

## Service Genre: Obtain

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The Service Genre is derived from work created as part of the D<sup>3</sup>UI: Deposit to Discovery to Delivery – A User-Focused Infrastructure for Content Management in an ADL Environment project within the Workforce ADL Co-Lab. The D<sup>3</sup>UI project was funded in part by the Joint ADL Co-Lab under contract N61339-07-2-0001 SOW 2. Any opinions, findings, conclusions or recommendations expressed herein are those of the author(s) and do not reflect the views of the U.S. Government, the University of Memphis or other project sponsors.

The D<sup>3</sup>UI Service Genre is derived from work created as part of the Federated Repositories for Education (FRED) Project within the Australian ADL Partnership Laboratory. The FRED project is sponsored by the Australian Commonwealth Department of Education, Science and Training under the Framework for Open Learning Programme.

The template structure and format of this document are based on the Service Genre Description document from the Evolving the JADL Integrated Prototype Architecture: Alignment with the e-Framework Technical Report. This work was funded in part by the Joint ADL Co-Lab under contract N61339-06-C-0082.

The template structure and format are derived from the e-Framework documentation templates and guidelines, which are governed by the e-Framework *Intellectual Property Rights Statement* [<http://www.e-framework.org/Default.aspx?tabid=738>].

The template structure and format of this document are also based on Federated Repositories for Education (FRED) project documentation templates and guidelines, which were created as part of the FRED Project within the Australian ADL Partnership Laboratory. The FRED project is sponsored by the Australian Commonwealth Department of Education, Science and Training under the Framework for Open Learning Programme.

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**LSAL**

Information Architecture & Design, Learning Technologies, Training

## Introduction

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

The obtain service genre provides an abstract service end point for accessing data objects (e.g., LOM metadata XML documents, SCOs, content packages) from a managed resource. The accessor takes an identifier for the object, determines the source, and retrieves the object from the identified resource.

This obtain service genre is a derivative of the Federated Repositories for Education (FRED) obtain service genre. This derivative is technically equivalent to the source work; changes are editorial and in presentation only. While this service genre uses an identifier as the accessor, and the FRED service genre uses a label, how these are treated is determined by the service expressions and service implementations.

## Service Genre Description

The Service Genre Description is the complete, formal documentation of the Service Genre.

Obtain is the process by which an application fetches or retrieves one or more requested objects from a resource, in a specified form. An obtain service interface for the resource provides a mechanism for the external agent (requestor) to contact the resource to obtain the requested object(s). The requestor MAY specify how the requested object is to be presented in response to the request, i.e., the form of the returned object. This includes both the digital representation of the object content (e.g., file format), and the encoding and packaging preferred. The obtained data, returned as a whole object, is generally made available to an external user or application.

This is a general description of an obtain service genre, independent of application end point, resource, data object, or underlying communications protocols and service models. The service genre includes the notion that requested objects MAY have different representations, including file formats. The service genre includes a mechanism to authenticate clients. The service genre MAY be used in conjunction with authorization methods to control the return and filtering of results. Such authorization MAY be included as part of another service genre or as part of a service usage model that combines authorization with obtain.

## Service Genre Metadata

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

### Name

- Service Genre Name: obtain
- LSAL ID: hdl:1870/23B390B4D9D5477FBACC0ED202254829
- ADL Service Genre 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}
- JADL IPA ID: hdl:JADL-IPA-NA/E1002E1124B94A0AA14E0BC797E249AA (source for derivative)
- FRED Service Genre Name: obtain
- FRED ID: hdl:FREDNA/6E2F735AEE7F481ABFED422699E4B9D9 (source for derivative)

### Classification

Classification Facets:

- Service Genre Status: Unapproved
- Domains: Repository, Content Authoring, Training
- Domain Coverage: Multiple



- Deployment Status: Developmental
- Deployment Scale: Isolated
- Maturity: Immature
- Composition: Individual
- Purpose: Exemplar, Application

#### Technical Facets:

- State Behavior: Stateless
- Transactional Behavior: Non Transactional
- Batch Behavior: Batch
- Time Constraint Behavior: None
- Service End Point: Provider
- Authentication / Authorization: Auth'ed
- Exposure: Public

#### Version

- LSAL Version: 1.0.0 [hdl:1870/23B390B4D9D5477FBACC0ED202254829]
- JADL IPA Version: 1.0.0 [hdl:JADL-IPA-NA/E1002E1124B94A0AA14E0BC797E249AA]
- FRED Version: 1.0.0 [hdl:FREDNA/6E2F735AEE7F481ABFED422699E4B9D9]

Version History			
Version	Date	Author	Description
0.50	2007-09-04	DR	Initial D <sup>3</sup> UI version based on FRED obtain Service Genre version 1.0.0. hdl:FREDNA/6E2F735AEE7F481ABFED422699E4B9D9 hdl:JADL-IPA-NA/E1002E1124B94A0AA14E0BC797E249AA
0.51	2007-09-25	DR	Editorial review, consistency.
0.70	2007-10-07	DR	Draft for review.
0.90	2007-10-14	DR	Final editorial.
1.0.0	2007-10-21	DR	Final D <sup>3</sup> UI V 1.0.0.
1.0.0	2008-06-18	DR	LSAL V1.0.0. Derivative from D <sup>3</sup> UI version.

#### Notation

The Notation element includes conventions used to describe the Service Genre.

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 Genre Description follows those given in the LSAL *Service Genre Description Guidelines*.



## Description

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

The obtain service genre provides the mechanism to request objects from a resource. It is an example of a batch-oriented, request-response process. The resource is assumed to be a managed collection of objects, each of which is *retrievable* through a *label*. Labels and resources are encoded within the locator attribute of the identifier of the object. Each label identifies only one object in the collection. The prime use of the service genre is retrieving one or more of the objects in the collection by specifying their identifiers.

This service genre focuses on retrieving information from repositories and other similar data collections of content objects, making them available to external applications and end users. Typically, the data retrieved will be one or more of the objects in a repository. If there are multiple *representations* or *disseminations* of the object available from the repository, any of these *MAY* be requested. The service genre provides a direct content object accessor for an object (or object representation) in a data collection.

The service genre *MAY* be specialized in a service expressions to:

- obtain particular types of object representations and disseminations
- specify data packaging and exchange format for the objects returned
- specify communication protocols.

Resources (collections, repositories) expose an “obtain” interface, defined in the service expressions that specialize this service genre. Clients *MAY* send requests to this interface to retrieve the objects stored or managed by the resource. The associated service end point will respond to the request with the requested set of objects out of those managed by the resource. The client *MAY* request only one or a collection of objects. The client *MAY* also specify one or more acceptable representations of the objects to be obtained. The service end point will determine what object representation (if any) to return in response to the obtain request. The details of the data model packaging and encoding used to return results sets to the client are defined in the service expressions that specialize this service genre.

The obtain service genre is access controlled. A client request will include necessary authorization and authentication credentials such that the obtain service end point *MAY* permit or deny access to the requested objects. The source of the authorization and authentication credentials is not defined by the service genre. The service end point for the resource is responsible for determining what results it will return, by applying filtering to responses according to authorization-based access control constraints.

Note, as with other service genres, there is no expectation that all service implementations will be interoperable. Different service expressions *MAY* take different approaches to defining interfaces and data models.

## Usage Scenarios

The Usage Scenarios element is an informal, non technical description of how the Service Genre is used. An illustration of process or problem workflows, expressed using services, is included. An illustration of an application using the components of the Service Genre may be included (but not a description of the design of the application). No critical or essential information required to understand the Service Genre should be included.

Obtain services are typically provided by an application that manages content objects, such as a repository. Obtain services are expected to be used in conjunction with a discovery service (such as browse or search). The objects to be retrieved by the obtain service must first be discovered; the user typically does not know beforehand which objects they wish to retrieve, and (more importantly) through what identifiers those objects should be retrieved.

The usage scenario for the obtain service genre is to embed the accessor in another tool, e.g., within the *Reload* editor, as demonstrated in the (D<sup>3</sup>UI) Content Authoring service usage model. The tool first identifies a collection of



objects via search. The objects are known only by their identifiers. The user selects one or more objects from the resulting set, and the accessor is used to retrieve the corresponding objects. All of the interactions with the accessor service are hidden from the end user (the end user MAY not know which service end point was used) and the identifier resolution, location, access, retrieval workflow is fully automated.

## Applicability

The Applicability element details when the Service Genre is used or not used. It represents specific constraints and assumptions on the use of the Service Genre. It is more specific and normative than the informal Usage Scenarios. No critical or essential information required to understand the Service Genre should be included.

The service genre is applicable for retrieving any defined data representation or dissemination for any specific object(s) managed by the resource. Objects have unique identifiers that MAY be converted to locators naming the resource and a unique label within the resource used for retrieval. These labels are scoped only to the resource. There is no requirement that the label be a unique identifier that is resolvable to the item within the resource. The identifiers must be unique. The label is only an access key scoped to the resource.

A single representation and a single encoding and packaging is specified by the service genre as applying to all returned objects in the batch. The service genre is not applicable where distinct representations, encodings or packaging is required for different returned objects in the same batch, as a result of a single service request.

The obtain service genre does not provide a mechanism for search. Retrieval is direct by identifier.

It is possible that an intrinsic attribute is used as a label (e.g., the author field has been identified in the service expression as a legitimate label for retrieval); but the coincidence of a direct mapping between retrieval labels and object attributes is incidental and a result of generating unique identifiers to reference the locators in the resource: only the uniqueness of the identifier and label is relevant to the service genre, not their meanings.

Use of an obtain service expression presupposes that the requestor and the service provider have a common understanding of the retrieval label or identifier. If the client has access to metadata attributes uniquely specifying the object but which are not defined by the service expression as a label attribute in the locator, the service genre is not applicable (e.g., a client knows an object's ISBN but items MAY only be retrieved by DOI). The client must convert the attributes to the appropriate locator.

The service genre does not define the meaning of identifiers, locators or labels used to obtain objects. Service expressions that specialize this service genre MAY choose to align labels with meaningful attributes of objects, but such alignment is not a requirement.

Behavior of the service genre is not defined when the obtain request has a single label mapping to multiple objects.

Behavior of the service genre is defined when the resource requires authentication credentials included in the service request.

Behavior of the service genre is defined when the resource requires authorization or access controls that are based on authorization credentials included in the service request.

Behavior of the service genre is not defined when the resource requires its own authentication processes to permit retrieval.

Behavior of the service genre is not defined if communications need to be secure.

The obtain service genre is distinct from other accessor service genres with different requests or return types:

- The obtain service genre is applicable when the client specifies representation and packaging as part of the service request. A different accessor service genre is applicable when the representation and packaging



cannot be specified in the request, and when the simple data model of objects and object representations cannot be presumed. Such a service genre maps a label directly to a single digital object, with no choice of representation or encoding.

- The obtain service genre is applicable when the client specifies a single label for the object within a single resource. Other accessor service genres are applicable when the object is stored in multiple locations or in different representations, and the business logic of the service genre is used to decide which object instance is returned.
- The obtain service genre is applicable when the client specifies only the requested identifier. Other accessor service genres are applicable when the client also specifies other context entities through the request, such as information about the requestor or the service itself, with the expectation that this contextual information will determine which object is returned.
- The obtain service genre is applicable when each requested object maps to a unique object delivered in the response set. Other accessor service genres are applicable when the client expects to discover all the available instances of the requested object.

## Functionality

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

The obtain service genre supports only a single function to retrieve objects from a resource.

A request **SHALL** specify:

- What objects to retrieve (identifier) [REQUIRED].
- Authentication credentials [REQUIRED].

A request **MAY** specify:

- What representation of the objects to present to the requestor (i.e., which representations or disseminations to return) [OPTIONAL].
  - Representations **SHOULD** refer to existing standards and **SHOULD** include version numbers or version information.
- How to package and encode results [OPTIONAL].
  - Packaging and encoding **SHOULD** refer to existing standards and **SHOULD** include version numbers or version information.

Mechanisms **MAY** exist to provide flow control so that large results sets are returned in chunks.

Requests for multiple objects are treated as a batch; all request and result control settings **SHALL** be applied uniformly to all objects in the batch.

No other functionality is defined. The functionality that is defined **MAY** be extended. Major new or additional functionality **SHOULD NOT** be included; extended capabilities **SHOULD** be included in other service genres.

## Requests & Behaviors

The Requests & Behaviors element details all of the behaviors exposed by the Service Genre. It lists functionality that can be used by applications or Service Implementations. The information must be sufficient to specialize the Service Genre to one or more Service Expressions.

The format and definitions for requests and responses **SHALL** be defined by the service expressions that specialize the service genre. Requests and behaviors **SHALL** meet the following conditions:

- One *Obtain Request* **SHALL** be defined:
  - The request **SHALL** be capable of retrieving a single object given its identifier.
  - The request **MAY** be capable of retrieving a set of objects given a set of identifiers. Each identifier identifies a single object to be retrieved.



- The request SHALL be capable of obtaining any labeled object from the collection managed by the resource.
- The request MAY permit the client to specify one or more acceptable representations or disseminations for the requested objects.
  - The same representation SHALL be returned for all objects.
- The request MAY permit the client to specify the data encoding or packaging for the requested objects.
  - The same packaging or encoding SHALL be returned for all objects.
- The request MAY specify contextual information, to allow the service genre to determine which object instance and/or representation should be retrieved.
- The request SHALL include authentication credentials used to control access to the service end point.
- Responses SHALL include error indicators or other needed control information:
  - Error indicators SHALL be available for the request as a whole (e.g., the requested representation is unknown).
  - Separate error indicators SHALL be used to describe the availability of the results.
  - If the request is for multiple objects, error responses about the availability of the results SHALL be at the level of individual objects (e.g., for any requested object, the object is not available or the label is invalid).

## Use & Interactions

The Use & Interactions element details how the how the Requests & Behaviors are combined to provide the stated functionality of the Service Genre. This is a precise technical description of how the Service Genre provides its capabilities.

The model for a client to interact with a service implementation SHALL be defined by the service expressions that specialize the service genre.

## Structure

The Structure element provides a conceptual model of how the Service Genre manipulates data and state to provide results in response to requests. An illustration of the structure should be included. The structure information is used to specialize the Service Genre to one or more Service Expressions, but is not needed to understand how to use or interact with the Service Genre.

The service genre assumes the following logical data model for accessed and retrieved objects:

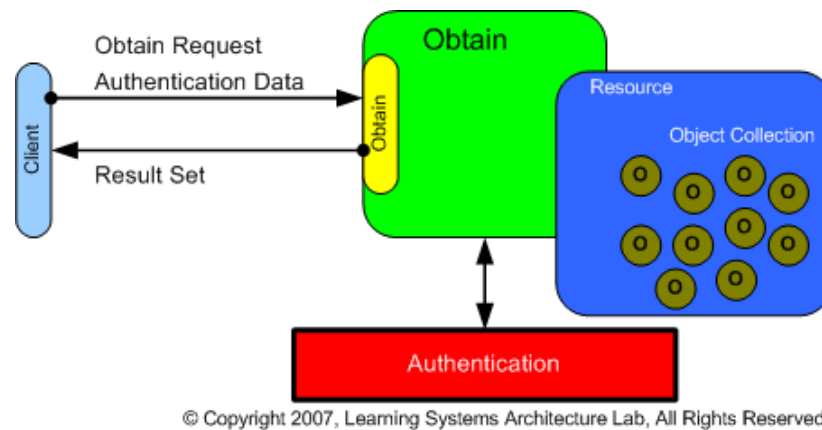
- Objects are within collections in managed resources. The physical manifestation of storage of the objects is hidden behind the service interface.
- Each object has a unique identifier that includes a locator attribute for the object.
- Each object has a locator that encodes the resource that contains the object and the label of the object within the resource.
- Labels or *access keys* are attributes of an object (possibly a composite set of attributes that MAY be treated as a single surrogate) that discriminate an object from all the other distinct objects held in the resource:
  - A label uniquely identifies an object in the context of a resource.
- Each object MAY have one or more digital *representations* or *disseminations*:
  - Different representations MAY be stored as static objects or they MAY be generated from the same underlying object on the fly in response to a request. Different representations of an object MAY be considered as distinct objects by other systems (e.g., they MAY have their own labels). No further assumptions on relations between objects or representations of objects are made.
- Representations of the content of the object at different levels of specificity are different objects (e.g., full text, abstract, metadata record). The service genre does not assume a fully elaborated model such as FRBR.
- Each object MAY have one or more *encodings*:
  - An object MAY need to be encoded or packaged according to some protocol or standard. Examples include ZIP, TAR, IMS CP for packaging, and BINHEX, URL-Encode, UTF-8 for encoding.



- An obtain request for an object is a request for an object or objects to be transmitted to the requestor from the resource. The requested object representation and encoding is considered an object to be returned to the client.
  - The objects SHALL be packaged and encoded according to the request, which MAY be specified by the requestor or a default packaging and encoding MAY be returned if not specified.
  - The representation or dissemination returned MAY be specified by the requestor or a default representation MAY be returned if not specified.
- Additional encodings MAY be required to support transport-level message exchange.

The structure of the service genre SHALL be defined by the service expressions that specialize the service genre.

The overall flow of interactions with the service is illustrated in the diagram.



**Figure 1: Obtain Service Genre** [© Copyright 2007, Learning Systems Architecture Lab, All Rights Reserved.]

### Design Decisions & Tradeoffs

The Design Decisions & Tradeoffs element documents overall choices, tradeoffs and their implications on the design of the Service Genre. It does not address the issues related to the internal details of a Service Implementation used to implement the Service Expression based on the Service Genre. No critical or essential information required to understand the Service Genre should be included.

The process of associating an identifier, locator or label with an object, or the meaning of labels, is not defined; the service genre only defines interfaces and observable behaviors, not internal models and structure.

The interface specifies an identifier used to retrieve the requested object. This identifier is structured to include a label that is a retrieval key for the object in the resource. This structured identifier has been chosen over the label as the key in the request to avoid the need to define a service usage model that overlays this service genre to convert the structured identifier to the label. Nothing in the service genre requires a particular structure for the identifier or the use of a resolver to obtain the label from the identifier. This version of the service genre differs from the source FRED service genre through its use of the structured identifier as data passed to the service end point.

The service genre supports batch processing, with all elements of the batch treated as a set. Since it uses request-response messaging, requests for single objects may be made. If necessary a simplified separate service genre that returns only a single object at a time may be defined. Alternatively, as defined, a service expression may specialize the service genre to return only a single object.

Authentication is an essential part of this service genre.



The service genre could include an *Inspection* request. The *Inspection* request returns to clients the range of permissible values for service request parameters (representations and encodings in particular). This service genre does not include such a request.

## Implementation Guide & Dependencies

The Implementation Guide & Dependencies element describes issues of concern in specializing the Service Genre to one or more Service Expressions and their corresponding Service Implementations. Resolution of issues discussed is deferred to the actual Service Implementation design. No critical or essential information required to understand the Service Genre should be included.

The following design decisions apply to the service expressions that specialize the service genre.

### Structure and Design:

- The service expression **MAY** include flow control for managing results. The service expression **SHALL** define whether flow control is supported and limits on request size and results sets.
- Any identifier that resolves to a label that uniquely identifies an object within a resource **MAY** be used as a retrieval label.
- The choice of retrieval label is made while developing the service expression. Extrinsic attributes of the object (e.g., semantically opaque identifiers) are a better choice as labels than intrinsic attributes (e.g., timestamp).
- Certain classes of extrinsic labels, such as file locations, are fragile, being dependent on object state, and **MAY** not have long-term persistence. Such labels **SHOULD NOT** be used as retrieval labels in contexts requiring long-term persistent of retrieval keys.
- The label only needs be unique within the scope of the resource. It need not be globally unique.
- The label need not be externally actionable: it **MAY** be defined as a retrieval key through an ad hoc, one-off arrangement between requestor and provider, with no expectation that the label will be stored and managed externally; be actionable by any other external service; or survive past the current obtain transaction.
- All design decisions related to the meaning of retrieval labels and their association with objects are deferred to the design of the service expression.
- While the service implementation accesses a specific resource, the resource itself **MAY** be a separately managed resource. A service expression **MAY** specify that the resource is a single physical storage system or it **MAY** specify that the resource is a distributed collection. The resource **MAY** be managed by a separate collection of storage manager services. All design decisions related to realization of the resource are deferred to the design of the service expression.
- Transport level encodings (e.g., UTF8 over HTTP) of results **SHALL** be defined by the service expressions that specialize the service genre.

### Consistency:

- The service implementation **SHALL** ensure that all labeled (identified) objects and all representations managed by the resource are obtainable.

### Performance:

- A service implementation **SHALL** be capable of handling simultaneous requests from different clients.
- A service implementation **SHOULD** implement an indexing scheme or equivalent method to permit efficient access to the requested object.
- Load balancing **SHOULD** be implemented for large resources or those that are accessed frequently (continuously).
- Flow control **SHALL** be implemented in contexts where returned representations are sizeable, or when large sets of objects are retrieved. Large results sets **MAY** be broken up over multiple request-response pairs.

### Security and Privacy Considerations:

- Service implementations **MAY** be subject to denial-of-service attacks.
- Care should be taken to maintain privacy of any personal data or other records that **MAY** disclose usage patterns.



- The client should not be able to discern existence of access-controlled objects by examining error codes.

### Applicable Standards

The Applicable Standards element lists domain-specific standards applicable to the Service Genre 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 Genre should be included.

None. No standards are directly applicable to the service genre as a whole.

The service expressions that specialize the service genre SHALL be defined in terms of standards:

- Service expressions SHALL specify applicable digital representation standards for the returned objects.
- Service expressions SHALL specify applicable data encoding and packaging format standards for the returned objects.
- Service expressions SHALL specify applicable communications, encoding and transport protocol standards.
- Service expressions SHALL specify applicable standards-based authentication models.

### Known Uses

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

Actual: The service genre is specialized in the D<sup>3</sup>UI development-to-deposit prototype using *Reload* to retrieve content from a repository.

Actual: The service genre is specialized in the D<sup>3</sup>UI discovery-to-delivery prototype using the *ADL SRTE* to retrieve content from a repository.

Potential: The service genre could be used in any content management or content creation process to retrieve content from a managed resource (resource collection).

Potential: The service genre could be used in a service usage model for a repository federation. The service genre supports retrieval of content into any of the resource components of the repository federation (repositories, registries).

### Service Genre Dependencies

The Service Genre Dependencies lists other Service Genres that this Service Genre is dependent upon. Dependent Service Genres are identified by name and version.

authenticate: Vx.xx.

[\[link to service genre\]](#)

The service genre requires authentication for use. The authenticate service genre is part of the identity service usage model [\[link to service usage model\]](#). The identity service usage model is an integrated set of service genres that provides the operational user identity infrastructure that includes the creation of user rights and roles, user authentication and user authorization.

authorize: Vx.xx.

[\[link to service genre\]](#)

The service genre uses authorization to filter results. The authorize service genre is part of the identity service usage model [\[link to service usage model\]](#). The identity service usage model is an integrated set of service genres that provides the operational user identity infrastructure that includes the creation of user rights and roles, user authentication and user authorization.



## Related Service Usage Models

The Related Service Usage Models element documents and illustrates how the Service Genre is used in Service Usage Models. Related Service Usage Models are identified by name and version. No critical or essential information required to understand the Service Genre should be included.

(D<sup>3</sup>UI) content authoring: V1.0.0.

[[D<sup>3</sup>UI content-authoring-sum-v100](#) / hdl:1870/3FD212C661F1464AA79DBB22D3DE00FF]

Obtain (genre) is part of the (D<sup>3</sup>UI) content authoring service usage model (genre based) and is used within an authoring and content deposit workflow to retrieve content from a repository.

(D<sup>3</sup>UI) delivery: V1.0.0.

[[D<sup>3</sup>UI delivery-sum-v100](#) / hdl:1870/01D0643B992B489ABEB4D89806918450]

Obtain (genre) is part of the (D<sup>3</sup>UI) delivery service usage model (genre based) and is used within a discovery-to-delivery workflow to retrieve content from a repository.

(FRED) repository federation: V1.0.0.

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

Obtain (genre) is a part of the repository federation service usage model (genre based) and is used to retrieve content from the repositories and collections that participate in the federation. The 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)

(ADL-R) repository federation: V1.0.0.

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

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 genre they are interchangeable.

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.

## Related Service Patterns

The Related Service Patterns element documents and illustrates how the Service Genre is used in Service Patterns. Related 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 Genre.

None.

## Glossary & Terminology

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

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



### Working Notes / Things To Do

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

None.

