate the ITS Technology Web Portal into its benefit package for marketing to potential members.

Portal Sustainability Plan

A technology portal is long-term ongoing investments that will grow and change as both the content and underlying technology evolve. The purpose of this portal sustainability plan is to examine issues relating to long-term usage of the portal. Consideration of these issues before the portal goes live will help to ensure both short- and long-term value to the users. Two key goals of portal sustainability are:

- Ensuring that the service provided by the portal (content and functionality) provides sufficient utility to all categories of users
- Ensuring that the software/hardware is sufficient to handle portal functionality in the near term and a projected 5-year future term

To address these goals, this Plan will consider three major issues relating to portal sustainability:

- **Portal Operations and Maintenance Resource Requirements.** Portal Maintenance Resource Requirements describe the requirements for the ongoing Operations and Maintenance of the Portal.
- **Portal Upgrade Planning.** Portal Upgrade Planning describes changes that could be made to the portal to enhance portal operations.
- **Ongoing Portal Evaluation.** Ongoing Portal Evaluation describes the process where operations are assessed to make decisions about the future of the portal.

Portal Maintenance Resource Requirements

The Portal Maintenance Resource Requirements can be broken into two areas:

- Human Resource Requirements
- System Resource Requirements

Another possibility exists to transition some of the human or system resources to a cloud-based “as-a-service” paradigm. This paradigm shift should be considered as part of a long-term sustainment of the portal. The dynamics of shifting to this can effect change on both the human and system resources.

Human Resource Requirements

Human resource requirements are those that require personnel to perform activities required to maintain the portal. Personnel may be paid APTA staff or volunteers (Reviewers and Review Committee Members). The Transit Technology Portal has been designed to operate within existing SharePoint capabilities of APTA, not as a separate system. Nonetheless there will be some O&M requirements to the portal itself. In addition, existing content of the portal must be managed and new content must be reviewed and approved for inclusion in the portal. This content review and management will also require ongoing resource commitments. These resource requirements can be summarized by three key roles associated with the Portal:

- System Administrator
- Content Administrator
- Content Reviewer

The requirements for each of these key roles are listed below:

- **System Administration.** A System Administrator (who will likely be a member of APTA Staff) will perform routine tasks to ensure that the portal is operational. This includes installing software updates provided by vendors, performing security operations on the portal (e.g. scanning content for viruses), responding to technical support inquiries by portal users, and resolving technical issues that occur. The cost of system administration is the labor cost of staff members required to perform the activities, and the required level of effort is variable based upon the activity of the portal and how well integrated the portal is to the APTA website. This is a typical role where the labor can be greatly reduced through cloud-based services and should be reviewed in the long-term sustainability of the portal. The additional resource requirement (above and beyond the existing SharePoint system that APTA operates) will likely be small – a few hours per week.
- **Content Administration.** In order for the portal to be an effective resource to its users, an ongoing content management and review process is required. This includes reviewing content submitted by users, approving content, publishing content, and ensuring the content is up to date. This work is led by a Content Administrator and supported by content reviewers and members of the review committee.

The role of Content Administrator could be performed by APTA staff, but will likely be done by an APTA member as an unpaid volunteer. The Content Administrator may be the Chair of the Tech Portal Subcommittee of APTA's Research and Technology Committee or someone to whom the Chair delegates the responsibility. Early in the deployment process the amount of effort required for this role will be a function of how much new content is submitted to the portal each month. Once the portal has been in operation for more than a year, then a portion of the effort will be to review existing material to consider whether it needs to be removed, revised, or left unchanged.

Another factor affecting the resource requirements will be how often the Review Committee meets to consider new submittals to the portal. The most logical meeting frequency is monthly, although in the early months of the portal meeting bimonthly may be worthwhile if there are many submittals to consider. The content administrator has two primary roles – to lead the submittal review effort and to manage the status and location of portal material. It is estimated that leading the review effort (which is primarily administrative in nature) should take no more than 4 hours per review period (e.g. either bimonthly or monthly). The additional effort to administer the content itself should amount to no more than a couple of hours per week.

- **Content Reviewers:** Content Reviewers are needed to review submittals to approve their inclusion in the portal. The Content Reviewers will likely be drawn from members of the Tech Portal Subcommittee of APTA's Research and Technology Committee, although they could include other transit professionals

invited by the Subcommittee to participate as reviewers. These Reviewers provide technical or quality review of submittals. The amount of effort required will depend on two factors – how many submittals need to be reviewed by an individual reviewer (will be affected by number of submittals and number of reviewers) and the amount of effort required to review each submittal. Once the portal has transitioned to APTA, Subcommittee members will need to decide how comprehensive a review they will want on the submittals. The review could be a quick look for quality or appropriateness, or the Subcommittee might ask for a more complete review of each submittal. In either case the effort will have to be supplied by the volunteer group of reviewers.

System Resource Requirements

System Resource requirements account for the ongoing technology needs of the portal. The exact long-term System Resource Requirements for maintenance of the portal are unknown and will vary based on portal utilization. There are a number of system resources that can be greatly reduced through cloud-based services and should be reviewed in the long-term sustainability of the portal. They range from cloud-based backups (of portal content) to complete hosting through PaaS (Platform as a Service). Throughout the lifecycle of the portal, the following requirements are possible:

- **Storage Media Upgrades.** In the event that the portal experiences extremely high utilization, it may be necessary to increase the available storage space. The probability of this routine upgrade increases if the amount of content uploaded to the portal is greater than expected or the average size of content increases. The cost of such upgrade would be that of new media plus the labor to make the changes. Another plausible future state would be to leverage cloud-based storage that expands or contracts based on needs and record storage longevity
- **Routine Software Updates.** It is possible that an update may be released for the SharePoint or FAST software items that run the portal to fix an issue in the existing software. This is not the same as a full upgrade of the version of SharePoint or FAST. The cost would likely only be the labor cost to perform such upgrades, and would probably not be unique to the portal but would represent a cost for APTA's overall SharePoint system. Another possible long-term objective would be to leverage cloud-based services to host the site as this would obviate the need for any software updates (provided by vendor through service-level agreement (SLA))
- **Hardware Repair/Replacement.** A possible, but unlikely, cost is that the hardware that the portal operates off of could have hardware problems requiring repair or replacement. However, since the hardware supporting the portal is just part of the hardware supporting the overall APTA website, the cost associated with repair or replacement is likely not directly associated with the portal. If hardware becomes an issue, at this juncture it would certainly be worth exploring hosting the system(s) through PaaS (Platform as a Service).

Portal Upgrade Planning

For the portal to remain a viable asset for APTA, planning for upgrades needs to be considered as part of the overall sustainability of the portal. Upgrades may be needed to hardware, software, or functionality/content in order to maintain ongoing interest in the portal.

Update Schedule

At this time, a specific upgrade schedule for the portal is not warranted because system utilization is not yet known. While both hardware and software upgrades may be necessary at a future date, these should be driven by the portal utilization which is not known at the present time.

While an exact timeframe for upgrades is not known and is dependent on system performance, it would be most efficient to perform such upgrades concurrently with any other planned upgrades to the APTA website. This takes advantage of economies of scope, as it is much more time- and cost-effective to perform work at the same time. This should help minimize disruptions to the portal, and other APTA systems. Further, if an upgrade to Microsoft SharePoint is performed as part of an APTA website upgrade, the portal will be directly affected, as it is specifically built to work on the version of SharePoint currently used by APTA.

Hardware Upgrades

The initial use of the portal will be supported by the existing hardware configuration of APTA systems. This configuration is likely to support portal activity for the near term depending on the level of usage, which should be monitored as part of performance evaluation. If the portal usage increases significantly over time then the hardware configuration may need to be upgraded but, as discussed above, any hardware upgrades should be done as part of larger APTA upgrade efforts or planned in a cloud-based roadmap.

Software Upgrades – Impact of Upgrading to a New Version of SharePoint

The current portal was built on SharePoint 2010, which is the current version of SharePoint used by APTA. Software upgrades will not be needed in the next couple of years, as that version of SharePoint should be supported for at least several more years. If APTA should decide to upgrade to the next version of SharePoint, which is SharePoint 2016 the features used for the portal would have to be tested to ensure compatibility across the entire APTA site.

Content or Functionality Upgrade

The portal will likely have limited content at its first introduction. This effort will provide some seeding of content, and the current APTA site has content in various locations that can be consolidated and organized onto the portal. One key to

sustainability for the portal will be for new content to be added in the first year of operations. The Portal One-Year Marketing Plan, previously developed and submitted, provides a plan for increasing awareness of and participation in the portal. The two most likely sources of new content are, first, from the members of the Technology and Research Committee and, secondly, from general APTA portal users. During the first year of portal operations, the committee should actively seek additional comments from its members and a recommendation is that discussion of the portal and its status (including evaluation measures mentioned below) should be an active topic of discussion at committee meetings.

Regarding functionality, the initial ITS Portal design has been developed with a base set of functionality as described in the System Requirements documentation. During the detailed design and development of the portal, the development team ran into a number of areas where design choices had to be made within the basic set of requirements. Some of these design choices were presented to the panel at a web conference last summer and our initial design choices were confirmed. Since then we have continued to identify and resolve issues associated with the site design. As the capabilities of the site are utilized over the first year of operations, it is likely that the subcommittee responsible for maintaining the portal will decide that changes should be made to the Standard Operating Procedures defined for the prototype or to the portal design itself. The prototype portal is built around existing SharePoint capabilities; should simple changes be required within the structures of SharePoint these will be well within the capabilities of APTA's staff that maintains the organization's overall SharePoint site. A recommendation is that the subcommittee charged with maintaining the portal meet quarterly or semiannually to discuss any changes or upgrades that should be made to improve the usability of the portal by content readers, content submitters, or content reviewers.

Ongoing Portal Evaluation

In order for the portal to be successful, it is important that it be assessed on a routine basis. This helps determine how well the portal is operating and identifies any issues that must be resolved. Ongoing evaluation will also give insight into how the portal is being used and allow it to be improved or updated.

Evaluation of the portal should be both quantitative and qualitative. Quantitative evaluation will consist of data that is collected about portal usage, which can be compared against benchmarked performance measures. This provides a snapshot of how well the portal is operating. Qualitative evaluation, in the form of user feedback, can provide insight into user satisfaction with the site.

It is important for evaluation to occur on a regular basis. By routinely looking at system performance, issues can be identified early and positive attributes of the portal can be capitalized upon.

Evaluation Methodology

Quantitative evaluation for the portal can be performed by collecting raw usage data from the portal itself. Every time a user interacts with the portal, a new data point is created.

Since all users must be logged in using their APTA accounts, demographic data is tied to each usage, which allows for an even more detailed analysis of who is using the portal. Further, general data about the portal, such as the total number of content items, can also be measured with ease. To perform this type of quantitative assessment would require some setup and continued monitoring of the portal. Any data collection activities should be performed in accordance with APTA policies, particularly as regards existing privacy policies. For example, it may be necessary to make usage data anonymous so that a specific user cannot be identified.

It is recommended that each login to the portal be recorded. This should include demographic data. At a minimum, the user access level should be recorded. A timestamp should also be recorded. Additionally, a timestamp and identifier linking to a specific login should be recorded every time content is viewed. It should be recorded if the content is downloaded to the user's computer or not. This recorded data should be paired with metadata about each content item, to provide insight into portal usage.

From recorded data, combined with content metadata a variety of values can be derived. This includes, but is not limited to:

- Total log-ins
- Total content views
- Total content downloads
- Number of log-ins for each user
- Number of content views for each content item
- Number of content downloads for each content item
- Total Storage Space Used

In addition to automatically collected data, user feedback should be solicited on the portal, so that qualitative aspects can be monitored. Further, if a significant change in performance metrics occurs, the user feedback should be checked to see if it provides insight on the change.

Performance Metrics

There are many possible performance metrics that can be used to evaluate portal operations. While a large quantity of data could be collected for the development of performance metrics, it is recommended that only a limited number of key performance indicators be utilized for general portal evaluation. This allows analysis to remain focused relative to the size of the portal. It is always possible for additional metrics to be observed.

The following are some suggested key performance indicators for the portal. Note that target values are not given, since the utilization of the portal is not known. It is recommended that, after the portal is deployed for one year, benchmark values be determined which can be used to drive any targets. Performance indicators should look at future changes in these values relative to the benchmarked values.

- **Total Weekly Visits.** This metric analyzes the total visits to the portal each week. Patterns in weekly visits can be used to observe the effect of various portal events, such as a change in functionality. A rapid change in total visits can also highlight a problem with the portal that may have occurred. A weekly period is selected to limit noise created by different days of the week having different usage patterns.
- **Rolling Average Weekly Visits.** This metric analyzes the average number of visits per week over the past year. This value is calculated by averaging the total visits each week for the past year, over the total number of visits for the past year. Since this is a rolling value, the past year is defined as beginning one year from when the value is calculated, as opposed to the calendar year. A weekly period is selected to limit noise created by different days of the week having different usage patterns. An average limits the effect of week to week variations in usage.
- **Monthly Unique Visitors.** This metric analyzes the total number of unique visitors each month. This metric can give insight as to whether visits to the portal are coming from a broad spectrum of users or not.
- **Average Time Between Visits.** This metric analyzes the average time between visits for all portal users who visit the portal two or more times. This gives insight into how frequently users are inclined to visit the portal, and check for new content.
- **Total Monthly Content Publications.** This metric gives insight into the variety of new content available on the portal and can be correlated with other metrics to measure the effect of new content on readership.
- **Average Age of Published Content.** This metric is an average of the length of time that all currently published content items have been published. This gives insight into whether or not content is fresh and likely to attract users to the portal.

During the first year of operation, the values of each performance measure should be closely observed. In addition to monitoring system performance, these values can be used to measure the effectiveness of the portal marketing plan. At approximately one year, benchmark values should be determined, based on observed values throughout the first year. Future observed metrics should be compared against these benchmark values to determine performance. Target values can also be determined once benchmarked values are known. As the portal matures, it may be necessary to modify target values if there is sufficient reason to believe they no longer reflect the ideal operations of the portal.

Chapter 5 : Conclusions, Recommendations, and Suggested Research

This research effort utilized the systems engineering process to realize the development of an ITS technology portal for transit managers. Prior to project initialization, little was known beyond the purpose that such a portal might serve and that MyAPTA would be the final location of the portal. Research led to the development of user needs, from which functional requirements were derived to describe the portal system. The requirements led to the selection of technologies, and a system architecture design. These initial outputs then allowed a prototype of the portal to be developed. The portal was tested to ensure that the requirements were met and validated to ensure that the user needs were met. This entire research effort demonstrated the ability of the systems engineering process to create a system that has real world utility for transit managers.

This research effort represents only the beginning of this process. The research effort does not include the actual integration of the portal into the MyAPTA environment, but provides the framework for the final system. The research team does recommend that APTA proceed with implementing the portal within MyAPTA. The Integration Plan provides steps to perform the integration. In this process, it is of key importance that the process be well integrated to MyAPTA. Users will benefit from a seamless operation between the portal developed by this research and the existing functionality of MyAPTA.

Once this portal is at its final location, attracting users is important. The research team recommends that the marketing plan defined by this effort be adopted. This will ensure that users are attracted to both provide and access content. Without users, the portal will provide minimal benefit to anyone. The sustainability plan provides performance metrics that can be used to evaluate how well the portal is being utilized.

Further, feedback should be frequently solicited from active and potential users of the portal. By ensuring that the portal reflects the desires of its users, it there will be more interest and usage of the portal. The team that operates the portal, particularly the review committee, will play a key role in portal upkeep. If the material is kept up to date and user-appropriate, the portal is more likely to be successful.

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ABBREVIATIONS, ACRONYMS, INITIALISMS, AND SYMBOLS

Acronym	Definition
APTA	American Public Transportation Association
AVL	Automatic Vehicle Location
CA	Content Administrator
ConOps	Concept of Operations
CR	Content Reviewer
CS	Content Contributor (Submitter)
FAST	Microsoft SharePoint Add-on
GB	Gigabytes
GHz	Gigahertz
GPS	Global Positioning System
HIA	Here I Am
HLD	High-Level Design
HTML	Hypertext Markup Language
IIS	Internet Information Services
INCOSE	International Council on Systems Engineering
IT	Information Technology
ITS	Intelligent Transportation Systems
MyAPTA	Portal for APTA members
O&M	Operations and Maintenance
RAM	Random Access Memory
RCM	Review Committee Member
R&T	Research and Technology
SA	System Administrator
SE	Systems Engineering
SEP	Systems Engineering Process
SOP	Standard Operation Procedures
SPS	SharePoint Solution
SQL	Structured Query Language
SysRqts	System Requirements
TAA	Technology Alternatives Analysis
TEAP	Transit Enterprise Architecture and Planning Framework
TCRP	Transit Cooperative Research Program
TSP	Transit Signal Priority
USR	Content Reader/User

Appendix A: Portal Governance Procedures

Note: This Appendix contains **proposed** Governance policies and procedures for the ITS Technology Web Portal. Presently, this is not an official policy of APTA, the Research and Technology Committee, or the Technology Portal Subcommittee. This document was compiled by Consensus Systems Technologies following discussion with the chairs of the APTA Research and Technology Committee and the Technology Portal Subcommittee and is pending stakeholder approval.

This appendix describes rules of governance for the ITS Technology Portal for Transit System Leaders. The portal will be managed by the American Public Transit Association (hereafter known as “APTA”) Research and Technology Committee (hereafter known as “R&T Committee”) and operated by APTA.

Scope

The ITS Technology Portal is a web site for Transit System Leaders to learn about new and emerging technologies as they apply to transit. The portal is a one-stop resource that provides information not only on the technologies, but also their relationship to transit business practices, technology implementation issues, and adoption challenges. The portal content is submitted by industry experts and reviewed by APTA’s Research and Technology Committee Tech Portal Subcommittee designated reviewers. The portal serves as a collaborative tool wherein transit system leaders may ask questions and find answers to basic transit technology questions.

APTA Policies

The portal shall be governed by any and all policies that govern the use of the APTA website.

Article 1- Membership

- 1.1 Membership to the portal shall be open to all individuals who are active members of APTA in good standing (hereafter called “members”).
- 1.2 Members may submit content for consideration to be published.
- 1.3 Members may look up, access, view, and download content that has been published on the portal.

Article 2- Technology Portal Subcommittee

- 2.1 The Technology Portal Subcommittee (hereafter known as the “Tech Portal Committee” or “Review Committee”) of the R&T Committee shall manage the portal content.
 - 2.1.1 The Tech Portal Committee shall review, approve (or reject), and remove publication of content on the portal.

- 2.1.2 The Tech Portal Committee should meet no less frequently than once per month.
- 2.2 The Tech Portal Committee shall be governed by the R&T Committee Bylaws.

Article 3- Portal Operations and Administration

- 3.1 The Tech Portal shall have one or more Content Administrators.
 - 3.1.1 The content administrator shall have the following roles and responsibilities:
 - 3.1.1.1 Has access to content administrator page and functions
 - 3.1.1.2 Removes or changes the status of a posted resource
 - 3.1.1.3 Provides (removes) access/privileges to Content Reviewers and/ or Review Committee Members.
 - 3.2 APTA's Information Technology staff shall operate the portal.

Article 4- Content Review and Approval Process

- 4.1 All content that is submitted to the portal must undergo a review and approval process prior to being published on the portal.
- 4.2 The Review Committee shall designate one or more individuals (hereafter known as "Reviewers") to review each item of content that is submitted to the portal.
 - 4.2.1 Content shall be reviewed for both quality and technical accuracy.
 - 4.2.2 Reviewers shall provide the Review Committee with feedback on the submitted content.
 - 4.2.2.1 Feedback should include a recommendation to either approve, conditionally approve, or reject the content for publishing.
 - 4.2.2.2 Feedback should include justification of the provided recommendation.
 - 4.2.2.3 If the feedback recommends that content should be conditionally approved, a list of items that should be fixed prior to approval should be included.
- 4.3 After content has been reviewed, the Review Committee shall hold a vote in accordance with the established procedures of the committee to approve, conditionally approve, or reject the content.
 - 4.3.1 This vote should take place within 60 days of content being submitted.
 - 4.3.2 Content that is approved shall be published on the portal and viewable on the portal.

- 4.3.3 Content that is conditionally approved shall be referred back to the member who submitted it to make improvements before it can be approved.
 - 4.3.3.1 Feedback shall be provided on what improvements should be made.
 - 4.3.3.2 The member who submitted the content should resubmit it to the portal.
 - 4.3.3.3 Resubmitted content shall undergo a full review and approval process as if it were submitted for the first time.
- 4.3.4 Content that is rejected shall not be published on the portal and shall be removed completely from the portal.

Article 5- Management of Published Content

- 5.1 From time to time, the Review Committee shall review all published content for continued relevance.
 - 5.1.1 The Review Committee may solicit updates to content from any appropriate member (including the original author).
 - 5.1.2 The Review Committee may determine that published content is no longer relevant and may terminate such content's publication.
- 5.2 Published content found to be in violation of APTA or portal policies shall be removed from the portal.
- 5.3 The Review Committee shall have the sole discretion to make all decisions related to the removal or termination of publication of content.

Article 6- Submission Guidelines

- 6.1 The following rules shall apply to all content submitted to the portal and must be consented to upon the submission of such content.
 - 6.1.1 Content that is submitted to the portal shall follow APTA's rules for web content.
 - 6.1.2 Content that is submitted to the portal shall not contain vulgar language.
 - 6.1.3 Content that is submitted to the portal shall not violate any anti-trust laws.
 - 6.1.4 A member who submits content to the portal must have the right to submit such content.
 - 6.1.5 APTA shall gain the license rights to all submitted content in accordance with APTA policy.
- 6.2 Content that is submitted to the portal should be in the suggested format provided on the portal.

6.3 Content shall not be submitted to the portal with the intent of soliciting new business.

Article 7- Amendment of Governance Policy

The R&T Committee or Review Committee may amend this in accordance with their established procedures.

Appendix B: Portal Prototype Standard Operating Procedures

Introduction

This Appendix provides the set of Portal Operating Procedures that were used to assist beta testers of the Portal in understanding how to use the different aspects of the Portal. This Appendix has the following Operating Procedures:

- Overall Portal Operations
- Access Management
- Content Management
- Keyword Management

Scope of Beta Test

The purpose of the Beta Test was to validate that the portal meets the high level user needs that have been defined for this project. User needs were defined by the TCRP G-13 Concept of Operations. The user needs that were validated by this beta test are as follows:

- Provide one-stop resource for APTA members to learn about new and emerging technologies applied to transit ITS.
- Ensure that the resources stored in the System:
 - Are easily discoverable by users
 - Are current
 - Show their applicability to transit users including transit system leaders and non-technical transit professionals
 - Comply with APTA content policies (TBD)
- Provide an interactive environment for industry discussion and exchange on new and emerging technologies.
- Provide guidance tools for APTA members to post content on ITS technologies in a standard format to the System. The tools should:
 - Support standard multimedia formats for posting to the System
 - Ensure the proper attribution and identification of the posting
 - Follow APTA policies on submittals hosted on APTA web sites
 - Provide a template for submitters to post their content
- Enable the content to be managed by APTA R&T Committee Tech Portal Subcommittee (hereafter called the Review Committee)
 - Implement tools for the Review Committee to review submitted content.
 - Allow for the Review Committee to delegate posted content to industry experts.
 - Provide event alerts to the Review Committee. Alerts may include when new or revised content is posted, when stored content should be reviewed periodically, and messages from users and reviewers.

- Ensure that new Review Committee members can be assigned or removed from the Review Committee access privileges.
- Develop a System that minimizes operations and maintenance costs and resources.
- Ensure compliance with APTA Tech Portal Governance Processes.

It should be noted that the scope of this beta test was for validating that the portal meets the needs of the users AT A HIGH LEVEL. The portal was hosted on a temporary server. When finalized, it will reside on APTA's servers, and will be subject to APTA's security process, and will have a user interface conformant to that of the MyAPTA site. Therefore, the following aspects of testing were out of scope of this review:

- Access procedures
- User interface/style
- Loading speed of pages
- Amount of content available at the current time (Only beta testers and consultant staff have had the opportunity to load content so far)

As defined for the Beta Test the portal was a testing environment. Because of limitations of the test Portal implementation, testers did have access to features/functionality that they will not have after the portal is integrated into APTA's environment. **To account for this we asked the testers to follow these Standard Operating Procedures as closely as possible.** They were written to guide testers through the critical role-based features that are expected to be integrated to the final portal that will reside with APTA.

Overview of Roles

Beta testers were assigned to one of more roles. Each of these roles tested a specific subset of portal functionality.

- **Content Contributor:** The content contributor role is responsible uploading content to the portal. Users with this role can also search and view content that has been published on the portal.
- **Content Reviewer:** The content reviewer is responsible for reviewing content that is submitted to the portal.
- **Content Administrator:** The content administrator role is responsible for guiding content through the review/approval process. This includes assigning content for review and managing the final approval process including publication.
- **System Administrator:** The system administrator role is responsible for the technical maintenance of the portal. This role involves a detailed knowledge of SharePoint, and is intended for APTA staff who will be maintaining the final version of the portal.

Testing Instructions by Role

This section of the standard operating procedures describes exactly which procedures each tester must follow. This depends on the role assigned to the tester.

Content Contributor

- Follow Procedure 2.1 to log in to the portal using the credentials provided.
- Follow Procedure 3.1 to upload content.
- Follow Procedure 1.3 to search and view content.

Content Reviewer

- Follow Procedure 2.1 to log in to the portal using the credentials provided.
- Follow procedure 4.3 to access content for review and to perform the review

Content Administrator

- Follow Procedure 2.1 to log in to the portal using the credentials provided.
- Once content is submitted to the portal:
 - Follow Procedure 4.1 to validate content.
 - Follow Procedure 4.2 to assign content for review.
- Once content review is completed by the reviewer:
 - Follow Procedure 4.4 to prepare the content for committee review.
- Once the committee has reviewed the document:
 - Follow Procedure 4.5 to publish the document.

System Administrator

- Follow Procedure 2.1 to log in to the portal using the credentials provided.
- Follow Procedure 2.2 to control permissions
- Follow Procedure 6.1 to access the SharePoint Server.
- Follow Procedure 6.2 to update the keyword lists.

Overall Portal Operating Procedure

Precondition: User has appropriate role assigned for access to APTA portal.

The portal is accessed via the main site and offers four major features, to registered APTA members, which are management of access, storage, content and discovery. These features present themselves through three primary web sites (SharePoint) as Landing Zone, Content Review and Discovery. Content is provided by content contributors in the landing zone where content administrators review it for validity and adherence to standards. The content administrator then makes it available to content reviewers on the content review site. Content reviewers can participate in review validation events and provide feedback for content approval. Once content is approved, the content administrator makes it available in the appropriate library on the Discovery section of the portal. Users can search by five primary methods: Enter Data, Keywords, People, Advanced or Browse Library available by selecting specific libraries or the overall portal as needed.

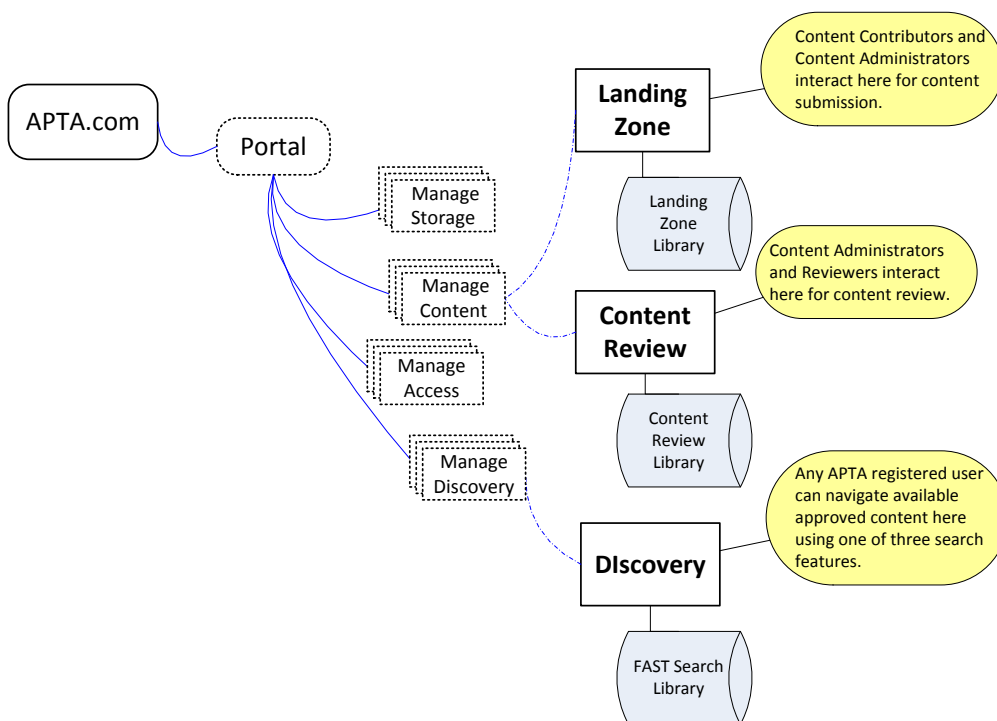


Figure A- 1. Portal Architecture

Procedure 1.1: Landing Zone

The landing zone provides the ability to upload content for content contributors. Content Contributors and Content Administrators interact here for content submission. Content contributors can only view the content that they contribute in the landing zone.

The screenshot shows the APTA Landing Zone interface. A callout box labeled "Landing Zone" points to the main content area. A yellow callout bubble states: "Content Contributors and Content Administrators interact here for content submission." A green callout bubble states: "Default View for Content Contributor includes only data fields relevant to 'contribution.'" Another green callout bubble states: "Content Administrator must SCAN for Virus and etc". A final green callout bubble states: "Default View for Content Administrator includes ALL data fields".

Type	Name	Modified	Modified By	Approval Status	Posted date	Current Status	Content Description	Do you agree with the Terms of Submission?	Review Committee Status	Publication
Document	APTA Project-Document	11/21/2014 3:13 PM	SysAdmin	Pending	11/21/2014	approved	oops we did it again	Yes	accepted	10/7/2014
Document	Library Settings	10/29/2014 3:16 PM	SysAdmin	Pending	10/29/2014	post-complete	test us	Yes	provisional	3/3/2013
Document	Consyted Server Documentation	1/5/2015 3:35 PM	SysAdmin	Approved	10/29/2014	approved	adffadff	Yes	accepted	2/2/2012
Document	PDFM: Performance Review	12/3/2014 2:47 PM	SysAdmin	Pending	12/3/2014	post-complete	test document	Yes	provisional	2/2/1999
Document	Itemplate	12/3/2014 2:54 PM	SysAdmin	Pending	12/3/2014	post-complete		Yes	provisional	
Document	iCRMNotes_EBook	12/12/2014 10:57 AM	SysAdmin	Pending	12/12/2014	post-complete	testing this out again	Yes	provisional	1/1/2001
Document	Paul-working-notes	10/29/2014 3:26 PM	SysAdmin	Pending	10/29/2014	revision-requested	a lot of information that is...	Yes	provisional	1/2/2002
Document	SharePoint-FAST-notes	1/5/2015 3:37 PM	SysAdmin	Pending	10/29/2014	pending-review	come back later	Yes	provisional	1/1/2002
Document	Stuffed with keywords in table	10/29/2014 10:06 AM	SysAdmin	Pending						
Document	teambuett-Enterprise-Case-Study	1/5/2015 3:51 PM	SysAdmin	Pending	12/2/2014	post-complete	while I was typing....	Yes	provisional	3/3/1999
Document	Terms and Term Sets in SharePoint	1/5/2015 3:52 PM	SysAdmin	Pending	11/21/2014	pending-review	pretty simple	Yes	provisional	2/2/1999

Figure A- 2. Landing Zone

Procedure 1.2: Content Review

Content Administrators and Reviewers interact here for content review. Calendars are provided for management and tasking of content review sessions. Content under review can be analyzed and assessed by all appropriate personnel.

The screenshot shows a web browser displaying the 'Content Review' portal. The URL is http://consysnet.portalfront.com/sites/APTA-FAST/Content_Review/SitePages/Home.aspx. The page title is 'Content Review > Home'. The main content area features a 'Content Review Calendar' for January 2015. A callout bubble points to the main content area, stating: 'Default View for Content Reviewer Includes only data fields relevant to "review."'. Another callout bubble points to the top right of the page, stating: 'Default View for Content Administrator includes ALL data fields relevant to "review" administration'. A third callout bubble points to the top left of the page, stating: 'Content Administrators and Reviewers interact here for content review.' The page also includes a sidebar with navigation options like 'Libraries', 'Lists', and 'Discussions', and a 'Content Review Shared Documents' section at the bottom.

Figure A- 3. Content Review

Procedure 1.3: Discovery

From the home screen: Users can search by five primary methods: Free Text, Keywords, People, Advanced or Browse Library available by selecting specific libraries or the overall portal as needed. To search by free text, use the search bar, with “All sites” highlighted. To search by person, click “People” and use the search bar. To search by keyword, click “keywords” and use the search bar. To use advanced search, click “advanced” to the right of the search bar. To browse libraries, click “APTA ITS Library” at the center.

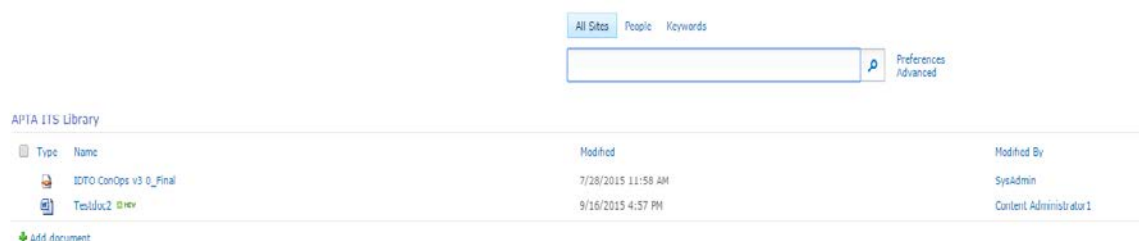


Figure A- 4. Discovery

Access Management Operating Procedure

Precondition: User has appropriate role assigned for access to APTA portal

Procedure 2.1: Log in to Portal

1. Access the portal at <http://consystec.portalfront.com/sites/APTA-FAST/Pages/default.aspx>.
2. You will be prompted with a logon screen similar to the following (browser dependent).

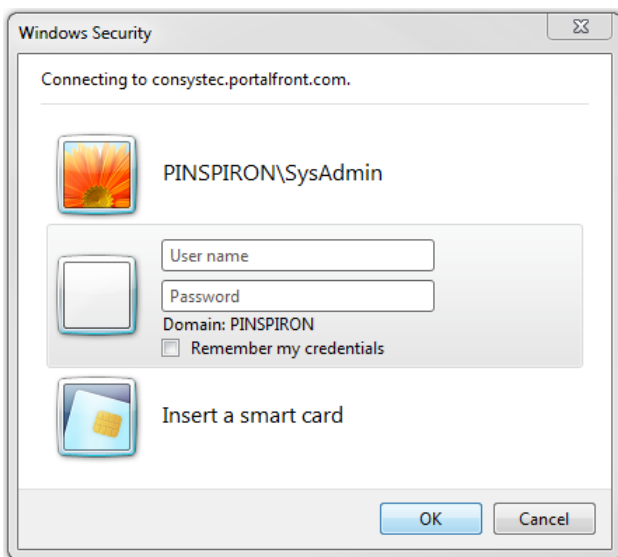
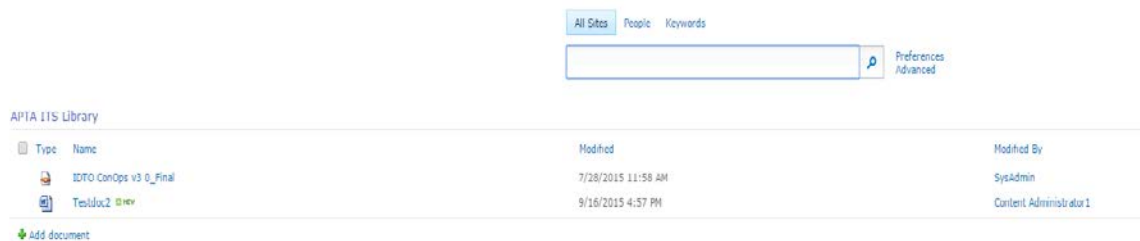


Figure A- 5. Portal Log-in Screen

3. Enter your User name and Password for your appropriate role then click the OK button.
4. You will be presented with a screen similar to the one below (browser dependent).



5. To view content: You can use the search bar to search for a document, or the “people” “keyword” buttons to search using those functions. The “APTA ITS Library button can be used to view library content by folder.

Procedure 2.2: Permissions Control

1. **System Administrators only** – Select the ‘Site Actions’ pulldown menu in the upper left corner, then select ‘Site Permissions’

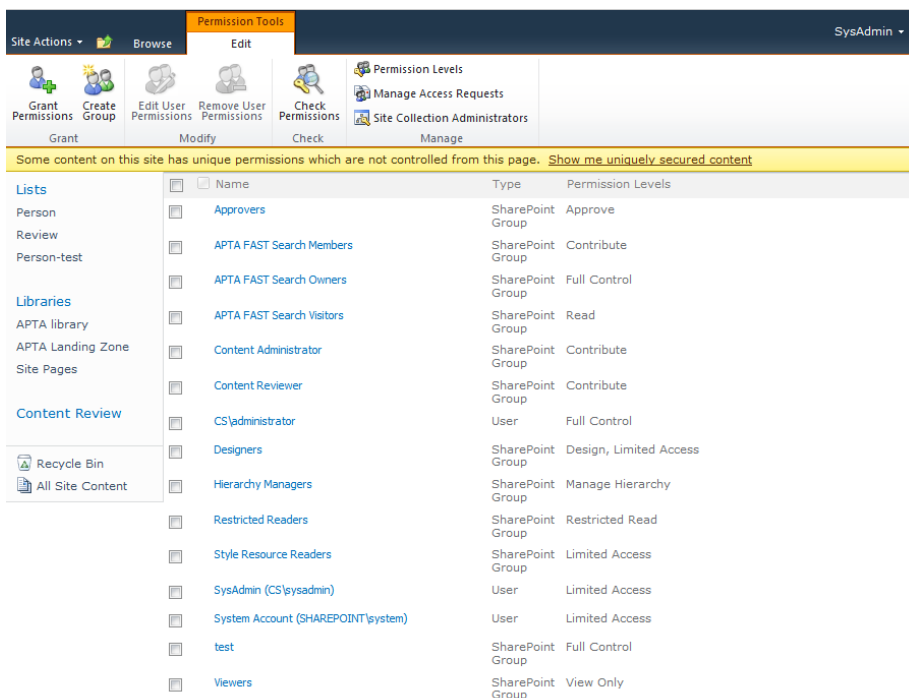


Figure A- 6. Permissions Control

2. The portal allows for distinct roles as follows:
 - a. ITS System Administrator – Create, Update and Delete roles and permissions
 - b. Content Administrator – Create, Update and Delete content
 - c. Content Contributor– Create, Update and Delete content –LIMITED to their content ONLY
 - d. Content Reviewer– Create, Update and Delete content reviews
3. Select ‘Grant Permissions’ for roles outlined in Step 6.

Content Management Operating Procedures

Precondition: User has appropriate “Content management” role assigned for access to APTA portal.

The content administrator has access to content at all three areas within the portal: Discovery, Review and Landing Zone. They are responsible for ensuring content is managed with respect to the validity, freshness and quantity of content in its lifecycle states of pending review, review completed, approved or rejected. The primary functions of content submission and content review are provided in this capability.

Procedure 3.1: Content Submission

1. Follow the steps for Access to logon to the portal.
2. Click on the hyperlink reading “APTA ITS Library” in the middle of the screen.

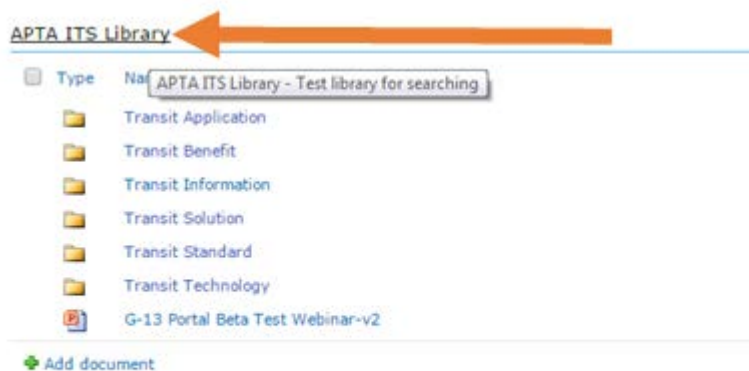


Figure A- 7. APTA ITS Library

3. On the left side menu, click “APTA Landing Zone.”

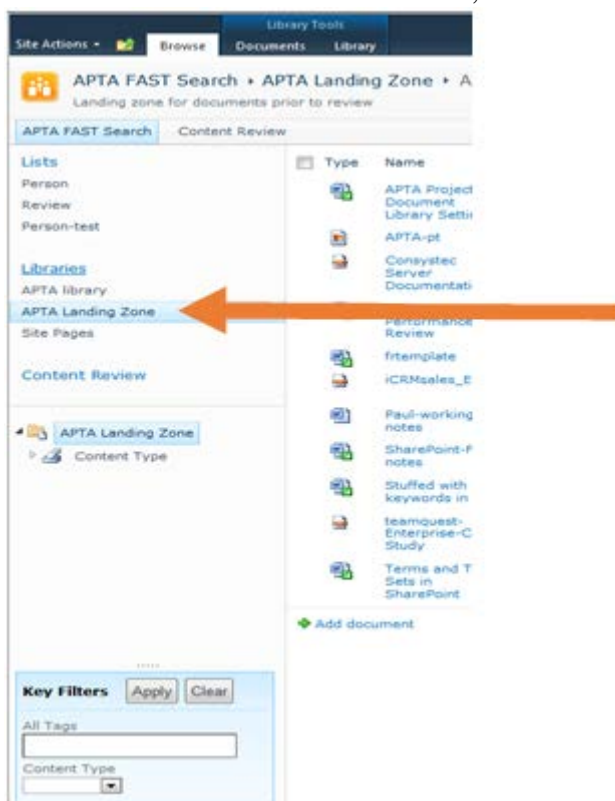


Figure A- 8. Landing Zone Button

4. You will be presented with a screen similar to the one below (browser dependent)

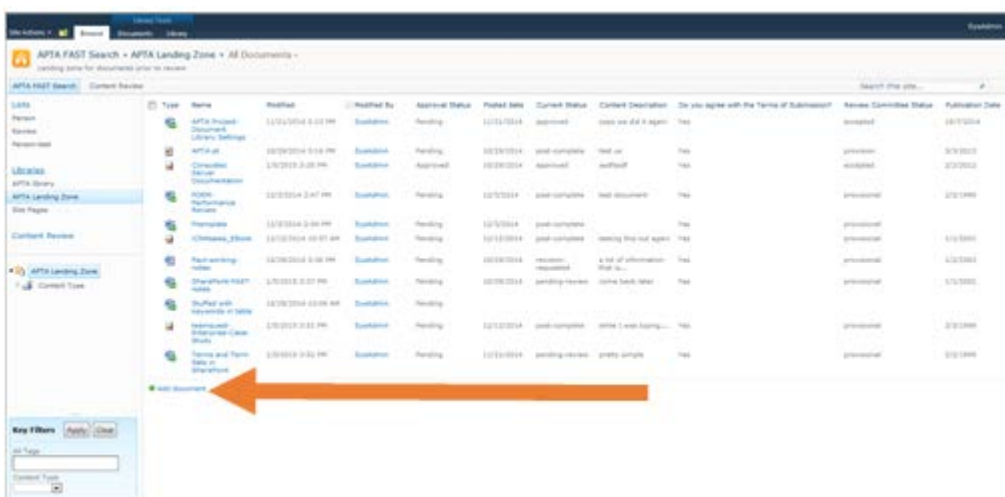


Figure A- 9. Landing Zone

5. Select 'Add Document' in the lower left of the screen.

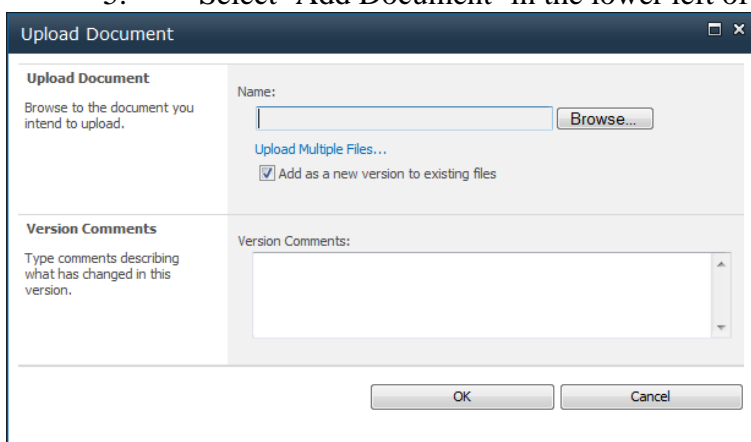


Figure A- 10. Add Document

6. Select 'Browse' and locate the content (document) on your local drive that you are submitting.
7. Enter "First submission" as the [Version Comments] and then select OK to submit.
8. You will be presented with a screen similar to the one below (browser dependent)

APTA Landing Zone - Enterprise_maturity_method_Asesment-DRAFT-2015-02-11.xlsx...

Edit

Check In Cancel Paste Copy Delete Item

Commit Clipboard Actions

i The document was uploaded successfully and is checked out to you. Check that the fields below are correct and that all required fields are filled out. The file will not be accessible to other users until you check in.

i Items on this list require content approval. Your submission will not appear in public views until approved by someone with proper rights. [More information on content approval.](#)

Name * Enterprise_maturity_method_Asesmen.xlsx

Title PrISM Enterprise Maturity Capture

Enterprise Keywords enterprise; Capture; Maturity; PrISM; assessment; EMM;
Enterprise Keywords are shared with other users and applications to allow for ease of search and filtering, as well as metadata consistency and reuse

Posted date * 3/1/2015
The initial date the file was uploaded to the portal. This date is automatically inserted when a new record is created.

Current Status * post-complete

Content Description *
An abstract of the content in the file. This field is inserted by the Content Contributor during the Registration Workflow.

Do you agree with the Terms of Submission? * Yes No
This field indicates that the author agreed to the terms for submitting and posting content.

Review Committee Status * provisional
The status assigned by the Review Committee to the document.

Publication Date *
Date content was published

Date Approved
The date when the Content Status was changed to "accepted".

Content Author (None)
One or more names of the authors of the content.

Topic Type * Application

Figure A- 11. Add Document Form

9. Enter a 'Content description' that best describes the content you are submitting.
10. Select 'Yes' to the "terms of the agreement"
11. Enter a 'Publication Date' for date content was originally published.
12. Enter or Select a 'Content Author'.
13. Select 'Save' and you should be presented a list that shows the content you just submitted.
14. Repeat steps 3 through 11 for each content item you are submitting.
15. Navigate to the upper right of your browser screen, select your username, and select 'Sign Out'.

Content Review Operating Procedure

Precondition: Content Contributor has uploaded one or more documents to the landing zone area. The document has a status of "Post-Complete".

Procedure 4.1: Content Validation (as Content Administrator)

1. Follow the steps for Access to logon to the portal.
2. Click on the hyperlink reading “APTA ITS Library” in the middle of the screen.

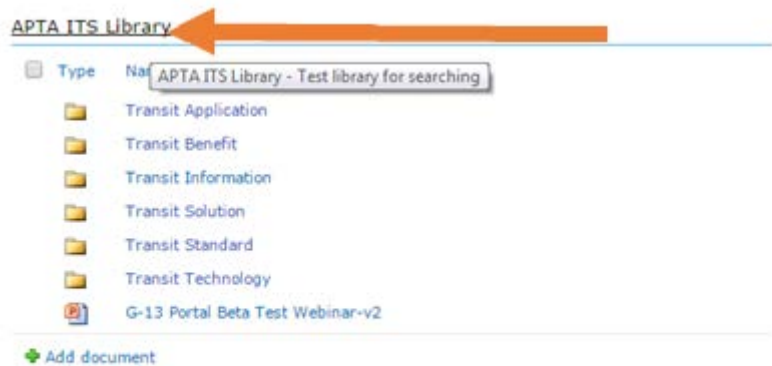


Figure A- 12. APTA ITS Library

3. On the left side menu, click “APTA Landing Zone.”

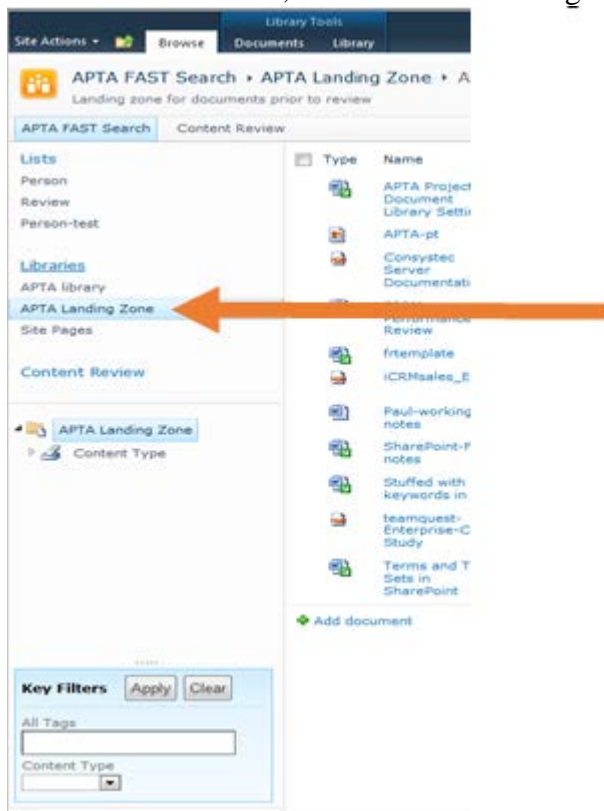


Figure A- 13. Landing Zone Button

4. You will be presented with a screen similar to the one below (browser dependent)

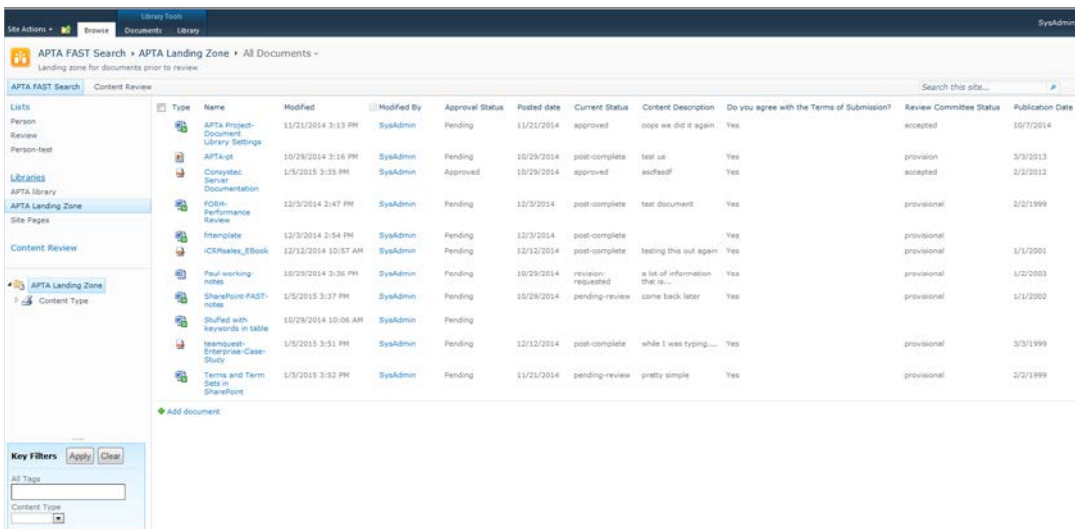


Figure A- 14. Landing Zone

5. Select the pull down to the right of the newly submitted content and ‘Check out’ and ‘use my local drafts folder’ and select OK.

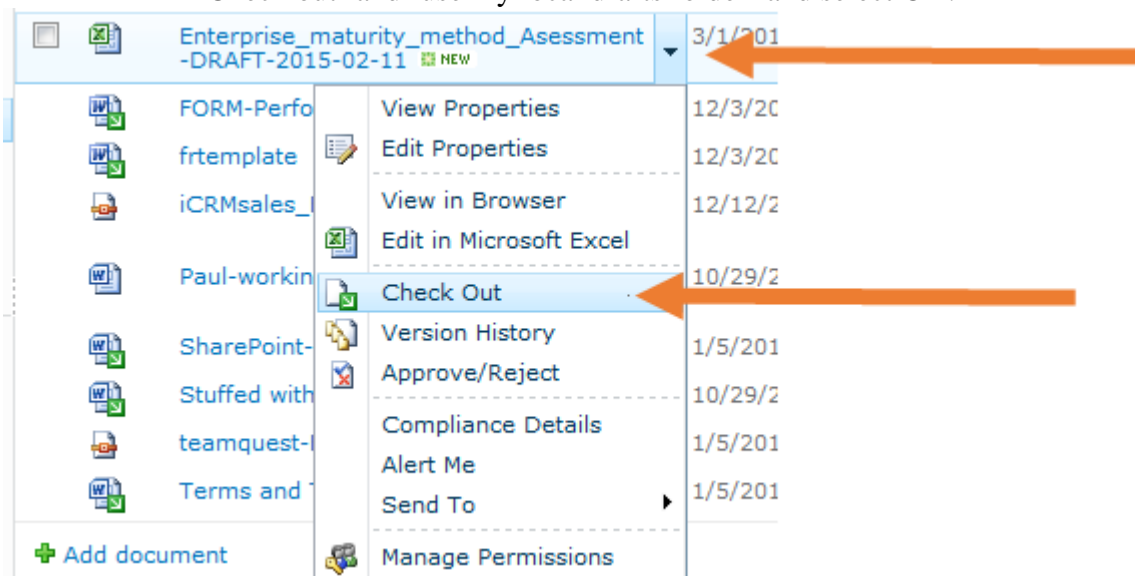


Figure A- 15. Check Out Document

6. Select the pull down to the right of the newly submitted content and ‘Send To > Download a Copy’ and save to a protected drive for virus scanning.

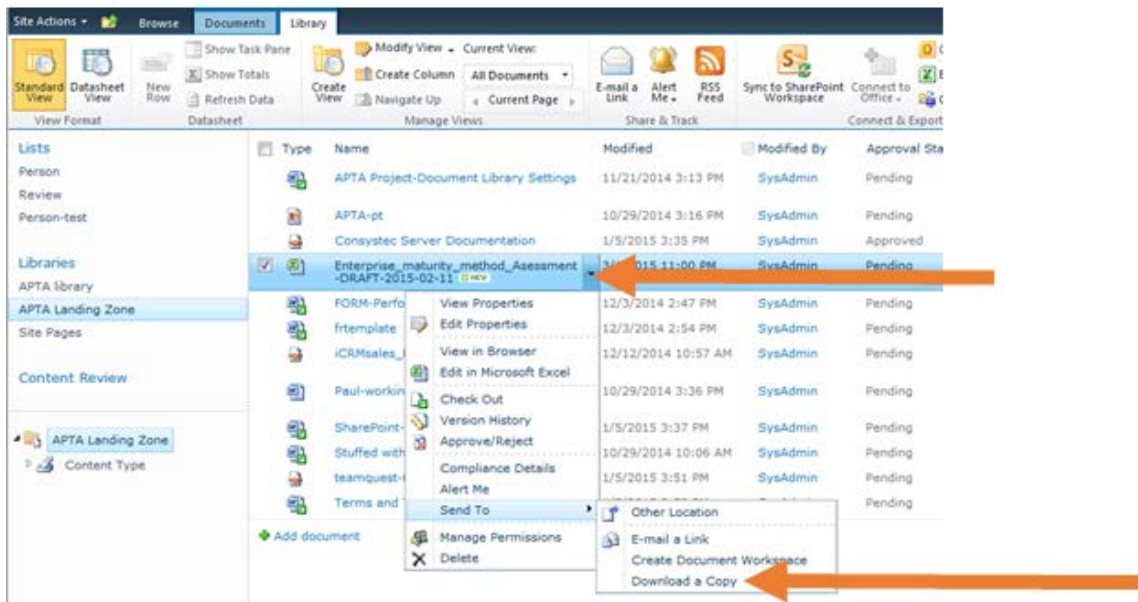


Figure A- 16. Download Document

7. Run the virus scan as required by your local requirements
8. If the content is virus free and no changes are required then select the pull down to the right of the previously ‘checked out’ content and select ‘check in’.

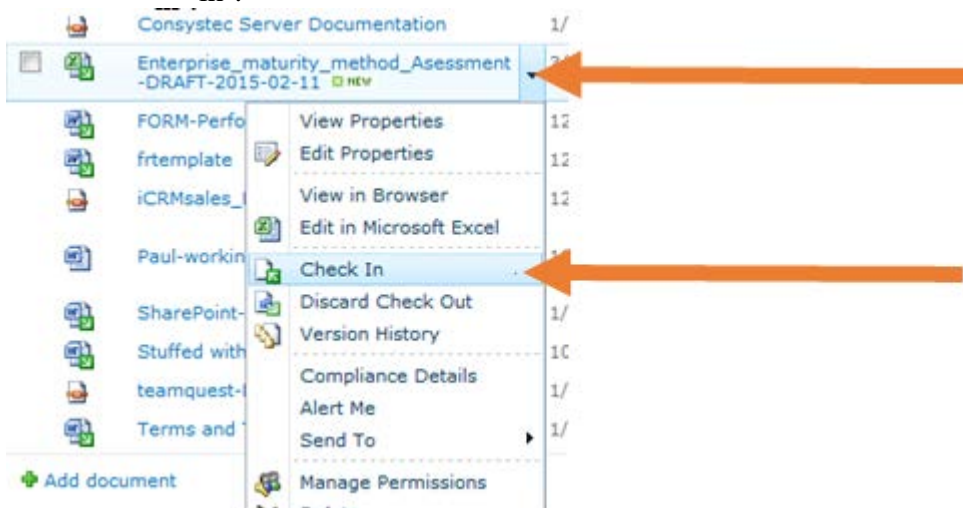


Figure A- 17. Check In Document

9. Type “Virus scanned” in the ‘Comments’ section and then Select OK.

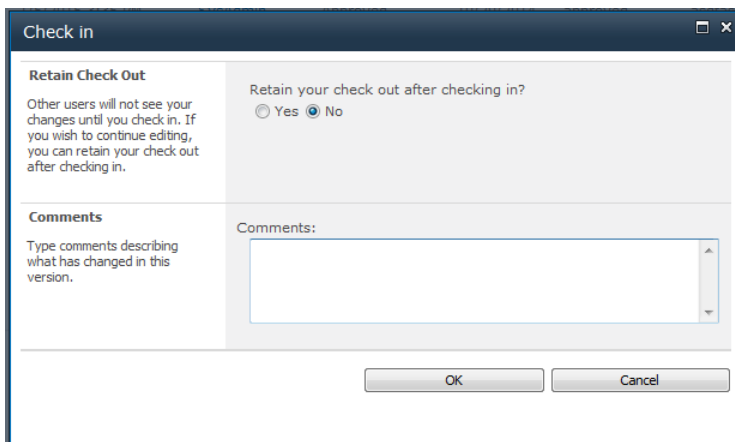


Figure A- 18. Check In Document Form

10. Select the document requiring approval by selecting “Approve/Reject” on the pull down to the right of the newly submitted content on the document list.

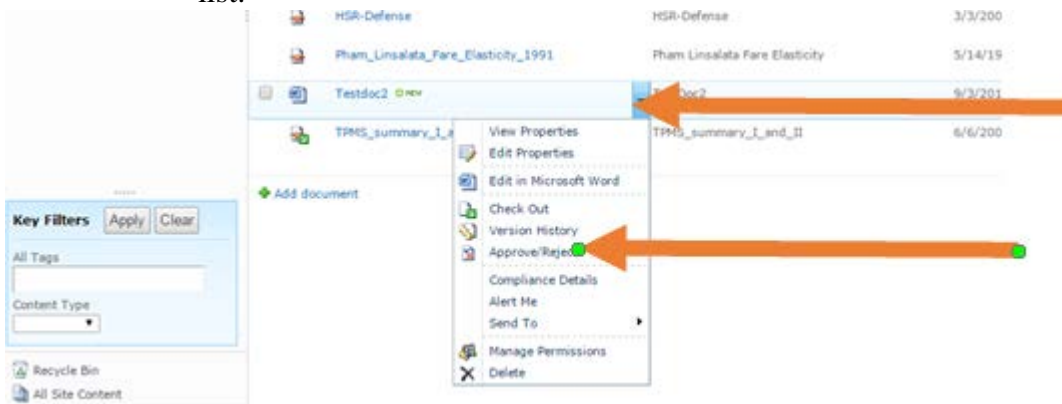


Figure A- 19. Approve/Reject Document

11. Select ‘Approved’ or ‘Rejected’ based on APTA guidelines. Comments are only required if ‘Rejected’. If Rejected, then email user that submitted content and make them aware of the problems and what they can to do fix them for content submission.

Approve/Reject

Approval Status
Approve, reject, or leave the status as Pending for others with the Manage Lists permission to evaluate the item.

Approved. This item will become visible to all users.

Rejected. This item will be returned to its creator and only be visible to its creator and all users who can see draft items.

Pending. This item will remain visible to its creator and all users who can see draft items.

Comment
Use this field to enter any comments about why the item was approved or rejected.

OK Cancel

Figure A- 20. Approve/Reject Document Form

12. If approved (validation succeeded), select the document by the pull down to the right of the newly approved content on the document list. Select ‘Send To > Other Location’

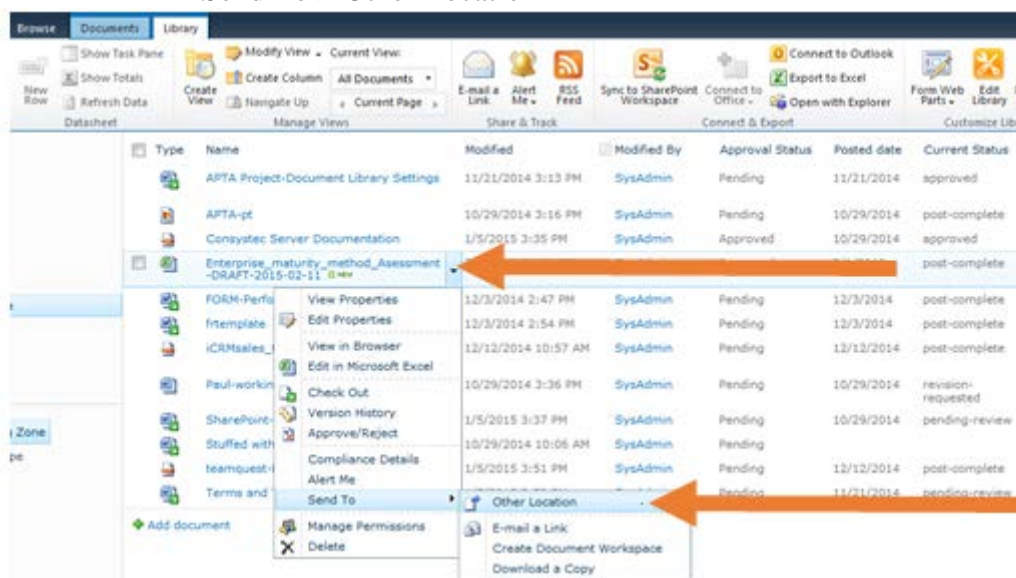


Figure A- 21. Move Document

13. Enter the destination document library or folder as required. When sending items for review use http://consystec.portalfront.com/sites/APTA-FAST/Content_Review/Shared%20Documents/Forms/AllItems.aspx. Select OK.

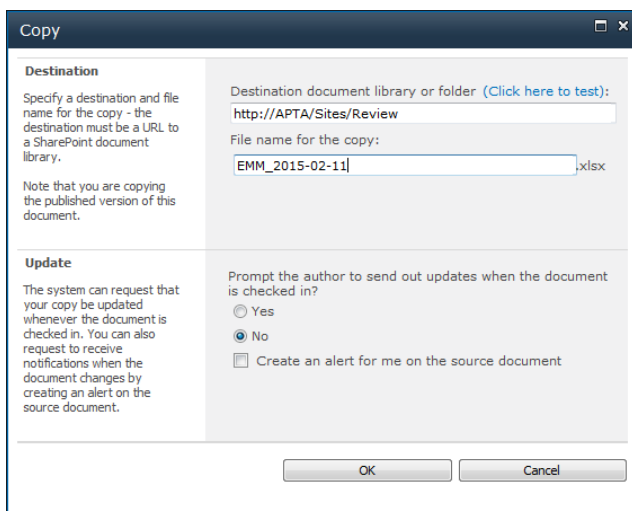


Figure A- 22. Move Document Form

Procedure 4.2: Review Assignment (as Content Administrator)

1. Follow the steps for Access to logon to the portal.
2. Click on the hyperlink reading “APTA ITS Library” in the middle of the screen.

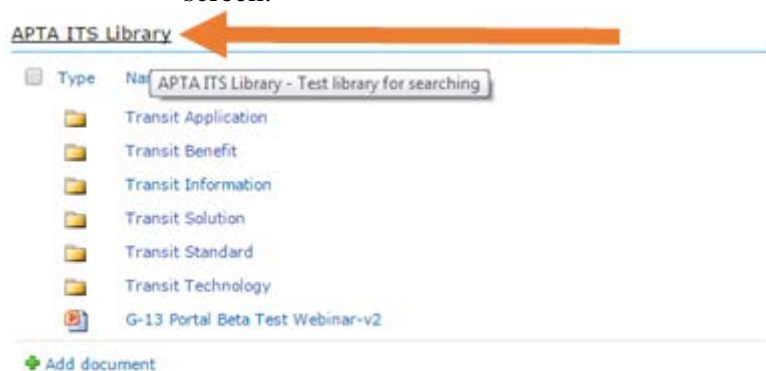


Figure A- 23. APTA ITS Library

3. Click the “Content Review” button at the top part of the screen.

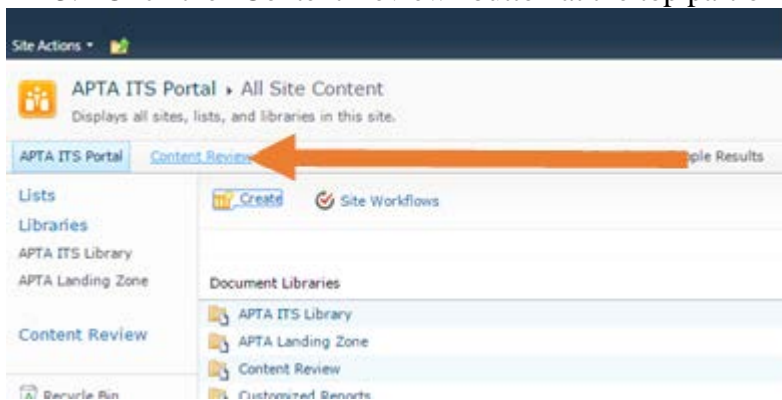


Figure A- 24. Content Review Button

4. Navigate to the “Content Under Review” heading at the middle of the page, and select document for review by selecting pulldown on right of document. Select ‘Edit Properties’.

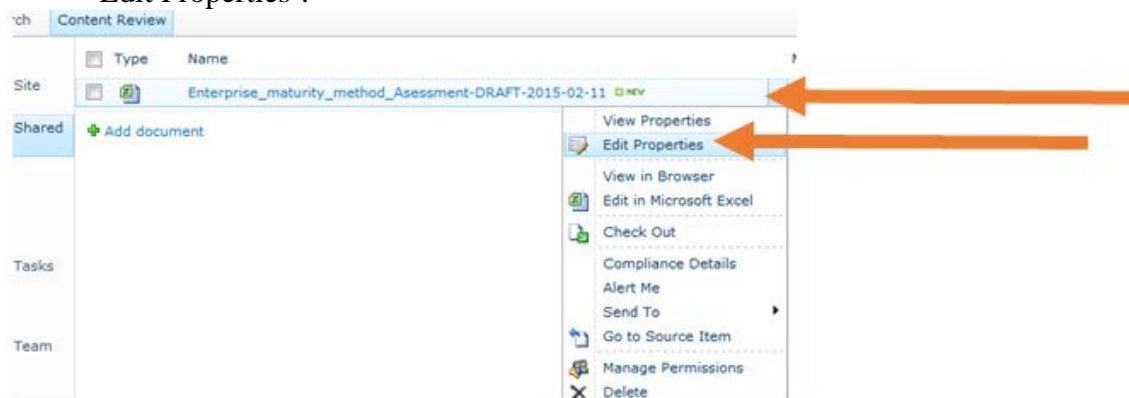


Figure A- 25. Assign Reviewer

5. Enter ‘Review due date’ for document.
6. Select reviewer(s) for a document (pulldown list of Reviewers). There may be one or two reviewers for each document. (Search for a reviewer by name. Current valid reviewer accounts are “Content Reviewer 1” and “Content Reviewer 2”
7. Change status of a document to ‘Pending Review’.

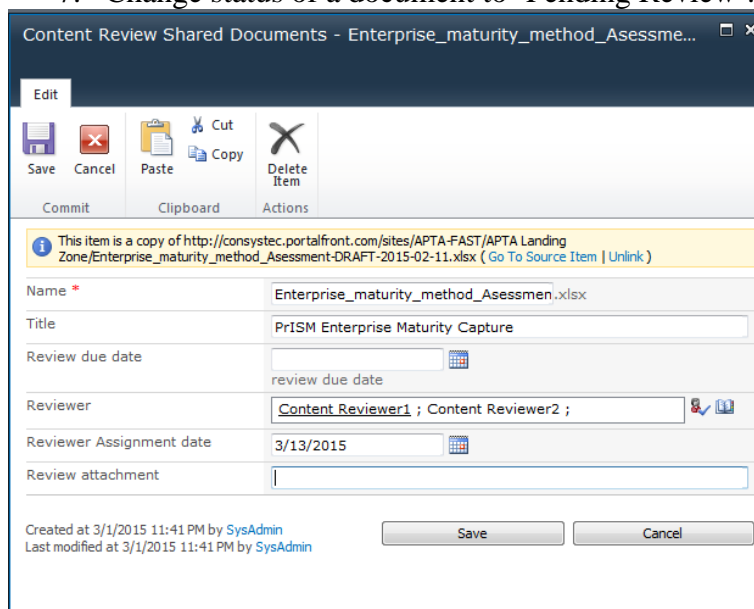


Figure A- 26. Assign Reviewer Form

8. If additional documents need to be reviewed, repeat steps 1-4 for each document. NOTE: Selected Reviewers will be notified by email for review initiation.
9. Click on the dropdown menu next to the content item and click “Check In.” Click OK when the form screen pops up.

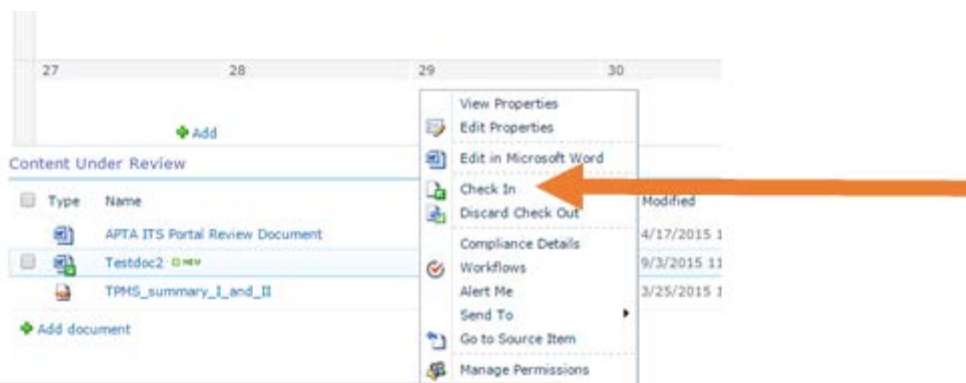


Figure A- 27. Check In Document

Procedure 4.3: Review Content

1. Follow the steps for Access to logon to the portal.
2. Click on the hyperlink reading “APTA ITS Library” in the middle of the screen.

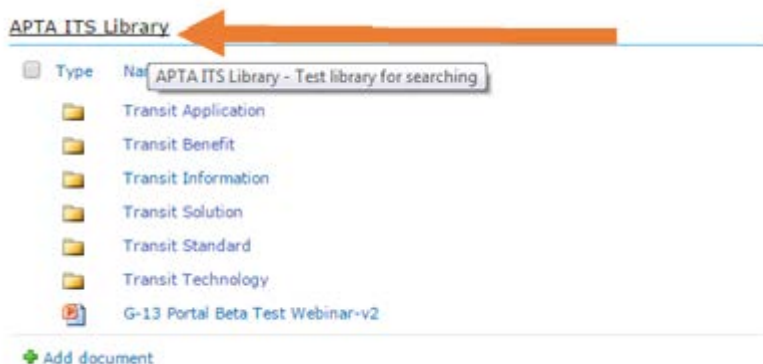


Figure A- 28. APTA ITS Library

3. Click the “Content Review” button at the top part of the screen.

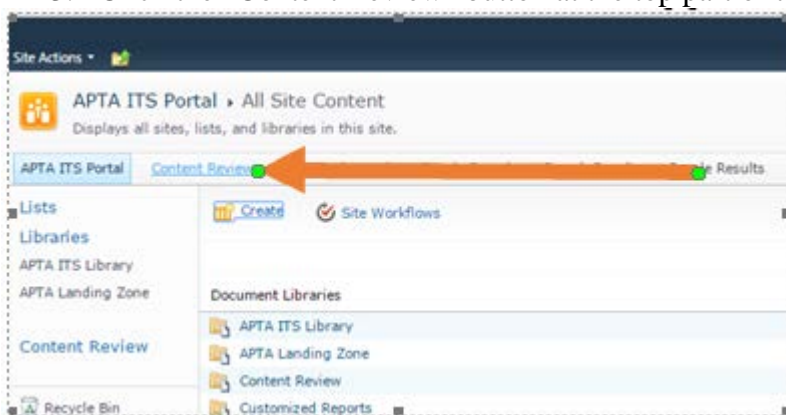


Figure A- 29. Content Review Button

4. Navigate to “Content Under Review” library at the middle part of the page, below the calendar. Select content in the list by selecting pulldown menu and ‘Send To > Download a Copy’.

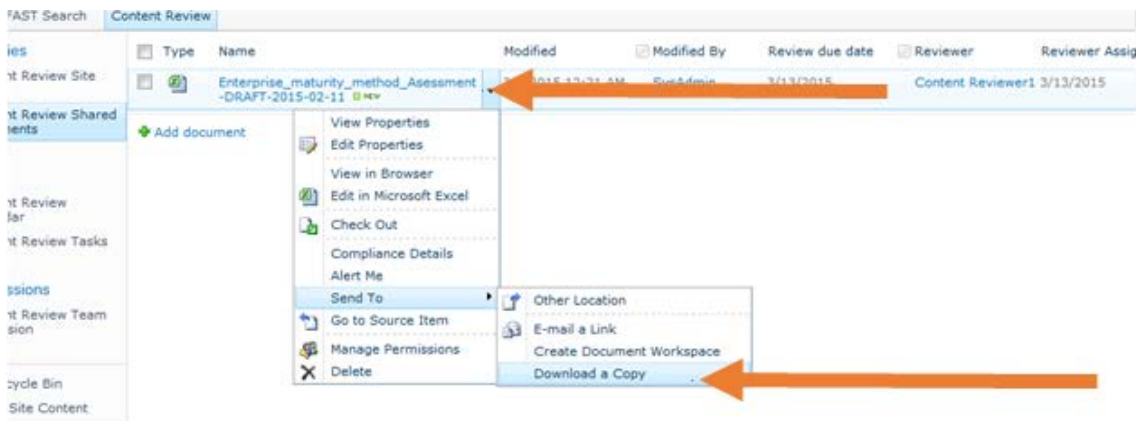


Figure A- 30. Download Document

5. Reviewer can print and/or review the content offline (disconnected from SharePoint) based on identified information in the “Content Review Criteria” (Details in review document)
6. Upon completion of review, reviewer fills out document in accordance with review guidelines.
7. Upload document review comments to portal “Document Reviews” library at the bottom of the Content Review Page.
8. Reviewer right clicks on the drop down next to the document and clicks “Edit Properties.”

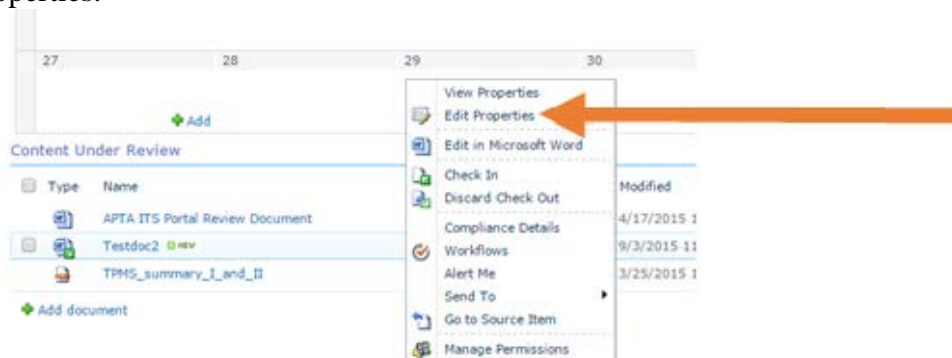


Figure A- 31. Edit Document

9. Reviewer assigns review status “Review Completed.” This triggers a system alert to all members who have “subscribed” to this area for alerts.

Procedure 4.4: Committee Review

1. Content Administrator (CA) logs on to the portal and navigates to “content review” site then navigate to “content review” library. Select View “Reviews Completed” which creates a summary report of items for the review committee. Filter ‘review due date’ for review cycle to report on.

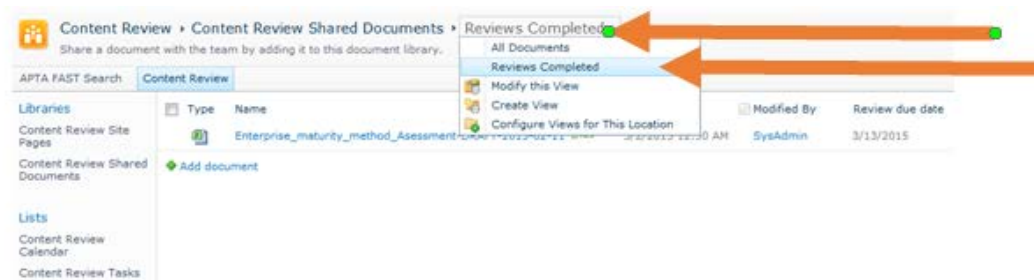


Figure A- 32. Completed Reviews Button

2. CA navigates to “content review” calendar and create event by clicking on the desired date and time.

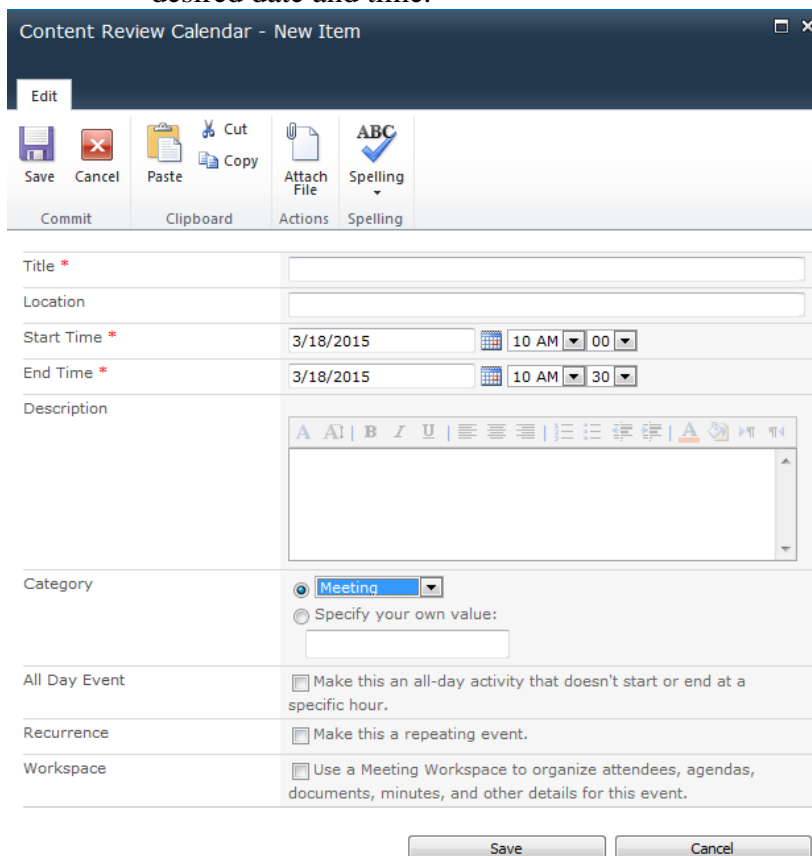


Figure A- 33. Content Review Calendar

3. CA sends an email invitation to the review committee members announcing the review meeting and including the information from the summary report.
4. The system creates a “status change” on each document that the Content Administrator has queued for review. This can provide alerts to anyone that has “subscribed” to this area for content using the “Alert me” feature of SharePoint. Review Committee Members are notified that the status of the content has been changed. We recommend selecting an “email” delivery

method for “all changes” with a frequency set to “send a daily summary” for items.

5. At the review committee meeting the CA goes through each review scoring list and using whatever level of formality the committee desires, the committee makes a decision on each document – approve, provisionally accept, or reject.
6. Following the meeting, the CA revises the status and level of acceptance for each document from the meeting
7. Review keywords as submitted and make committee choice for modifications.
8. An alert is generated to Content Administrator and Review Committee Members that the status of the content has been changed.
9. An alert is sent to each Content Contributor with the result of the review. If provisionally accepted, the alert should include an explanation of the revision requested. If rejected, the alert should contain an indication of the reason for rejection.

Procedure 4.5: Publish to Library

1. Content Administrator (CA) logs on to the portal and navigates to “content review” site then navigate to “content review” library. Select View “Reviews Completed“
2. Click on the content item to download it to the computer. (This is necessary due to limitations of the current SharePoint configuration).

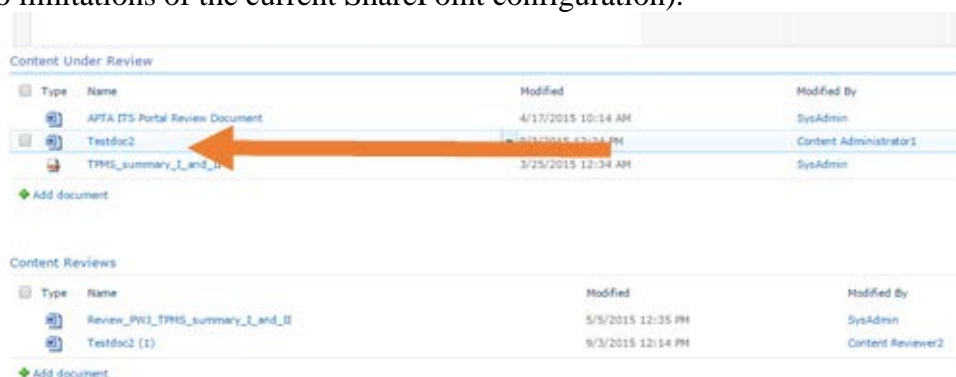


Figure A- 34. Content Under Review

3. Click on “APTA ITS Portal” in the upper left corner”

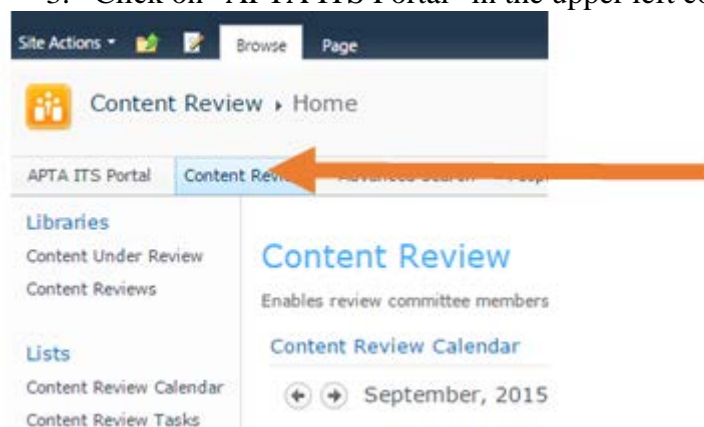


Figure A- 35. APTA ITS Portal Button

4. Click on the folder for the “Topic Type” designated for this content.



Figure A- 36. APTA ITS Library

5. Click “Add Document” and select the document to be uploaded.

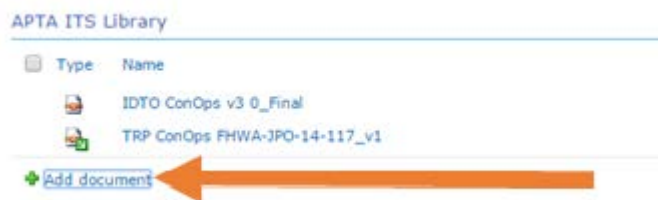


Figure A- 37. Add Document Button

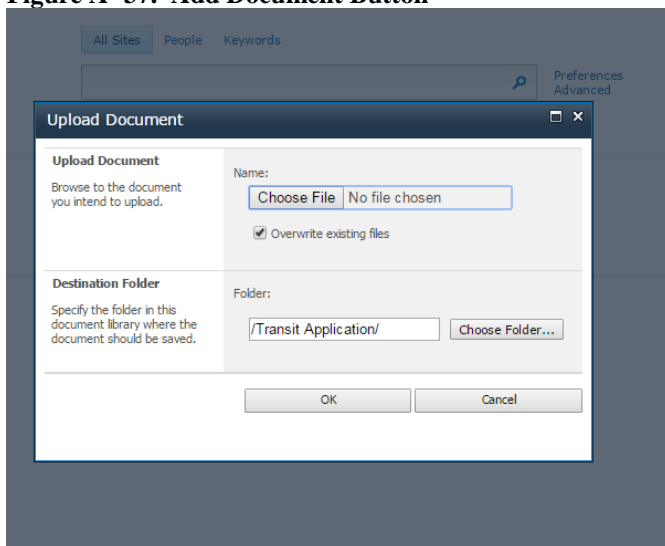


Figure A- 38. Upload Document

6. Complete the second form, filling in all fields. Set “current status to “approved.”

APTA ITS Library - Testdoc2.docx

Edit

Check In Cancel Paste Cut Copy Delete Item

Commit Clipboard Actions

The document was uploaded successfully and is checked out to you. Check that the fields below are correct and that all required fields are filled out. The file will not be accessible to other users until you check in.

Name * Testdoc2 .docx

Content Title Test Document 2

Content Description Test Test Test

An abstract of the content in the file.

Topic Type Transit Application
Topic Type from managed metadata

Current Status * Approved

Posted Date * 9/16/2015
Date Content was originally posted

Publication Date
Date content was published

Enterprise Keywords Transit Connected Vehicle:
Enterprise Keywords are shared with other users and applications to allow for ease of search and filtering, as well as metadata consistency and reuse

Rating (0-5) ☆☆☆☆☆

Target Audiences Transit Executives

Content Author John Smith Jr
Primary name of author of the content.

Created at 9/16/2015 4:56 PM by Content Administrator1
Last modified at 9/16/2015 4:56 PM by Content Administrator1

Save Cancel

Figure A- 39. Upload Document Form

7. The document is now available for Discovery. The document and review forms may be deleted from the review section at the discretion of the Content Administrator.

Keyword Management Operating Procedure

Precondition: User has appropriate “Content management” role assigned for access to APTA portal.

The content administrator has access to content at all three areas within the portal: Discovery, Review and Landing Zone. They are responsible for ensuring content is managed with respect to the validity, freshness and quantity of content in its lifecycle states of pending review, review completed, approved or rejected. The primary functions of content submission and content review are provided in this capability.

Procedure 6.1: Server Logon

1. Access the server through Remote Desktop Connectivity
2. Logon as Spadmin with appropriate permissions to central administrate the Site Collection. This may vary depending on site configuration.

Procedure 6.2: Keyword Updates

1. Navigate to “Central Administration” You will be presented with a screen similar to the one below (browser dependent)

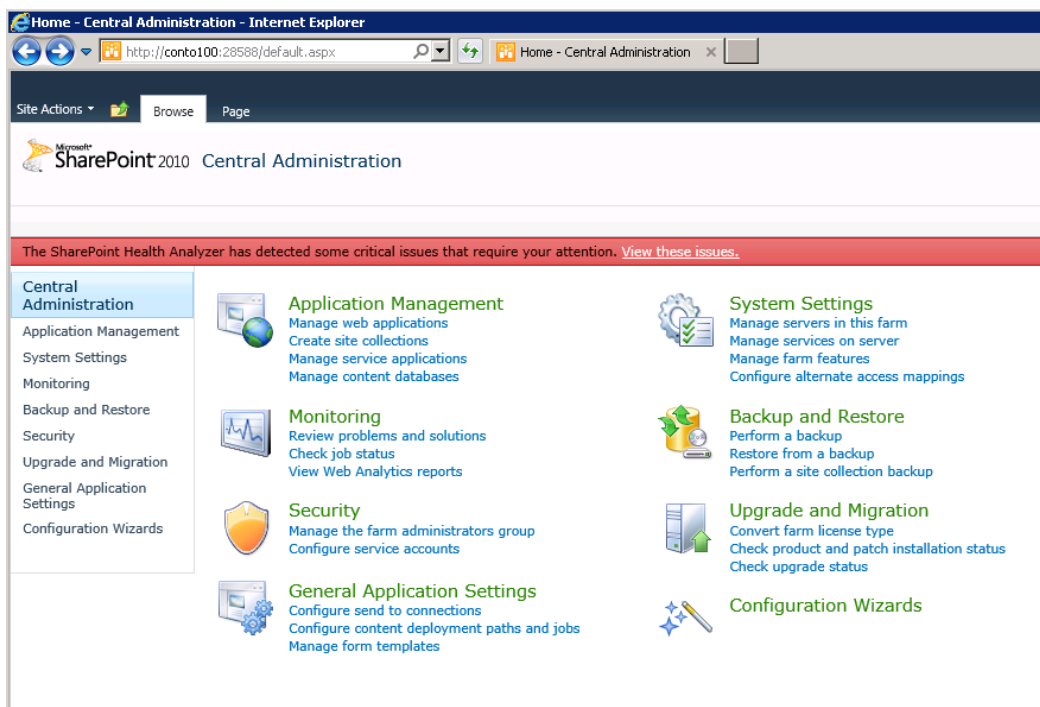


Figure A- 40. Content Administration

2. Select Manage Service Applications under the [Application Management] menu
3. You will be presented with a screen similar to the one below (browser dependent)

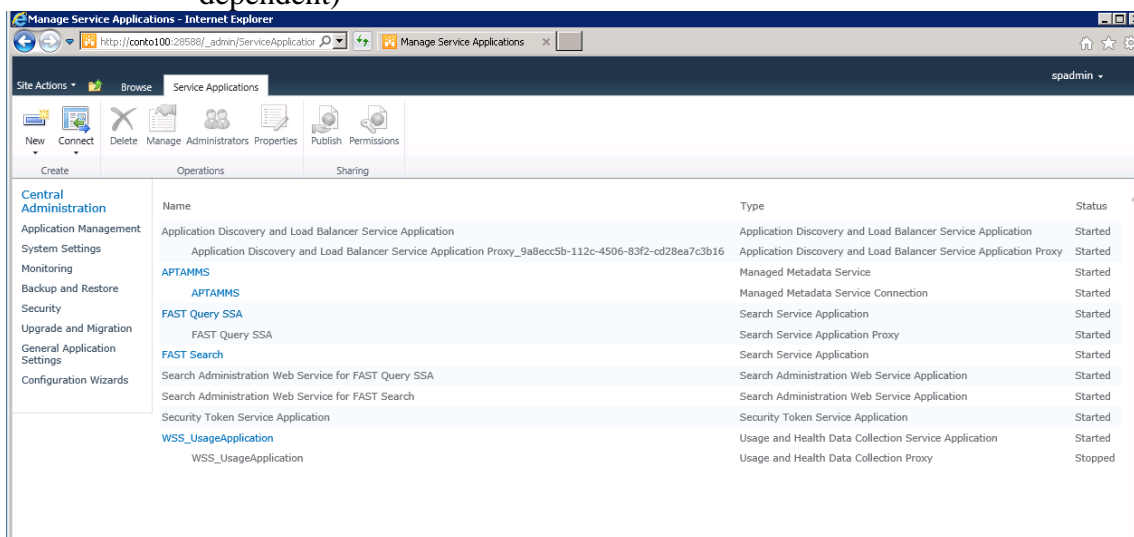


Figure A- 41. Server Applications

4. Select “APTAMMS” service under the [APTAMMS] header
5. You will be presented with a screen similar to the one below (browser dependent)

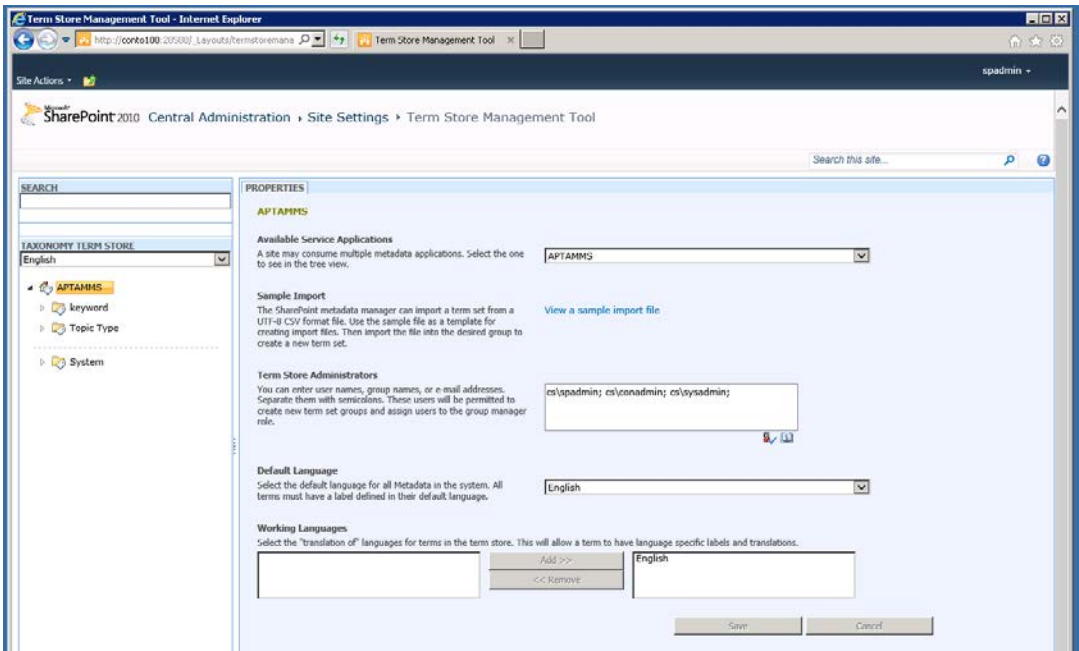


Figure A- 42. Term Store

6. Under the TAXONOMY TERM STORE navigation on the right navigation pane select the keyword pull down.

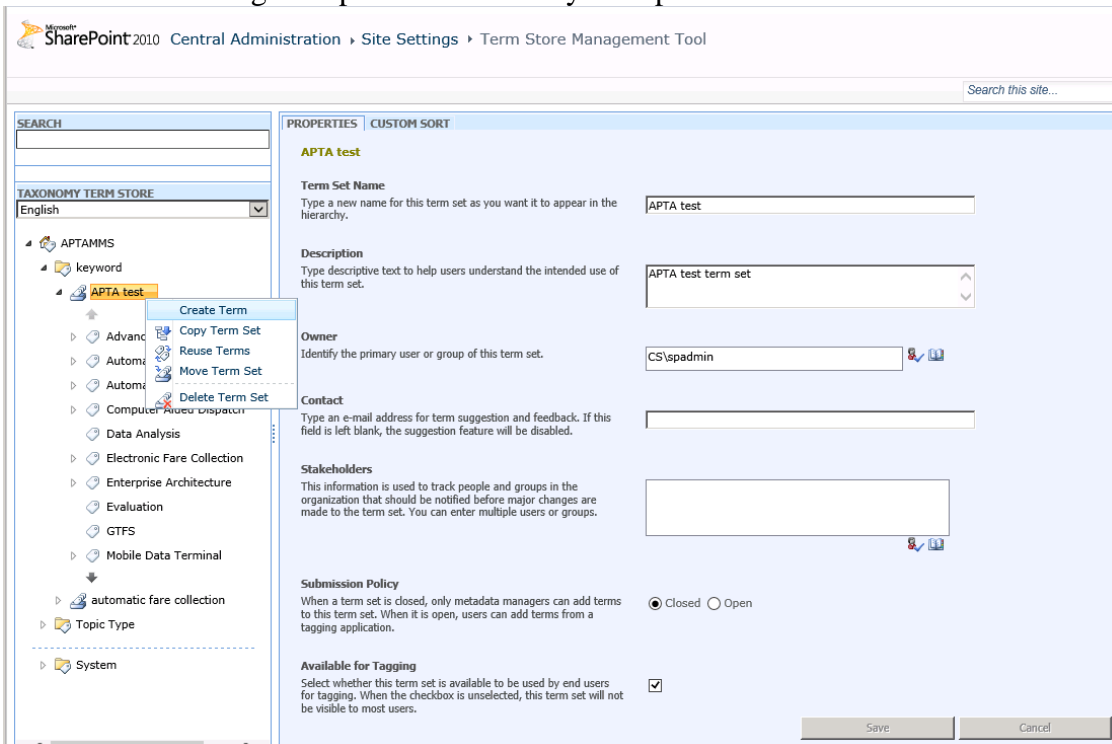


Figure A- 43. Term Store

7. Select 'create term' to create a new term
8. Enter Name, Description and Contact information
9. Select the 'Save' button

Appendix C: Portal Test Procedures

This Appendix contains the test procedures used in the alpha testing of the Portal. The Appendix contains 15 different test cases, or sets of tests, to test the complete set of functional requirements for the system. Table C-1 below shows which test cases are used to test each requirement.

Table C-1. Test Case Summary

New ID	Requirement Title	Group	Test Case(s)
1.1	Manage Access	Access	1.1, 1.2, 1.3, 1.4
1.1.1	Manage Portal Login	Access	1.1
1.1.2	Manage Roles	Access	1.2
1.1.2.1	Assign User Role	Access	1.2
1.1.2.2	Assign User to Multiple Roles	Access	1.2
1.1.2.3	Manage Role Privileges	Access	1.3
1.1.2.3.1	Manage System Administrator Privileges	Access	1.3
1.1.2.3.2	Manage Content Administrator Privileges	Access	1.3
1.1.2.3.3	Manage Review Committee Member Privileges	Access	1.3
1.1.2.3.4	Manage Content Contributor Privileges	Access	1.3
1.1.2.3.5	Manage Content Reader Privileges	Access	1.3
1.1.3	Automate Role Grant	Access	1.2
1.1.4	Manage Content Access	Access	1.4
1.1.5	Manage User Access	Access	1.4
1.1.5.1	Manage Reviewer List	Access	1.4
1.1.5.2	Manage Committee Member List	Access	1.4
1.2	Manage Storage	Storage	2.1, 2.2
1.2.1	Populate List	Storage	2.1
1.2.2	Validate List Entry	Storage	2.1
1.2.3	Manage Provisional Content	Storage	2.1, 2.2
1.2.3.1	Restrict Access to Provisional Content	Storage	2.2
1.2.4	Manage Content Catalog	Storage	2.2
1.3	Manage Content	Content	3.1, 3.2
1.3.1	Manage Content Status	Content	3.1
1.3.1.1	Designate Status	Content	3.1
1.3.2	Manage Status Change	Content	3.1
1.3.2.1	Document Status Change	Content	3.1

New ID	Requirement Title	Group	Test Case(s)
1.3.2.2	Publish Status Change	Content	3.1
1.3.2.3	Manage Content Approval	Content	3.2
1.3.3	Manage Content Registration	Content	3.1
1.3.3.1	Manage Registration Process	Content	3.1
1.3.3.2	Validate and Store Content	Content	3.1
1.3.3.3	Manage Content Upload	Content	3.1
1.3.3.4	Manage Content Agreement	Content	3.1
1.3.3.4.1	View Terms and Conditions	Content	3.1
1.3.3.4.2	Print Terms and Conditions	Content	3.1
1.3.3.4.3	Reject Terms and Conditions	Content	3.1
1.3.3.5	Submit Content for Review	Content	3.1
1.3.3.6	Manage Incomplete Content Submission	Content	3.1
1.3.3.7	Manage Revised Content	Content	3.1
1.3.4	Administer Content Review	Content	3.2
1.3.4.1	Manage Pending Content	Content	3.2
1.3.4.2	Manage Content Review Assignment	Content	3.1
1.3.4.3	Review Content by Selection Criteria	Content	3.2
1.3.4.4	Manage Content Committee Review	Content	3.2
1.3.4.4.1	Edit Review Agenda	Content	3.2
1.3.4.5	Provisional Acceptance Alert	Content	3.2
1.3.5	Manage Content Quality Review	Content	3.3
1.3.5.1	Reviewer Summary Page	Content	3.3
1.3.5.2	View Assigned Content	Content	3.3
1.3.5.3	Manage Review Scoring	Content	3.3
1.3.5.4	Manage Incomplete Scoring	Content	3.3
1.4	Manage Discovery	Discovery	4.1, 4.2, 4.3, 4.4, 4.5
1.4.1	Manage Content Availability	Discovery	4.1
1.4.2	Manage Free Text Search	Discovery	4.1
1.4.3	Manage Keyword Search	Discovery	4.2
1.4.4	Manage Most Viewed Search	Discovery	4.3
1.4.5	Manage New Content Search	Discovery	4.4
1.4.6	Manage Content Catalog Search	Discovery	4.5
1.4.6.1	Sort Catalog Content	Discovery	4.5
1.4.7	View Multimedia Formats	Discovery	4.5
1.4.8	Print Multimedia Formats	Discovery	4.5
1.5	Administer the System	Administration	5.1
1.5.1	Create Lists	Administration	5.1

New ID	Requirement Title	Group	Test Case(s)
1.5.1.1	Create Topic Type List	Administration	5.1
1.5.1.2	Create Keyword Lists	Administration	5.1
1.5.1.3	Create Content List	Administration	5.1
1.5.1.4	Create a Reviewer List	Administration	5.1
1.5.1.5	Create a Review Scoring List	Administration	5.1
1.5.1.6	Create Supplementary Resources List	Administration	5.1
1.5.1.7	Create Association between Lists	Administration	5.1
1.5.1.8	Create a Lookup List	Administration	5.1
1.5.2	Update List Format	Administration	5.1

Test cases, and the associated test procedures, are divided by the overall portal function (e.g. Manage Access, Manage Storage, Manage Content, Manage Discovery, Administer the System)

Manage Access Testing

This set of test cases verifies that the requirements under Requirement 1.1 of the System Requirements, “Manage Access,” are met.

Test Case 1.1: Verify Portal Login

Requirements Tested:

- 1.1: Manage Access
- 1.1.1: Manage Portal Login

Table C-2. Test Case 1.1

Step	Type	Procedure	Requirement(s) Met	P/F/NA	Comments
1	Configuration	Locate the portal within the APTA website, or emulate this capability			
2	Demonstration	Verify the ability to access the Portal after first logging into the APTA website (or emulated APTA website)	1.1.1		
3	Demonstration	Verify that the portal cannot be accessed without first logging in to the APTA website (or emulated APTA	1.1.1		

		website)			
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Test Case 1.2: Verify Role Assignment Capabilities

Requirements Tested:

- 1.1: Manage Access
- 1.1.2: Manage Roles
- 1.1.2.1: Assign User Roles
- 1.1.2.2: Assign User to Multiple Roles
- 1.1.3: Automate Role Grant

Table C-3. Test Case 1.2

Step	Type	Procedure	Requirement(s) Met	P/F/NA	Comments
1	Configuration	Ensure that one user exists with System Administrator Capabilities			
2	Configuration	Create five user accounts that have access to the portal			
3	Configuration	Login to the portal with the Role of System Administrator			
4	Demonstration	Verify that all user accounts with access to the portal are automatically assigned the roles of Content Contributor and Content Reader	1.1.3		
5	Demonstration	Verify the ability to assign three of the five user accounts specified in Step 2 as follows: <ul style="list-style-type: none"> • System Administrator • Content Administrator 	1.1.2, 1.1.2.1		

Step	Type	Procedure	Requirement(s) Met	P/F/NA	Comments
		<ul style="list-style-type: none"> Review Committee Member 			
6	Demonstration	Verify the ability to assign two of the five user accounts specified in Step 2 as follows: <ul style="list-style-type: none"> Content Administrator and Review Committee Member System Administrator, Content Administrator, and Review Committee Member 	1.1.2, 1.1.2.1, 1.1.2.2		
7	Demonstration	Verify the ability to modify a user's role by removing the designation of "Content Administrator" from the user account having this role specified in Step 6	1.1.2		

Test Case 1.3: Verify Role Privilege Management

Requirements Tested:

- 1.1: Manage Access
- 1.1.2.3: Manage Role Privileges
- 1.1.2.3.1: Manage System Administrator Privileges
- 1.1.2.3.2: Manage Content Administrator Privileges
- 1.1.2.3.3: Manage Review Committee Member Privileges
- 1.1.2.3.4: Manage Content Contributor Privileges
- 1.1.2.3.5: Manage Content Reader Privileges

Table C-4. Test Case 1.3

Step	Type	Procedure	Requirement(s) Met	P/F/NA	Comments
1	Configuration	Login to the portal as a System Administrator			
2	Demonstration	Verify the ability of a System Administrator to Create, Update, and Delete roles, by creating a role entitled “Test,” setting privileges for this role, and deleting this role	1.1.2.3, 1.1.2.3.1		
3	Demonstration	Assign to the Content Administrator role the following privileges: <ol style="list-style-type: none"> 1. The ability to view all content, regardless of status 2. The ability to change the status of content 3. The ability to assign content reviewers to a specific post and provide access to that content 4. The ability to edit the list of content reviewers 5. The ability to edit the list of review committee members 	1.1.2.3, 1.1.2.3.2		

Step	Type	Procedure	Requirement(s) Met	P/F/NA	Comments
		6. The ability to edit the content privileges of review committee members			
4	Demonstration	Assign the Review Committee Member role the following privileges: <ul style="list-style-type: none"> • The ability to view all content, regardless of status 	1.1.2.3, 1.1.2.3.3		
5	Demonstration	Assign the Content Contributor role the following privileges: <ul style="list-style-type: none"> • The ability to submit content 	1.1.2.3, 1.1.2.3.4		
6	Demonstration	Assign the Content Reader role the following privileges: <ul style="list-style-type: none"> • The ability to view content that has a status of “published” • The ability to search for content 	1.1.2.3, 1.1.2.3.5		

Test Case 1.4: Verify User and Content Access Requirements Tested:

- 1.1: Manage Access
- 1.1.4: Manage Content Access
- 1.1.5: Manage User Access
- 1.1.5.1: Manage Reviewer List
- 1.1.5.2: Manage Committee Member List

Table C-5. Test Case 1.4

Step	Type	Procedure	Requirement(s) Met	P/F/NA	Comments
1	Configuration	Login to the portal as a System Administrator			
2	Demonstration	Verify the ability of the System Administrator to edit and update the Reviewer List and the Review Committee Member list	1.1.5, 1.1.5.1, 1.1.5.1.2		
3	Configuration	Login to the portal as a Content Administrator			
4	Demonstration	Verify the ability of the Content Administrator to edit and update the Reviewer List and to assign at least one user to this role	1.1.5.1,		
5	Demonstration	Verify the ability of the Content Administrator to edit and update the Reviewer Committee Member list and to assign at least one User to this role	1.1.5.1.2		
6	Configuration	Load two content items to the portal, with an unpublished			

Step	Type	Procedure	Requirement(s) Met	P/F/NA	Comments
		status			
7	Demonstration	Verify the ability of a Content Administrator to view all content items, including those that are unpublished	1.1.4		
8	Demonstration	Verify the ability of a Content Administrator to grant privileges to a specific reviewer to review one item; reviewer has only the roles of Content Contributor and Content Reader	1.1.5.1		
9	Configuration	Login to the portal as the user granted review privileges specified in Step 8.			
10	Demonstration	Verify the ability of the assigned reviewer designated in Step 8 to view content that was assigned for review and any published content. Verify that the assigned reviewer cannot view unpublished content that was not assigned.	1.1.4		
11	Configuration	Login to the portal as a Review Committee			

Step	Type	Procedure	Requirement(s) Met	P/F/NA	Comments
		Member assigned to the role in Step 5			
12	Demonstration	Verify that a Review Committee Member can view all portal content, whether it is published or unpublished	1.1.4		

Manage Storage Tests

This set of test cases test verifies that the requirements under requirement 1.2 of the System Requirements, “Manage Storage,” are met.

Test Case 2.1: Verify Content Upload Process

Requirements Tested:

- 1.2: Manage Storage
- 1.2.1: Populate List
- 1.2.2: Validate List Entry
- 1.2.3: Manage Provisional Content

Table C-6. Test Case 2.1

Step	Type	Procedure	Requirement(s) Met	P/F/NA	Comments
1	Configuration	Login to the portal as a Content Administrator			
2	Demonstration	Upload a content item, filling out the upload form without making any errors in syntax and completing all required fields	1.2.2		
3	Demonstration	Attempt to upload a content item, filling out the upload form making a syntax	1.2.2		

Step	Type	Procedure	Requirement(s) Met	P/F/NA	Comments
		error in one field, but completing all required fields. Verify that the submission was rejected			
4	Demonstration	Attempt to upload a content item, filling out the upload form without making syntax errors but not completing all required fields. Verify that the submission was rejected	1.2.2		
5	Demonstration	Verify that the information entered to the content upload process during Step 2 appears in the appropriate content list	1.2.1		
4	Demonstration	Verify that the content loaded in Step 2 is stored in the portal with a status of provisional	1.2.3		

Test Case 2.2: Verify Provisional Content Access and Content Catalog

Requirements Tested:

- 1.2: Manage Storage
- 1.2.3: Manage Provisional Content
- 1.2.3.1: Restrict Access to Provisional Content
- 1.2.4: Manage Content Catalog

Table C-7. Test Case 2.2

Step	Type	Procedure	Requirement(s) Met	P/F/NA	Comments
1	Configuration	Login to the			

Step	Type	Procedure	Requirement(s) Met	P/F/NA	Comments
		portal as a Content Administrator			
2	Configuration	Upload two content items to the portal and set the status of one content item to be published			
3	Demonstration	Verify that the unpublished content item loaded in Step 2 does not appear in the content catalog and is listed in the content list as provisional content	1.2.3, 1.2.4		
4	Demonstration	Verify that the published content item loaded in Step 2 does appear in the content catalog	1.2.4		
5	Demonstration	Verify the ability of a Content Administrator to view both content items loaded to the portal in Step 2	1.2.3, 1.2.3.1, 1.2.4		
6	Configuration	Login to the portal as a Content Reader			
7	Demonstration	Verify that the Content Reader is able to view the published content item and unable to view the unpublished content item	1.2.3.1		

Manage Content Tests

This set of test cases verifies that the requirements under requirement 1.3 of the System Requirements, “Manage Content,” are met.

Test Case 3.1: Verify Content Registration Process

Requirements Met:

- 1.3: Manage Content
- 1.3.1: Manage Content Status
- 1.3.1.1: Designate Status
- 1.3.2: Manage Status Change
- 1.3.2.1: Document Status Changes
- 1.3.2.2.: Publish Status Changes
- 1.3.3: Manage Content Registration Process
- 1.3.3.1: Manage Registration Process
- 1.3.3.2: Validate and Store Content
- 1.3.3.3: Manage Content Upload
- 1.3.3.4: Manage Content Agreement
- 1.3.3.4.1: View Terms and Conditions
- 1.3.3.4.2: Print Terms and Conditions
- 1.3.3.5: Submit Content for Review
- 1.3.3.6: Manage Incomplete Content Submission
- 1.3.3.7: Manage Revised Content

Table C-8. Test Case 3.1

Step	Type	Procedure	Requirement(s) Met	P/F/NA	Comments
1	Configuration	Login to the portal as a user with Content Contributor and Content Administrator Privileges			
2	Demonstration	Enter the Content Registration Process for a new submission	1.3.3.1		
3	Demonstration	Complete the submission form, making errors in syntax and omitting	1.3.3.2		

Step	Type	Procedure	Requirement(s) Met	P/F/NA	Comments
		mandatory fields. Verify that the form is rejected, and the user is given the opportunity to make corrections			
4	Demonstration	Save the submission in its current state and exit the submission process	1.3.3.6		
5	Demonstration	Verify that the status of the content saved in Step 4 is "Post-Incomplete"	1.3.1, 1.3.1.1		
6	Demonstration	Verify that the user is able to resume the content registration process terminated in step 4, verifying that the submission form is completed as it was prior to exiting the process	1.3.3.6		
7	Demonstration	Complete the submission form, ensuring that there are no errors in syntax and that all mandatory fields are completed	1.3.3.2		
8	Demonstration	Upload content in a format not supported by the portal, and verify that it is rejected	1.3.3.3		
9	Demonstration	Upload content in a format supported by the portal, and	1.3.3.3		

Step	Type	Procedure	Requirement(s) Met	P/F/NA	Comments
		verify that it is accepted			
10	Demonstration	Verify that the user can view the terms and conditions of the portal	1.3.3.4.1		
11	Demonstration	Verify that the user can print the terms and conditions of the portal	1.3.3.4.2		
12	Demonstration	Verify that the user can accept the terms and conditions of the portal, completing the review process	1.3.3.4, 1.3.3.5		
13	Demonstration	Verify that the content submitted is automatically granted a status of "Post Complete "	1.3.1, 1.3.1.1		
14	Demonstration	Verify that Content Administrator and Review Committee Members receive an alert that the status of the content has been changed in Step 13	1.3.2		
15	Demonstration	Verify that the status change of the content changed in Step 13 is documented	1.3.2.1		
16	Demonstration	Verify that the status of the content changed in Step 13 is published to the	1.3.2.2		

Step	Type	Procedure	Requirement(s) Met	P/F/NA	Comments
		personalized web page of Content Administrator and Review Committee Members			
17	Configuration	Perform Steps 1, 2, 7, and 8 again			
18	Demonstration	Verify that the user can reject the terms and conditions of the portal and that the content registration process is terminated	1.3.3.4.3		
19	Configuration	Set the status of the content submitted in Step 16 to "Revision Requested"			
20	Demonstration	Verify the ability of the user to make changes to the content using a streamlined process and to resubmit content	1.3.3.7		

Test Case 3.2: Verify Content Review Administration

Requirements Tested:

- 1.3: Manage Content
- 1.3.2.3: Manage Content Approval
- 1.3.4: Administer Content Review
- 1.3.4.1: Manage Pending Content
- 1.3.4.2: Manage Content Review Assignment
- 1.3.4.3: Review Content by Selection Criteria
- 1.3.4.4: Manage Content Committee Review
- 1.3.4.5: Provisional Acceptance Alert
- 1.3.4.4.1: Edit Review Agenda

Table C-9. Test Case 3.2

Step	Type	Procedure	Requirement(s) Met	P/F/NA	Comments
1	Configuration	Load multiple content items into the portal with each possible content status being covered			
2	Configuration	Login to the portal as a Content Administrator			
3	Demonstration	Verify the ability of the Content Administrator to view a summary page of the review process	1.3.4		
4	Demonstration	Verify the ability of the Content Administrator to view a list of pending content	1.3.4.1		
5	Demonstration	Verify the ability of the Content Administrator to review a list of content that has been assigned for review	1.3.4.2		
6	Demonstration	Verify the ability of the Content Administrator to view the entire content list, organized by selection criteria	1.3.4.3		
7	Demonstration	Verify the ability of the Content Administrator to view a list of content to be discussed at the next meeting of the review committee,	1.3.4.4		

Step	Type	Procedure	Requirement(s) Met	P/F/NA	Comments
		organized by status			
8	Demonstration	Verify the ability of the Content Administrator to edit, save, and submit a Review Committee Meeting agenda	1.3.4.4.1		
9	Demonstration	Verify the ability of a Content Administrator to change the status of any content item in the portal to “accepted,” “provisionally accepted,” or “rejected”	1.3.2.3		
10	Configuration	Login to the portal as a Review Committee Member			
11	Demonstration	Verify the ability of the Review Committee Member to view a summary page of the review process	1.3.4		
12	Demonstration	Verify the ability of the Review Committee Member to view a list of pending content	1.3.4.1		
13	Demonstration	Verify the ability of the Review Committee Member to review a list of content that has been assigned for review	1.3.4.2		
14	Demonstration	Verify the ability	1.3.4.3		

Step	Type	Procedure	Requirement(s) Met	P/F/NA	Comments
		of the Review Committee Member to view the entire content list, organized by selection criteria			
15	Demonstration	Verify the ability of the Review Committee Member to view a list of content to be discussed at the next meeting of the review committee, organized by status	1.3.4.4		
16	Demonstration	Verify the ability of the Review Committee Member to view the agenda of the next Review Committee Meeting	1.3.4.4.1		
17	Configuration	Provisionally accept content with specific changes that the content contributor must make			
18	Configuration	Login to the Portal as the Content Contributor whose content was provisionally accepted in step 17			
19	Demonstration	Verify that an alert is received stating required revisions for content to be published			

Test Case 3.3: Verify Quality Review Processes**Requirements Tested:**

- 1.3: Manage Content
- 1.3.1.1: Designate Status
- 1.3.5: Manage Content Quality Review
- 1.3.5.1: Reviewer Summary Page
- 1.3.5.2: View Assigned Content
- 1.3.5.3: Manage Review Scoring
- 1.3.5.4: Manage Incomplete Scoring

Table C-10. Test Case 3.3

Step	Type	Procedure	Requirement(s) Met	P/F/NA	Comments
1	Configuration	Load multiple content items into the portal and assign them for review to a user who has only the role of a Content Contributor and Content Reader. At least one content item shall have already been reviewed			
2	Configuration	Login to the portal as the user designated in Step 1			
3	Demonstration	Verify the ability of the user to view a Reviewer Summary Page showing pending, incomplete, and complete reviews	1.3.5.1		
4	Demonstration	Verify the ability of the Reviewer to view content that has been assigned for review	1.3.5.2		
5	Demonstration	For a content item that has been	1.3.5.3		

Step	Type	Procedure	Requirement(s) Met	P/F/NA	Comments
		assigned, open the Review Scoring form and partially complete the form			
6	Demonstration	Verify the ability of the Reviewer to save, exit, and re-enter the Review Scoring form prior to completion	1.3.5.4		
7	Demonstration	Complete and submit the Review Scoring form, verifying that the status of the item is changed to review complete	1.3.1.1		

Manage Discovery Tests

This set of test cases verifies that the requirements of under requirement 1.4 of the System Requirements, “Manage Discovery,” are met.

Test Case 4.1: Verify Free Text Search

Requirements Tested:

- 1.4: Manage Discovery
- 1.4.1: Manage Content Availability
- 1.4.2: Manage Free Text Search

Table C-11. Test Case 4.1

Step	Type	Procedure	Requirement(s) Met	P/F/NA	Comments
1	Configuration	Populate the portal with multiple content items set to a status of “published” and record at least two distinct search terms for each content item			

Step	Type	Procedure	Requirement(s) Met	P/F/NA	Comments
2	Configuration	Populate the portal with at least two content items set to a status of “unpublished” and record at least two distinct search terms for each content item			
3	Configuration	Login to the portal as a user with content reader/Content Contributor credentials only			
4	Demonstration	For each published content item loaded in step 1, use each search term identified to search for each content item and verify that each item can be located in the portal	1.4.2		
5	Demonstration	For each unpublished content item loaded in step 2, use each search terms identified to search for each content item and verify that these content items cannot be located	1.4.1		

Test Case 4.2: Verify Keyword Search

Requirements Tested:

- 1.4: Manage Discovery

- 1.4.1: Manage Content Availability
- 1.4.3: Manage Keyword Search

Table C-12. Test Case 4.2

Step	Type	Procedure	Requirement(s) Met	P/F/NA	Comments
1	Configuration	Populate the portal with multiple content items set to a status of “published” and record the keywords assigned to each content item			
2	Configuration	Populate the portal with at least two content items set to a status of “unpublished” and record the keywords assigned to each content item			
3	Configuration	Login to the portal as a user with content reader/Content Contributor credentials only			
4	Demonstration	For each published content item in Step 1, use the portal’s keyword navigation functionality to verify that the content item can be located in the portal	1.4.3		
5	Demonstration	For each unpublished content item loaded in step 2, use the portal’s keyword	1.4.1		

Step	Type	Procedure	Requirement(s) Met	P/F/NA	Comments
		navigation functionality and verify that these content items cannot be located			

Test Case 4.3: Verify Most Viewed Search

Requirements Tested:

- 1.4: Manage Discovery
- 1.4.4: Manage Most Viewed Search

Table C-13. Test Case 4.3

Step	Type	Procedure	Requirement(s) Met	P/F/NA	Comments
1	Configuration	Load multiple content items into the portal, each set to a status of “published”			
2	Configuration	View each content item from Step 1 multiple times, with each content item being visited a different number of times. Record the number of times each content item is viewed			
3	Demonstration	Use the Most Viewed Search functionality, and verify that the content items loaded in Step 1 appear in the order of visits set in Step 2	1.4.4		

Test Case 4.4: Verify New Content Search

Requirements Tested:

- 1.4: Manage Discovery

- 1.4.5: Manage New Content Search

Table C-14. Test Case 4.4

Step	Type	Procedure	Requirement(s) Met	P/F/NA	Comments
1	Configuration	Load multiple content items into the portal, each set to a status of “published.” Record the order that content is loaded			
2	Demonstration	Use the New Content Search functionality, and verify that the order of content is the same as the order in which content was loaded to the portal	1.4.5		

Test Case 4.5: Verify Content Catalog and Content Viewing Capabilities

Requirements Tested:

- 1.4: Manage Discovery
- 1.4.6: Manage Content Catalog Search
- 1.4.6.1: Sort Content Catalog
- 1.4.7: View Multimedia Formats
- 1.4.8: Print Multimedia Formats

Table C-15. Test Case 4.5

Step	Type	Procedure	Requirement(s) Met	P/F/NA	Comments
1	Configuration	Load at least one content item for each type of content supported by the portal, and set the status of each content item to “publish”			
2	Demonstration	View the catalog of all content items	1.4.6		

		in the portal, and verify that each item loaded into the portal is listed in the catalog			
3	Demonstration	Sort the content catalog by each column in the catalog	1.4.6.1		
4	Demonstration	Verify the ability to open and view each content item listed in the content catalog	1.4.7		
5	Demonstration	Verify the ability to print each content item which is not an audio or video file	1.4.8		

Administer the System

This set of test cases verifies that the requirements under requirement 1.5 of the System Requirements, “Administer the System,” are met.

Test Case 5.1: Verify Administration

Requirements Tested:

- 1.5: Administer the System
- 1.5.1: Create Lists
- 1.5.1.1: Create Topic Type List
- 1.5.1.2: Create Keyword Lists
- 1.5.1.3: Create Content List
- 1.5.1.4: Create a Reviewer List
- 1.5.1.5: Create a Review Scoring List
- 1.5.1.6: Create Supplementary Resources List
- 1.5.1.7: Create Association Between Lists
- 1.5.1.8: Create a Lookup List
- 1.5.2: Update List Format

Table C-16. Test Case 5.1

Step	Type	Procedure	Requirement(s) Met	P/F/NA	Comments
1	Configuration	Login to the portal as a System Administrator			
2	Demonstration	Create a Topic Type	1.5.1,		

Step	Type	Procedure	Requirement(s) Met	P/F/NA	Comments
		List as specified in the System Requirements, and verify the ability to edit this list, add a new field, and delete the new field	1.5.1.1, 1.5.2		
3	Demonstration	Create a Keyword List as specified in the System Requirements, and verify the ability to edit this list, add a new field, and delete the new field	1.5.1, 1.5.1.2, 1.5.2		
4	Demonstration	Create a Content List as specified in the System Requirements, and verify the ability to edit this list, add a new field, and delete the new field	1.5.1, 1.5.1.3, 1.5.2		
5	Demonstration	Create a Reviewer List as specified in the System Requirements, and verify the ability to edit this list, add a new field, and delete the new field	1.5.1, 1.5.1.4, 1.5.2		
6	Demonstration	Create a Review Scoring List as specified in the System Requirements, and verify the ability to edit this list, add a new field, and delete the new field	1.5.1, 1.5.1.5, 1.5.2		
7	Demonstration	Create a Supplementary Resources List as specified in the	5.2.2.1.5.1, 5.2.2.1.5.1.6, 5.2.2.1.5.2		

Step	Type	Procedure	Requirement(s) Met	P/F/NA	Comments
		System Requirements, and verify the ability to edit this list, add a new field, and delete the new field			
8	Demonstration	Create a set of Association lists as specified in the System Requirements, and verify the ability to edit these lists, add a new field, and delete the new field	5.2.2.1.5.1, 5.2.2.1.5.1.7, 5.2.2.1.5.2		
9	Demonstration	Create a Lookup List as specified in the System Requirements, and verify the ability to edit this list, add a new field, and delete the new field	1.5.1, 1.5.1.4, 1.5.2		