

Service Usage Model: D³UI Content Authoring

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LSAL

Information Architecture & Design, Learning Technologies, Training

Introduction

The Introduction provides a brief, standalone overview of the Service Usage Model. It is for a non technical reader. It may duplicate other material in the Service Usage Model Description.

The D³UI Content Authoring service usage model describes the conceptual structure for an application that provides support for a content development-to-deposit process, as described below.

Delivery for Analysis: In a content development environment, gather a set of requirements and characteristics for content needed to satisfy a specific training need. Use these requirements to search for (discovery) available content. Extract from the content registry, source repository and associated data stores information about the content, its structure, prior use, applicability, relationships to other content, competency associations, etc., and make this information available (delivery) in the content development and analysis environment. Perform appropriate analysis, potentially developing new content or other supporting information. Develop and record (deposit) new information in the appropriate repositories and registries.

The D³UI Content Authoring service usage model illustrates how a collection of services, providing interfaces to processes and resources, are combined within an authoring tool to demonstrate the content discovery-to-development-to-deposit process.

Service Usage Model Description

The Service Usage Model Description is the complete, formal documentation of the Service Usage Model.

The D³UI Content Authoring service usage model is an e-Framework representation of a prototypical tool that provides a user-friendly, content development-to-deposit process. An authoring tool integrates a set of other tools and resources, via their service interfaces, to provide a single interface for the development-to-deposit process.

Rationale

The Rationale element presents the justification for the Service Usage Model and explains the use intended by its authors.

The D³UI Content Authoring service usage model is a formal description of the content development-to-deposit process using the e-Framework modeling methodology. The service usage model focuses on content management in the ADL environment, where content conforms to known standards, is tagged with metadata, has persistent identifiers, is managed in repositories and is discoverable through a federated registry infrastructure.

The D³UI Content Authoring service usage model may be used to:

- Illustrate how to produce a simplified user environment to support the discovery-to-development-to-deposit process.
- Identify and document a set of open, standards-based service components needed to support content discovery, development (reuse, repurposing) and distribution.
- Design, implement and deploy different applications and client systems using the defined services.
- Provide a straw man for discussion of how to promulgate service components to support content development and management.



Service Usage Model Metadata

The Service Usage Model Metadata contains basic labeling, classification and a version history for the Service Usage Model.

Name

- Service Usage Model Name: (D³UI) Content Authoring
- LSAL ID: hdl:1870/3FD212C661F1464AA79DBB22D3DE00FF
- JADL IPA Service Usage Model Name: D³UI Content Authoring
- JADL IPA ID: hdl:JADL-IPA-NA/4062CA2B0B754E448A90735FDEEC672D (source for derivative)

Classification

Classification Facets:

- Service Usage Model Type: Domain
- Service Usage Model Status: Unapproved
- Domains: Content Authoring, Repository
- Domain Coverage: Multiple
- Deployment Status: Prototype
- Deployment Scale: Isolated
- Maturity: Immature
- Composition: Composite
- Purpose: Exemplar, Application, Planning
- Genre or Expression: Genre

Technical Facets:

- Batch Behavior: Individual
- Time Constraint Behavior: None
- Service End Point: Transcoder
- Authentication / Authorization: Auth'ed

Version

- LSAL Version: 1.0.0 [hdl:1870/3FD212C661F1464AA79DBB22D3DE00FF]
- JADL IPA Version: 1.0.0 [hdl:JADL-IPA-NA/4062CA2B0B754E448A90735FDEEC672D]

Version History			
Version	Date	Author	Description
0.50	2007-09-04	DR	Initial D ³ UI version. hdl:JADL-IPA-NA/4062CA2B0B754E448A90735FDEEC672D
0.51	2007-10-03	DR	Editorial review, consistency.
0.70	2007-10-08	DR	Draft for review.
0.90	2007-10-14	DR	Final editorial.
1.0.0	2007-10-21	DR	Final D ³ UI V 1.0.0.
1.0.0	2008-06-18	DR	LSAL V 1.0.0. Derivative from D ³ UI version.

Notation

The Notation element includes conventions used to describe the Service Usage Model.

The words MUST, MUST NOT, REQUIRED, SHALL, SHALL NOT, SHOULD, SHOULD NOT, RECOMMENDED, MAY, and OPTIONAL in this document are to be interpreted as described in [RFC 2119].

Notational conventions follow those given in the LSAL *Service Notation and Document Conventions*.



The identification and versioning scheme follows those given in the LSAL *Service Component Identification Scheme*.

The service classification scheme follows those given in the LSAL *Service Classification Scheme*.

The Service Usage Model Description follows those given in the LSAL *Service Usage Model Description Guidelines*.

Description

The Description element is an informal, standalone, non technical narrative description of the Service Usage Model (problem, process, business-level capabilities and workflow).

The D³UI Content Authoring service usage model describes the structure of a collection of collaborating service genres (along with their associated resources) used in an authoring tool environment to support a user-friendly, content development-to-deposit process.

The D³UI Content Authoring service usage model content development-to-deposit process includes:

- Discovery of existing content (e.g., via the ADL-R)
- Obtaining the identified content from its host repository
- Developing (modifying) the content in an authoring environment
- Tagging it (with an identifier [e.g., registered in the Handle System])
- Generating discovery metadata
- Validating the correctness of the content and its metadata
- Depositing the content and metadata in a repository
- Registering the new content for discovery (e.g., with the ADL-R)

These processes are combined in an authoring tool that integrates a set of other tools and resources, via their service interfaces, to provide a single interface for the development-to-deposit process. The service usage model can be used to design and implement such an authoring application.

While the service usage model is described in generic terms (registries, metadata, repositories), it was authored for content management in an ADL environment. It assumes:

- Content is managed and stored in repositories.
- Content is of known types and formats.
- Content has discovery and cataloging metadata described using known metadata schemes.
- Content has persistent, unique, resolvable (actionable) identifiers that can be used to access and retrieve content from repositories.
- Content access is subject to authentication and authorization controls.
- Discovery is based on metadata, stored in a central registry that is supporting a federation of repositories.
- Workflow steps are subject to authentication and authorization controls.
- An identifier management infrastructure exists.
- A metadata-based content discovery infrastructure exists.
- A single sign-on infrastructure exists.
- A central metadata registry infrastructure exists.

A component, resource and user workflow view of the content development-to-deposit process is illustrated in Figure 1.



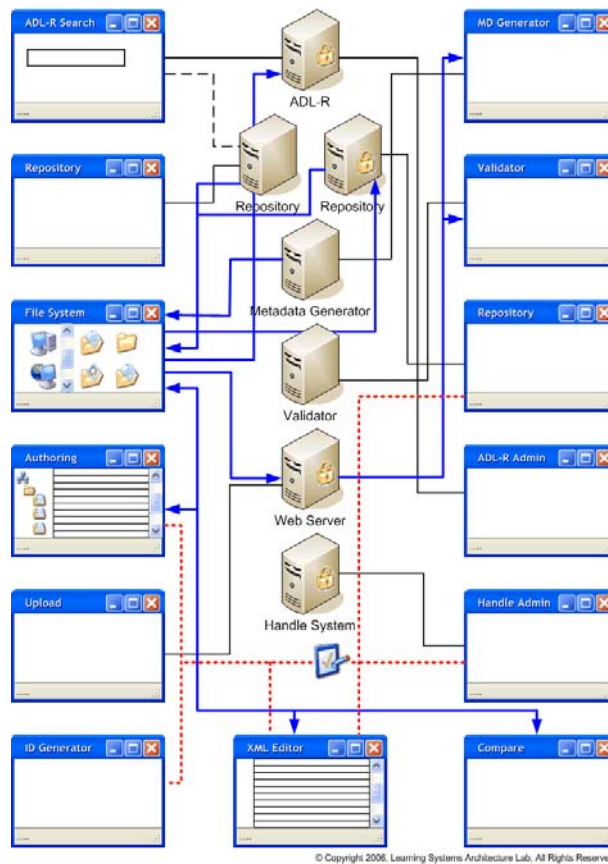


Figure 1: Development-to-Deposit Workflow, Processes and Resources
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Business Process Modeling

The Business Process Modeling element lists the business functions to be supported by the Service Usage Model. Business process modeling provides necessary context to understand the description of the Service Usage Model. The business analysis motivating the Service Usage Model should be summarized within the Service Usage Model (to make it readable as a self-contained object), with fuller discussion possibly outside the Service Usage Model. Functions should be listed as groups, in business terms. The description should not be encumbered with either technical services or detailed workflows.

The business function of content development-to-deposit (discover-to-distribute) consists of three business processes:

- Discovery of content and knowledge objects – find existing content that is an appropriate starting point for modification, reuse, etc.
- Development of content – modify the content to meet new requirements.
- Distribution of content and knowledge objects for reuse – make the revised content available for use by others; deposit and register.

From the business perspective, how these steps are accomplished is not important; tools, workflows and processes matter only in that they support the business functions.

Service Usage Model Diagram

The Service Usage Model diagram in Figure 2 shows the business functions, business processes, component service genres and resources.



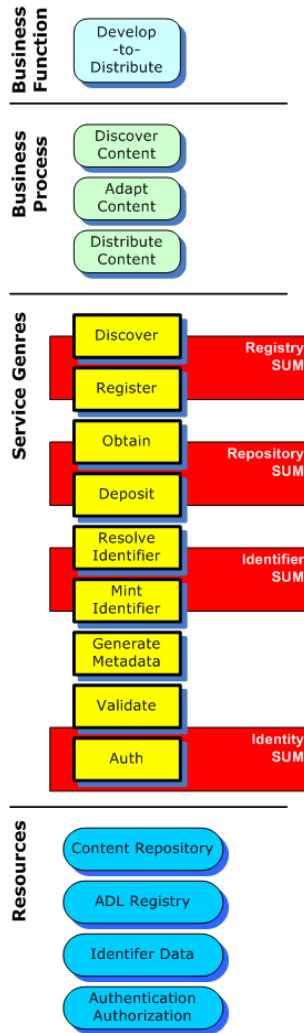


Figure 2: Service Usage Model Diagram: D³UI Content Authoring
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Usage Scenarios

The Usage Scenarios element is an informal, non technical description of how the Service Usage Model is used in support of business processes. An illustration of business workflows, expressed using services, is included. An illustration of an application using the components of the Service Usage Model may be included (but not a description of the design of the application). Full business process modeling and detailed diagrams are excluded. No critical or essential information required to understand the Service Usage Model should be included.

The usage scenario is documented separately in the D³UI *Development-to-Deposit Demonstrator*.



Applicability

The Applicability element details when the Service Usage Model can be used or when its use would be inappropriate. It represents specific constraints and assumptions on the use of the Service Usage Model. It is more specific and normative than the informal Usage Scenarios. No critical or essential information required to understand the Service Usage Model should be included.

The D³UI Content Authoring service usage model is applicable to applications and processes that discover, manipulate and distribute content through the assembly and orchestration of a set of independent services, each of which performs part of the process.

The service usage model assumes these services exist and can be used from within an application; the end user sees only the functionality provided and does not interact with the individual services.

The service usage model assumes the application is used within an ADL environment that includes:

- An identifier management system
- A federated identity and single sign-on system
- A federated repository infrastructure with a metadata registry (e.g., the ADL-R)
- A collection of content repositories

The service usage model assumes individual service end points require authentication or authorization. Each of the service genres SHALL specify if authentication or authorization is required. As documented, discovery (search) does not require authentication. Resolving identifiers does not require authentication.

The service usage model assumes all authorization to access data and data filtering is performed by the services used. The application itself does not apply authorization controls.

The service usage model is applicable to any type of content (SCO, S1000D, knowledge objects, etc.) and metadata. Individual applications and service expressions SHALL specify the specific types of content and metadata supported.

Functionality

The Functionality element details and illustrates the behaviors provided by the Service Usage Model in terms of services, workflows, messages, resources and data objects. It is not a technical description of the Service Usage Model, but it must provide sufficient information to develop the Structure & Organization of the Service Usage Model and to evaluate conformance of the Service Usage Model to the stated behaviors. It should not include implementation-specific information.

The service usage model supports three business processes, as listed above:

- Content Discovery – Discovery of content and knowledge objects
- Content Adaptation and Development – Adaptation of, or development of, content and knowledge objects
- Content Distribution – Distribution of content and knowledge objects for reuse

Each of these processes is implemented via a set of services.

Content Discovery Processes:

Discovery services are used to identify content and retrieve it for manipulation. The functions are not specialized by type of content.

Name: *Discover*

Search for content to be adapted

Workflow:

- Display search interface
- Pass query to metadata registry
- Return metadata object to display

Service End Point (Service Genre): search



Supporting Service Usage Model(s): none
 Primary Resource: (ADL-R) repository federation registry
 Secondary Resource(s): none
 Objects(s): metadata object

Name: *Obtain*

Retrieve user-selected content

Workflow:

- Get identifier from metadata object
- Resolve identifier to get content object locator
- Retrieve content object from content repository via locator
- Load content into authoring tool

Service End Point (Service Genre): obtain {content object}

Supporting Service Usage Model(s): identifier [resolve], identity

Primary Resource: content repository

Secondary Resource(s): identifier resolution data, authentication data

Objects(s): content object, metadata object, identifier, locator

Content Adaptation and Development Processes:

Content adaptation is used to manipulate (create, modify, reuse, adapt, develop) content. Content development, adaptation and manipulation are intrinsic parts of the application that implements the functionality of the Content Authoring service usage model. No separate explicit services or functionality are defined.

Content Distribution Processes:

Distribution services are used to make content available for use. The functions are not specialized by type of content.

Name: *Generate Metadata*

Generate metadata for a content object for submission to the registry for discovery

Workflow:

- Pass the content object to the metadata generation service
- Return a generated metadata object

Service End Point (Service Genre): generate metadata {content object basic metadata object}

Supporting Service Usage Model(s): identity

Primary Resource: n/a

Secondary Resource(s): authentication data

Objects(s): content object, metadata object

Name: *Validate Content*

Validate content submissions to the repository and registry

Workflow:

- Pass a content object to the validation service
- Return validation results
- Pass a metadata object to the validation service
- Return validation results

Service End Point (Service Genre): validate {content object}, validate {metadata object}

Supporting Service Usage Model(s): identity

Primary Resource: n/a

Secondary Resource(s): authentication data

Objects(s): content object, metadata object



Name: *Deposit*

Add content and metadata to a repository

Workflow:

- Generate an identifier for the content object
- Generate an identifier for the metadata object
- Add the content object to the repository, returning a locator
- Associate the locator with the identifier
- Insert the content locator into the metadata object
- Add the metadata object to the repository, returning a locator

Service End Point (Service Genre): deposit {content object}, deposit {metadata object}

Supporting Service Usage Model(s): identifier [mint], identity

Primary Resource: content repository

Secondary Resource(s): identifier resolution data, authentication data

Objects(s): content object, metadata object, identifier, locator

Name: *Register*

Add discovery metadata to the registry

Workflow:

- Transform metadata object to registry format
- Add the metadata object to the registry

Service End Point (Service Genre): register

Supporting Service Usage Model(s): identity

Primary Resource: (ADL-R) repository federation registry

Secondary Resource(s): authentication data

Objects(s): metadata object

Structure & Organization

The Structure & Organization element is a normative, technical description of the Service Usage Model that documents and illustrates the service-oriented operational view of the Service Usage Model as a whole, in terms of services, resources and their messaging interactions. The Structure & Organization element is required to implement applications that use the Service Usage Model, but the Service Usage Model must be understandable without reference to the contents of the element.

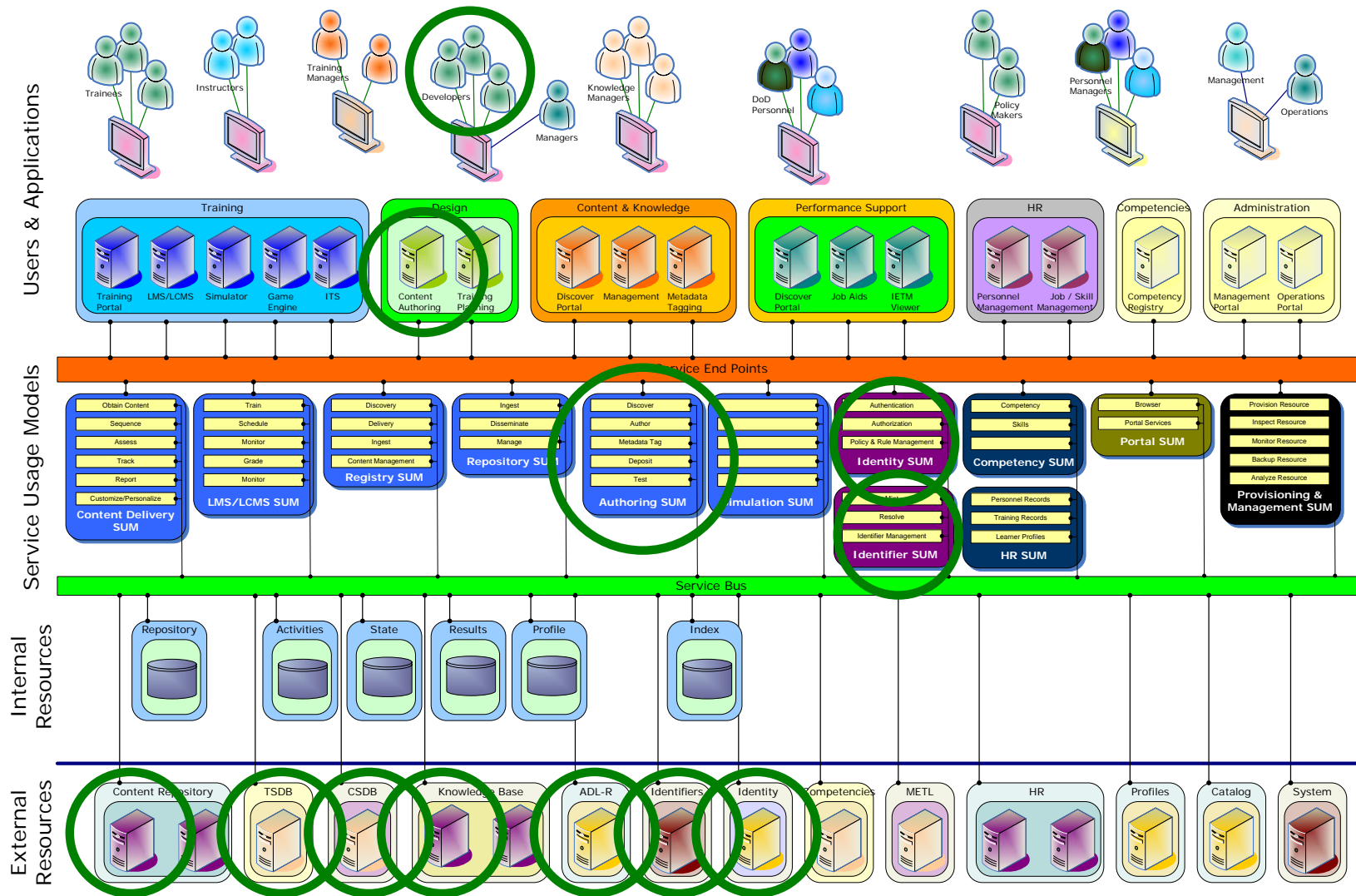
NB: The Structure & Organization element does not describe how to implement applications that use the Service Usage Model, but provides information needed to implement elements of the Service Usage Model itself.

The overall normal workflow within the application is documented separately in the “Revised Process” section of the D³UI *Development-to-Deposit Demonstrator*.

A prototype implementation of the service usage model was developed using the *Reload* editor as the content authoring tool, integrating the various services and providing the described workflow.

The overall diagram of the ADL Environment service usage model illustrates how the D³UI Content Authoring service usage model relates to an overall ADL environment. Components of the environment that correspond to this service usage model are indicated with green circles in Figure 3.





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Figure 3: ADL Environment Service Usage Model Schematic [© Copyright 2007, Learning Systems Architecture Lab, All Rights Reserved.]



A simplified view of the service orchestration workflow, embedded in the authoring tool of an application that implements the service usage model, is shown in Figure 4. The workflow includes authentication and sign-on processes.

Full details of the structure of an application based on the service usage model SHALL be specified in the design documents for the application.

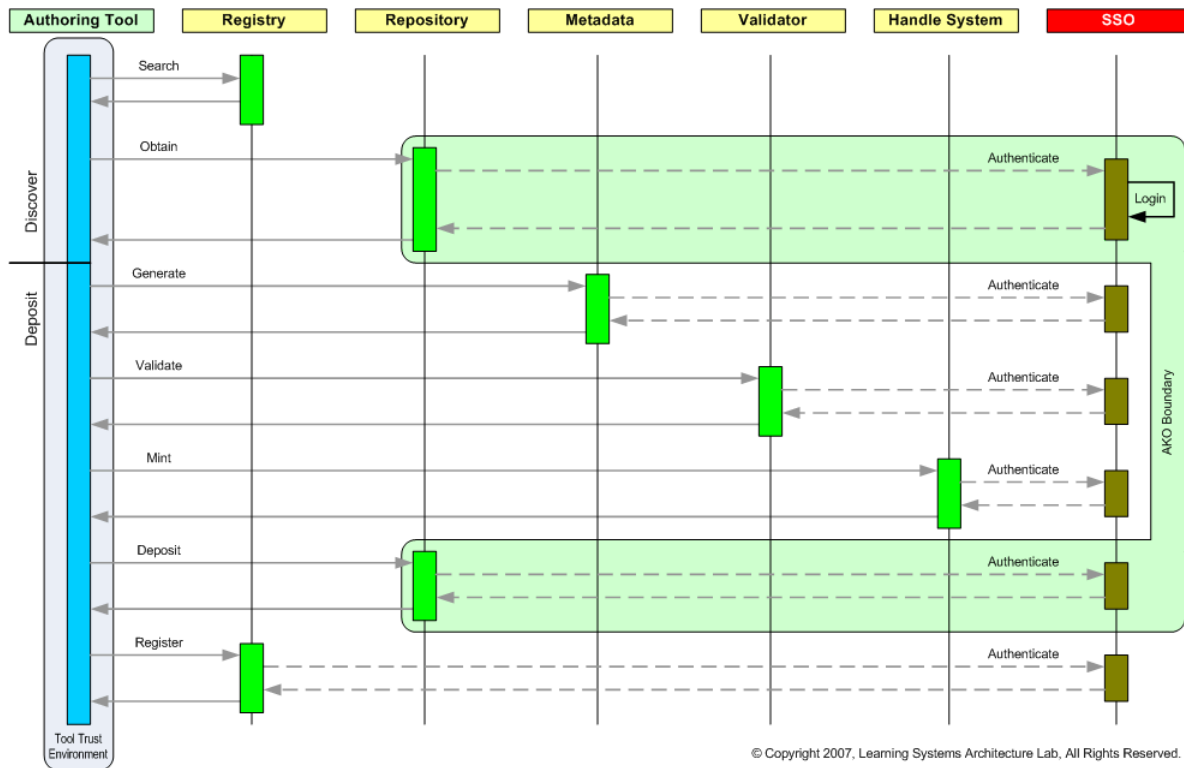


Figure 4: The D³UI Content Authoring Service Workflow
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Design Decisions & Tradeoffs

The Design Decisions & Tradeoffs element documents overall choices, tradeoffs and their implications on the design of the Service Usage Model. It does not address the design of applications or the internal implementation of the elements of the Service Usage Model. No critical or essential information required to understand the Service Usage Model should be included.

The D³UI Content Authoring service usage model represents a general workflow and conceptual structure for a content authoring application. The implemented prototype demonstrator represents one possible application design based on this model. The service usage model is intentionally general, and not fully detailed, so as to serve as an exemplar for other similar types of applications.

The design of an application based on the service usage model is meant to capture the requirements for the demonstrator documented separately in the D³UI *Development-to-Deposit Demonstrator*.

The authoring application is assumed to be a monolithic application that uses other services for integration. Service calls, data management of results, etc., are all handled explicitly within the application. This assumption is based on the design of traditional authoring applications. An alternative, not used herein, would be to factor the authoring application to expose an ingest service interface and a publication service interface. Integration with the other services would then require only orchestration of services, e.g., the content retrieval via the obtain interface from a



repository would be directly ingested into the authoring tool via its deposit interface. Likewise, saving content from the authoring application would trigger its publication service to export data.

It is intentional that the service usage model focuses only on integration of the authoring environment with other components, services and resources. A more detailed model could be constructed to describe content authoring and adaptation using service components.

From the user perspective, there is a simple workflow within an application, with most steps except the actual modification of the content being automated. As noted in the demonstrator description, the design supports either a fully automated “deposit” workflow (generate metadata, assign identifier, validate, deposit metadata and content in repository, register metadata in the ADL-R) or it supports the user performing each of these actions individually. If the user manages the workflow, the same services are used, and all of the details of the interactions with the service end points remain hidden. The user simply has a choice of applying all the steps at once or applying them one at a time.

The design does not require the user to login except when a particular service end point requires authentication (versus an explicit login to use the application). Authentication decisions are deferred to the constituent services and assumed to be provided by services from a federated identity system. Once any service requires authentication, it generates a set of single sign-on (SSO) credentials, and passes these back to the application. The application may forward them to any other service, supporting SSO throughout the application. This design requires that the application be trusted to manage the SSO credentials.

An alternative design would be to add login directly to the application; the application would initiate the SSO process. While this alternative is more straightforward, the use of federated identity sign-on was selected for demonstration purposes.

While not depicted in the workflow diagram, the resolution of identifiers to obtain locators and their subsequent use to retrieve content are separate steps. The application must provide this behavior, and this is driven by the interface of the obtain service genre. An alternative design would factor identifier resolution and content retrieval, or search and retrieval, into small service usage models. The overall D³UI Content Authoring service usage model would then be described in terms of these service usage models and not their constituent service genres.

The component service genres (or their specializations in service expressions) of the D³UI Content Authoring service usage model SHALL document additional design decisions.

Implementation Guide & Dependencies

The Implementation Guide & Dependencies element describes issues of concern in implementing applications that use the Service Usage Model, including organization, performance, behaviors, representations and policies. Resolution of issues discussed is deferred to the actual application design. No critical or essential information required to understand the Service Usage Model should be included.

Content authoring and management applications should focus on simplifying user interactions. All interactions with service genres should be hidden from end users.

An application should support all possible flows through the process, e.g., a user might begin by loading existing content from their local storage system and proceeding to try to register it. The user does not need to begin with discovery; when performing steps manually, a user need not follow any prescribed workflow.

Most of the service genres require authenticated access. The service usage model assumes a single sign-on (SSO) environment, and that details of the SSO process are defined externally to the service usage model. SSO interactions between the application and the services are defined for each service; the application must accommodate the different models and SSO interactions required by each service end point.

If the application manages SSO credentials, it must insure the security and privacy of those credentials.



The service usage model assumes an identity management system. Identity management is described in the identity service usage model and identity provisioning and management service usage model. Identity management supports SSO. An implementation is responsible for relating the identity service genres listed to those in the identifier service usage model.

The service usage model assumes an identifier system. Key identifier service genres are described in the identifier service usage model. The full set of identifier services are described in the identifier service usage model and identifier provisioning and management service usage model. An implementation is responsible for relating the identifier service genres listed to those in the identifier service usage model.

The component service genres (or their specializations in service expressions) of the D³UI Content Authoring service usage model SHALL document implementation guidance.

Applicable Standards

The Applicable Standards element lists domain-specific standards required to implement the functionality of the Service Usage Model as a whole. Standards are described in terms of name, version and citation link. Conformance requirements and extensions should be noted. Standards used to implement applications are excluded. No critical or essential information required to understand the Service Usage Model should be included.

None. No standards are directly applicable to the D³UI Content Authoring service usage model as a whole.

The component service genres (or their specializations in service expressions) of the D³UI Content Authoring service usage model SHALL document their applicable standards and specifications.

Known Uses

The Known Uses element documents actual uses of the Service Usage Model in applications and systems, including how used, extensions, and limits.

Actual:

The D³UI Content Authoring service usage model represents the general model of the D³UI *Development-to-Deposit Demonstrator*. The implemented functionality within the demonstrator is a subset of that described in the service usage model. The implementation used *Reload* as the base content authoring tool; the functionality was added into *Reload* via calls to the services described herein.

Resources Used

The Resources Used element documents all Resources used in the Service Usage Model. Resources are identified by name and version.

The service genres within the D³UI Content Authoring service usage model manages resources.

Resources used directly by the service usage model are listed. Resources used to support the listed service genres, or those used internally by the service genres, are not included.

(ADL-R) repository federation registry:

Managed storage for metadata used in discovery (metadata objects, collection objects, repository objects), i.e., content exposed and discoverable from the ADL-R repository federation. The repository federation registry resource incorporates other registry resources.

authentication data:

Information about authentication of users for those who access the registries and repositories.



content repository:

Managed storage for learning objects, learning content and related information used in training and performance support. Content objects conform to learning content standards. A content repository may include as subtypes:

- TSDB: Trusted source database. Managed storage for objects used as source material for training and performance support.
- CSDB: Common source database. Managed storage for performance support content and materials. Content objects conform to performance support content standards, e.g., S1000D.
- knowledge base repository: General repository of knowledge objects used in training, performance support and supporting other functions in an ADL environment.
- competency data: Managed storage for competency data used in managing skills (e.g., competency objects, competency maps, job skills, job roles).
- training catalog data: Managed storage for descriptions of training events (e.g., course descriptions, training events, schedules).
- task lists data: Managed storage for descriptions of tasks lists (e.g., job skills, mission task lists). Task list data may be managed external to the ADL environment, e.g., part of a shared DoD environment.
- rights licenses: Managed storage for digital rights management (DRM) licenses used to control content access.

identifier resolution data:

Identifier attributes used in identifier resolution and object access. Identifier data conforms to identifier standards. The D³UI Content Authoring service usage model assumes a single, shared, common identifier infrastructure.

identity data:

Information about user identities for those who access components and services in the ADL environment. Identity data may be managed via a single registry, a federation registry, or a collection of different identity repositories.

The D³UI Content Authoring service usage model assumes federated identity management that is provided through the identity service usage model. Identity data may be managed external to the ADL environment, e.g., part of a shared DoD environment.

Services Used

The Services Used element documents all Services used in the Service Usage Model. Services are identified by name and version.

Service genres used directly by the service usage model are listed. Service genres used to support the listed service genres are not included.

deposit: V1.0.0.

[[deposit-genre-v100](#) / hdl:1870/0E248E210A294CAA06550842941CF74]

Add an object (or set of objects) (e.g., LOM metadata XML documents, SCOs, content packages) to a managed resource (e.g., registry, repository).

ADL Service Name: deposit {collection registry}, deposit {CSDB}, deposit {competency resource}, deposit {knowledge base}, deposit {LMS activity model data}, deposit {LMS learner profile data}, deposit {LMS results data}, deposit {LMS activity model data}, deposit {LMS/LCMS repository}, deposit {metadata registry}, deposit {repository}, deposit {repository registry}, deposit {rights license repository}, deposit {task list}, deposit {training catalog}, deposit {TSDB}, deposit {user profile repository}

generate metadata {content object basic metadata object}: V1.0.0.

[[mdgenerate-genre-v100](#) / hdl:1870/8A4A0B0A813849DAB60AAB656CCD287D]

Generate content object metadata (e.g., LOM metadata XML documents) for learning content objects (e.g., SCOs, content packages).

ADL Service Name: generate metadata {content object basic metadata object}



mint: V1.0.0.

[[mintid-genre-v100](#) / hdl:1870/CAE742A5FF9A46F0818ED87C1FB31773]

Generate a new, unique, persistent, resolvable identifier for an object (e.g., a metadata object, a content object).

ADL Service Name: register identifier

obtain: V1.0.0.

[[obtain-genre-v100](#) / hdl:1870/23B390B4D9D5477FBACC0ED202254829]

Retrieve an object (or set of objects) (e.g., LOM metadata XML documents, SCOs, content packages) from a managed resource (e.g., registry, repository).

ADL Service Name: obtain {collection object}, obtain {CSDB content object}, obtain {competency object}, obtain {content object}, obtain {knowledge object}, obtain {metadata object}, obtain {content package}, obtain {rights license}, obtain {task list object}, obtain {training catalog object}, obtain {TSDB content object}

register: V1.0.0.

[[register-genre-v100](#) / hdl:1870/051A0B3C187C4EDE9DCBCBA187DC8B2A]

Deposit metadata objects in the ADL-Registry (ADL-R) for later discovery.

ADL Service Name: ingest/deposit metadata object {repository registry}

resolve: V1.0.0.

[[resolveid-genre-v100](#) / hdl:1870/7D2A1D106AEC44A7AD7D0020F647F98D]

Resolve a unique, persistent, resolvable identifier for an object (e.g., a metadata object, a content object) and return the “locator” used to retrieve (obtain) the object.

ADL Service Name: resolve identifier

search: V1.0.0.

[[search-genre-v100](#) / hdl:1870/662CC57E60FD4EF092F7F0E8C1D69862]

Discover data objects (e.g., LOM metadata XML documents, SCOs, content packages) from collections within a managed resource (e.g., registry, repository).

ADL Service Name: search {collection registry}, search {CSDB}, search {competency resource}, search {HR data resource}, search {knowledge base}, search {metadata registry}, search {repository}, search {repository registry}, search {repository}, search {rights license repository}, search {task list}, search {training catalog repository}, search {TSDB}

validate: V1.0.0.

[[validate-genre-v100](#) / hdl:1870/CB160B6A2B3D42839D4D220802F100CA]

Validate the structure of content objects and content object metadata.

ADL Service Name: validate {collection object}, validate {CSDB content object}, validate {competency object}, validate {content object}, validate {knowledge object}, validate {metadata object}, validate {content package}, validate {rights license}, validate {task list object}, validate {training catalog object}, validate {TSDB content object}

Related Service Usage Models

The Related Service Usage Models element documents and illustrates how the Service Usage Model is related to other Service Usage Models required to provide its stated behaviors. Related Service Usage Models are identified by name and version. No critical or essential information required to understand the Service Usage Model should be included.

ADL Environment: V1.0.0

[[ADL environment-sum-v100](#) / hdl:1870/F231D5A451D3412A9464CF4F9CAE7523]

The ADL Environment service usage model is a set of service usage models that describes overall ADL service model. The ADL Environment service usage model includes content authoring processes (content discovery, development, distribution).



(ADL-R) repository federation: V1.0.0

[[ADL-R repository-federation-sum-v100 / hdl:1870/E2FE4AD428A1468FA284E270245F72D7](#)]

The (ADL-R) repository federation service usage model provides an integrated set of service genres used to populate and use the metadata registry that supports a repository federation. Functionality includes content management (creation and management of metadata objects within a repository federation), content discovery (discovery of content objects from a repository federation) and content delivery (retrieval of and access to content objects discovered through a repository federation). The (ADL-R) repository federation service usage model is a derivative subset of the (FRED) repository federation service usage model. For the purposes of this service usage model they are interchangeable.

identifier: Vx.xx.

[[link to service usage model](#)]

The identifier service usage model is an integrated set of service genres that provides the operational identifier infrastructure used by the (ADL-R) repository federation service usage model. Functionality includes the creation, registering, publishing, managing and resolving of individual identifiers.

identity: Vx.xx.

[[link to service usage model](#)]

The identity service usage model is an integrated set of service genres that provides the operational user identity infrastructure used by the (ADL-R) repository federation service usage model. Functionality includes the creation of user rights and roles, user authentication and user authorization.

NB: Authentication and authorization are combined within a single service usage model.

repository: Vx.xx.

[[link to service usage model](#)]

The repository service usage model integrates a set of service genres to support the operations of an individual repository, e.g., a training content repository, a competency repository, a knowledge repository. Functionality includes content ingestion, discovery, dissemination, delivery and tagging. The repository service usage model provides a common service usage model that may be further specialized to handle specific types of content. When designing applications based on the repository service usage model, these specializations are applied to selecting appropriate service expressions bound to specific standards for the type of content in the repository. Resource-specific variants of the repository service usage model SHOULD NOT be required.

repository storage manager: Vx.xx.

[[link to service usage model](#)]

The repository storage manager service usage model is an integrated set of service genres that provides access operators (CRUD, versioning, audit, ACID transactions) for a stored data collection, e.g., the metadata registry, collection registry, repository registry, archival repository, escrow repository.

(ADL-R) federated metadata registry provisioning and management: Vx.xx.

[[ADL-R registry-provision-sum-v100 / hdl:1870/84E0738844B54A1DB69C649E85B1EE67](#)]

The (ADL-R) federated metadata registry provisioning and management service usage model provides an integrated set of service genres used to create, provision and manage the metadata registry that supports a repository federation. Functionality includes provisioning of rules (authorization and business), data management (backup), analytics and computing the registry's state, and maintaining the registry's internal structures used for discovery and operations. The (ADL-R) federated metadata registry provisioning and management service usage model is a derivative subset of the (FRED) federated metadata registry provisioning and management service usage model. For the purposes of the service usage model they are interchangeable.

identifier provisioning and management: Vx.xx.

[[link to service usage model](#)]

The identifier provisioning and management service usage model is an integrated set of service genres that manages the identifier infrastructure. Functionality includes provisioning and management of the identifier system.



identity provisioning and management: Vx.xx.

[\[link to service usage model\]](#)

The identity provisioning and management service usage model is an integrated set of service genres that manages the user identity infrastructure. Functionality includes provisioning and management of the identity system.

NB: Authentication and authorization are combined within a single service usage model.

repository provisioning and management: Vx.xx.

[\[link to service usage model\]](#)

The repository provisioning and management service usage model provides an integrated set of service genres used to create, provision and manage an individual repository, e.g., a training content repository, a competency repository, a knowledge repository. Functionality includes configuration, provisioning users, data management (backup) and analytics.

Service Patterns Used

The Service Patterns Used element documents all Service Patterns used in the Service Usage Model. Service Patterns are identified by name and version.

None.

References

The References element includes references and bibliographic citations to works needed to understand the Service Usage Model.

None.

Glossary & Terminology

The Glossary & Terminology element defines domain-specific terms used in documenting the Service Usage Model.

Terms in the LSAL *Service Glossary* are applicable to this Service Usage Model.

Working Notes / Things To Do

The Working Notes element documents open issues in the development of the Service Usage Model and is for internal project use only. It should be deleted before the Service Usage Model is submitted for publication.

None.

