



CTS2 Concept Domain and Concept Domain Binding Services

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1 Introduction

The CTS2 specification is divided into a number of separably implementable profiles. This document on Concept Domain Services describes the relationship between enumerated data elements as described in models, schemas and databases, and value sets, which represent the set of possible value meanings that can be coded in the data element. This model focuses on sets of meanings and does not directly speak to how a given meaning might be represented in an instance of the described model, although some obvious choices could include the entity name, the entity namespace and name as a tuple or the entity URI.

1.1 Notation

Model elements are referenced using Typewriter font.

1.2 Identifiers

- Class names are capitalized camel case (`CodeSystemCatalog`, `String`).
- Attribute and role names are lower camel case (`version`, `sourceAndRole`).
- Enumeration values are all capital letters with underscores ('_') introduced as needed for clarity. (`EMPTY`, `STOP_ON_ERROR`).
- Method names are `lowerCamelCase`.

1.3 Stereotypes

The following stereotypes are used throughout the model:

- `dataType` - UML `dataType` semantics.
- `enumeration` - UML enumeration semantics.
- `interface` - UML interface semantics.
- `mixin` - a class that provides a certain functionality to be inherited by a subclass, while not meant for instantiation.
- `opt` - an optional parameter in a method call. This stereotype should always be accompanied by a 0..1 cardinality and is provided to make optionality visible in the modeling tool.
- `optparam` - an optional attribute in a class instance. This indicates that an implementation must be able to distinguish three alternatives: (1) add or change the attribute to whatever is in the class, (2) remove the attribute if its minimum cardinality is zero, and (3) leave the attribute unchanged.
- `delta` - a method call that changes the state of the service. Note that the semantics of this stereotype is the inverse of the `is query model attribute`.
- `exception` - an exception.
- `exceptionSet` - a set of exceptions, the members of which are represented by aggregation.

1.4 Read Only Attributes

The CTS2 PIM is based on a RESTful architectural style. Resources can be created, updated, read, and/or deleted, and every resource has one or more immutable characteristics - characteristics that, if changed, would change the identity of the resource itself. In the information model we distinguish these characteristics from those that can be modified by declaring the identifying characteristics as *ReadOnly*. The computational model utilizes a pattern based on this information where the *create* operation(s) supply the identifying characteristics plus any of the non-optional mutable characteristics. The *update* operations then supply a unique identifier and a set of one or more mutable characteristics to be changed.

2 Concept Domain Information Model

2.1 Concept Domain Catalog Entry

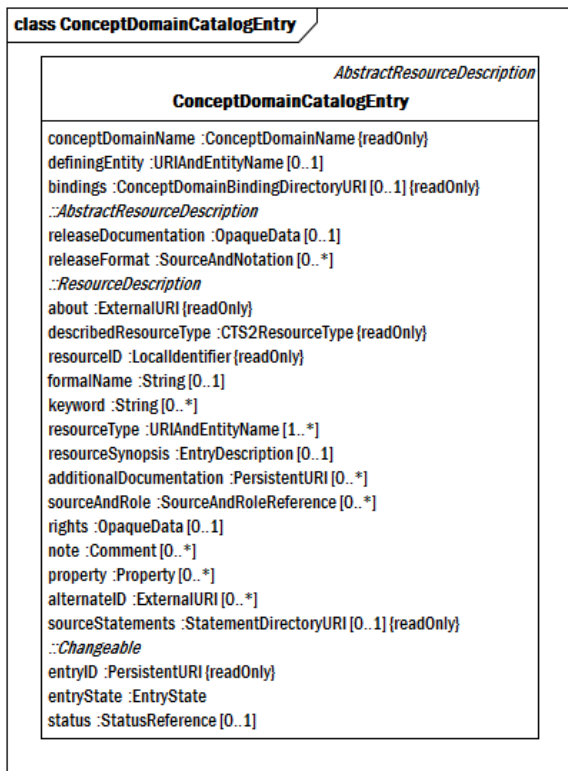


Figure 2.1 - Concept Domain Catalog Entry

2.1.1 Class ConceptDomainCatalogEntry

Metadata about what, in ISO-1 1179, is called a “Data Element Concept” - “a CONCEPT that can be expressed in the form of a DATA ELEMENT, described independently of any particular representation.”

The HL7 SFM defines a *ConceptDomain* as “A named category of like concepts (a semantic type) that will be bound to one or more attributes in a static model whose datatypes are coded. Concept Domains exist to constrain the intent of the coded element while deferring the association of the element to a specific coded terminology until later in the model development process. Thus, Concept Domains are independent of any specific vocabulary or code system. Concept Domains represents an abstract conceptual space such as ‘countries of the world,’ ‘the gender of a person used for administrative purposes,’ ‘languages of the world,’ etc.”

Superclasses

- Every instance of *ConceptDomainCatalogEntry* is also an instance of *AbstractResourceDescription*.

Attributes

- **conceptDomainName** - the name by which the concept domain is known within the context of the *CTS₂* service instance. **conceptDomainName** must uniquely designate a single, abstract **ConceptDomain** within the context of all concept domains known to the instance of the service. Note that **conceptDomainName** is not necessarily globally unique and the **about** URI should be used whenever communication information about the **ConceptDomain** across time or service instances.
- **definingEntity** - the name and URI of an **EntityDescription** that describes the domain and scope of meaning for the **ConceptDomain**. If present, this association is equivalent to the data element concept domain association in section 11.2.3.2 of ISO 11179-3. **entityReference** provides a definition for the **ConceptDomain** and potentially describes its relationship with other **ConceptDomains** as well as providing a semantic link to the possible value meanings available to domain bindings.
- **bindings** - a URI that resolves to the known bindings (aka. Data Elements) of the referenced **ConceptDomain**.

2.2 Concept Domain Directory and List

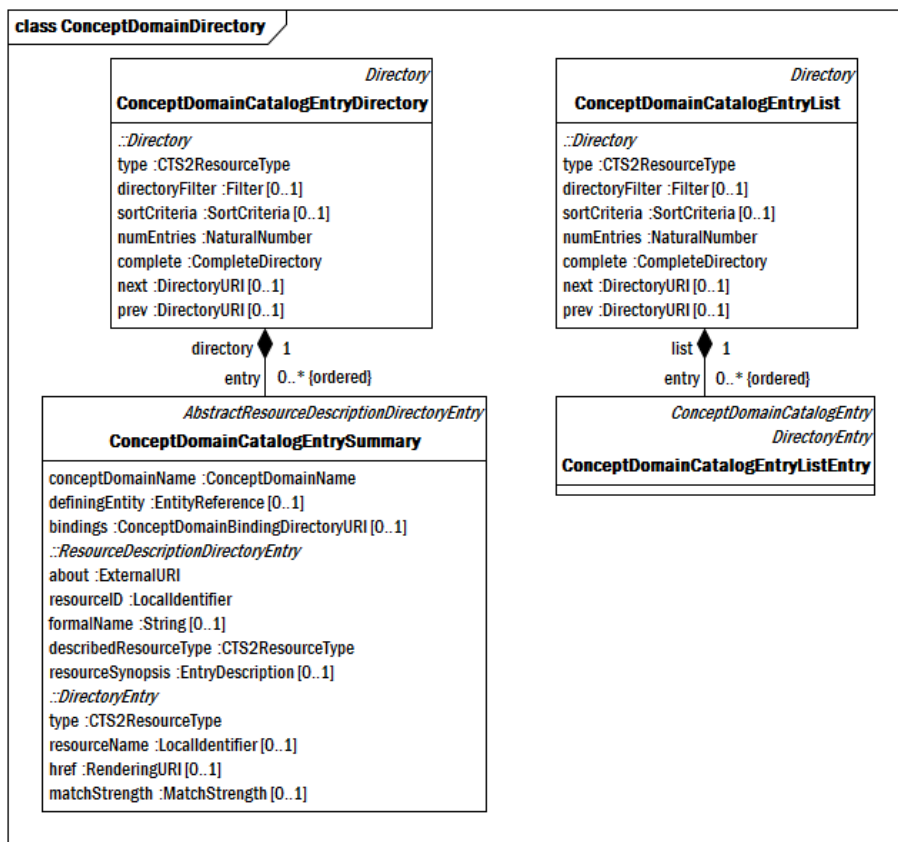


Figure 2.2 - Concept Domain Directory

2.2.1 Class ConceptDomainCatalogEntryDirectory

A directory of **ConceptDomain** resources that meet a specified criteria.

Superclasses

- Every instance of `ConceptDomainCatalogEntryDirectory` is also an instance of `Directory`.

Attributes

- **entry** - an entry in the directory.

2.2.2 Class `ConceptDomainCatalogEntryList`

A collection of complete `ConceptDomain` resources that meet a specified criteria.

Superclasses

- Every instance of `ConceptDomainCatalogEntryList` is also an instance of `Directory`.

Attributes

- **entry** - an entry in the list

2.2.3 Class `ConceptDomainCatalogEntrySummary`

A synopsis of a `ConceptDomain` along with information about how to access the complete resource.

Superclasses

- Every instance of `ConceptDomainCatalogEntrySummary` is also an instance of `AbstractResourceDescriptionDirectoryEntry`.

Attributes

- **conceptDomainName** - the name by which the concept domain is known within the context of the CTS2 service instance. `conceptDomainName` must uniquely designate a single, abstract `ConceptDomain` within the context of all concept domains known to the instance of the service. Note that `conceptDomainName` is not necessarily globally unique and the `about` URI should be used whenever communication information about the `ConceptDomain` across time or service instances.
- **definingEntity** - a reference to an `EntityDescription` that describes the domain and scope of meaning for the `ConceptDomain`. If present, this association is equivalent to the data element concept domain association in section 11.2.3.2 of ISO 11179-3. `entityReference` provides a definition for the `ConceptDomain` and potentially describes its relationship with other `ConceptDomains` as well as providing a semantic link to the possible value meanings available to domain bindings.
- **bindings** - a URI that resolves to the known bindings (aka. Data Elements) of the referenced `ConceptDomain`.

2.2.4 Class `ConceptDomainCatalogListEntry`

An instance of `ConceptDomain` that meets a specified filter criteria.

Superclasses

- Every instance of `ConceptDomainCatalogListEntry` is also an instance of `ConceptDomainCatalogEntry`.
- Every instance of `ConceptDomainCatalogListEntry` is also an instance of `DirectoryEntry`.

3 Concept Domain Catalog Services

3.1 Concept Domain Catalog Read Service

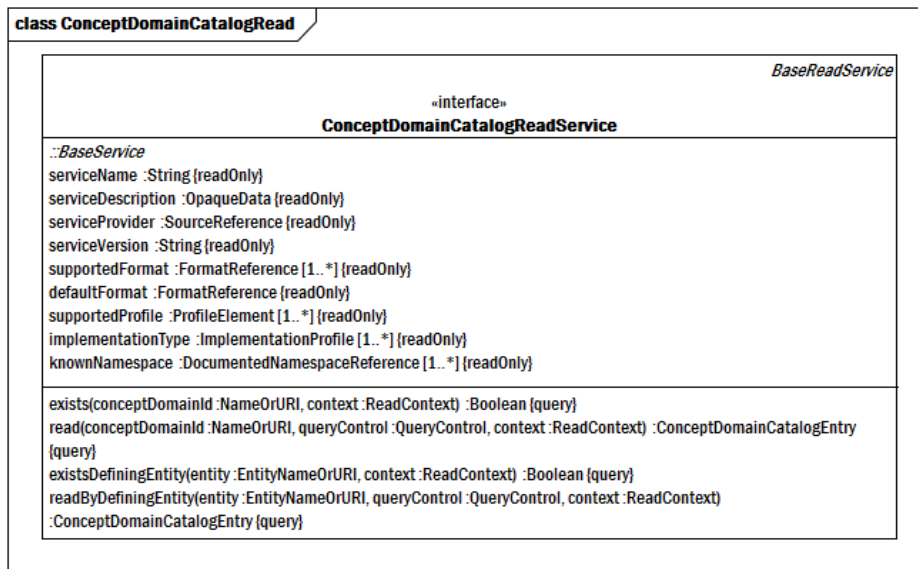


Figure 3.1 - Concept Domain Catalog Read

The `ConceptDomainCatalogReadService` provides direct read access to the contents of a `ConceptDomain` catalog. Catalog entries may be retrieved by name, about URI, alternateID URI, or definingEntity. Context information may be supplied that determines whether only active concept domains will be considered or all will be candidates and, where supported, the temporal context of the retrieval.

3.1.1 Interface ConceptDomainCatalogReadService

A service that provides direct read access to metadata about concept domains that are known to the service implementation.

Superclasses

- Every instance of `ConceptDomainCatalogReadService` is also an instance of `BaseReadService`.

3.1.1.1 Operation: exists

Determine whether the service has a catalog entry for a concept domain with the supplied name or URI in the supplied context.

Input Parameters

- **conceptDomainId** - the local identifier or URI of a concept domain (Type: `NameOrURI`).
- **context_{OPT}** - parameters that control the language, date, and other contextual variables (Type: `ReadContext`).

Return Type: Boolean

Exceptions

- **UnsupportedLanguage** - The `referenceLanguage` is not supported by the service.
- **UnknownChangeSet** - The change set specified could either not be read or located by the service.
- **ChangeSetIsNotOpen** - The `changeSetContext` is recognized by the service, but its state is not OPEN.
- **UnsupportedContext** - One or more `changeSetContext` is not supported by the service.

3.1.1.2 Operation: read

Return the `ConceptDomainCatalogEntry` referenced by the supplied name or URI. Note that the URI may either be the about URI or one of the `alternateIDs`.

Input Parameters

- **conceptDomainId** - the local name or URI of a concept domain (Type: `NameOrURI`).
- **queryControl**_{OPT} - parameters that control the ordering, timeout, and query behavior (Type: `QueryControl`).
- **context**_{OPT} - parameters that control the language, date, and other contextual variables (Type: `ReadContext`).

Return Type: `ConceptDomainCatalogEntry`

Exceptions

- **UnknownConceptDomain** - The named `conceptDomain` is not recognized by the service.
- **UnsupportedMatchAlgorithm** - The `matchAlgorithm` is not supported by the service.
- **UnsupportedPredicate** - The predicate name or URI is not recognized by the service.
- **UnsupportedNamespaceName** - The supplied namespace name is not one that is known to the service.
- **UnsupportedModelAttribute** - The name or URI of a CTS2 model attribute is not recognized and/or supported by the service implementation.
- **MatchValueFormatException** - The match value does not meet the format or syntax required or the supplied match algorithm.
- **UnsupportedFormat** - The `format` is not supported by the service implementation.
- **QueryTimeout** - The `timeLimit` was exceeded by the service.
- **UnsupportedLanguage** - The `referenceLanguage` is not supported by the service.
- **UnknownChangeSet** - The change set specified could either not be read or located by the service.
- **ChangeSetIsNotOpen** - The `changeSetContext` is recognized by the service, but its state is not OPEN.
- **UnsupportedContext** - One or more `changeSetContext` is not supported by the service.

3.1.1.3 Operation: existsDefiningEntity

Determine whether there is a catalog entry that is defined by the referenced entity or “concept.”

Input Parameters

- **entity** - the namespace/name or URI of an entity that is used in the definition of a concept domain (Type: `EntityNameOrURI`).
- **context_{OPT}** - parameters that control the language, date, and other contextual variables (Type: `ReadContext`).

Return Type: `Boolean`

Exceptions

- **UnsupportedNamespaceName** - The supplied namespace name is not one that is known to the service.
- **UnsupportedLanguage** - The `referenceLanguage` is not supported by the service.
- **UnknownChangeSet** - The change set specified could either not be read or located by the service.
- **ChangeSetIsNotOpen** - The `changeSetContext` is recognized by the service, but its state is not `OPEN`.
- **UnsupportedContext** - One or more `changeSetContext` is not supported by the service.

3.1.1.4 Operation: `readByDefiningEntity`

Return the `ConceptDomainCatalogEntry` whose defining entity is represented by the supplied entity URI or namespace and name.

Input Parameters

- **entity** - the namespace/name or URI of a defining entity (“concept”) (Type: `EntityNameOrURI`).
- **queryControl_{OPT}** - parameters that control the ordering, timeout and query behavior (Type: `QueryControl`).
- **context_{OPT}** - parameters that control the language, date, and other contextual variables (Type: `ReadContext`).

Return Type: `ConceptDomainCatalogEntry`

Exceptions

- **UnsupportedNamespaceName** - The supplied namespace name is not one that is known to the service.
- **NoCatalogEntryForDefiningEntity** - There is not a catalog entry that references the supplied entity in the supplied context.
- **UnsupportedLanguage** - The `referenceLanguage` is not supported by the service.
- **UnknownChangeSet** - The change set specified could either not be read or located by the service.
- **ChangeSetIsNotOpen** - The `changeSetContext` is recognized by the service, but its state is not `OPEN`.
- **UnsupportedContext** - One or more `changeSetContext` is not supported by the service.
- **UnsupportedMatchAlgorithm** - The `matchAlgorithm` is not supported by the service.
- **UnsupportedPredicate** - The predicate name or URI is not recognized by the service.
- **UnsupportedNamespaceName** - The supplied namespace name is not one that is known to the service.

- **UnsupportedModelAttribute** - The name or URI of a CTS2 model attribute is not recognized and/or supported by the service implementation.
- **MatchValueFormatException** - The match value does not meet the format or syntax required or the supplied match algorithm.
- **UnsupportedFormat** - The format is not supported by the service implementation.
- **QueryTimeout** - The timeLimit was exceeded by the service.

3.2 Concept Domain Catalog Query Service

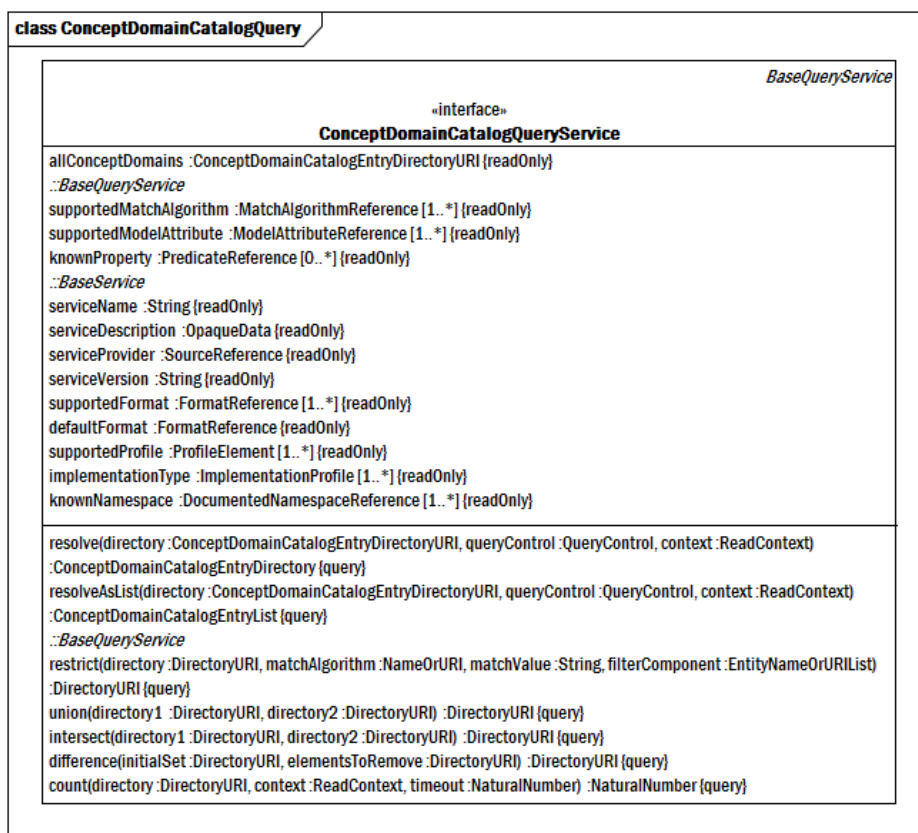


Figure 3.2 - Concept Domain Catalog Query

The **ConceptDomainCatalogQuery** service provides the ability to select and filter **ConceptDomainCatalogEntries** based on property values and other criteria.

3.2.1 Interface ConceptDomainCatalogQueryService

Superclasses:

- Every instance of **ConceptDomainCatalogQueryService** is also an instance of **BaseQueryService**.

Attributes:

- **allConceptDomains** - a `DirectoryURI` that references all of the entries known to the `ConceptDomainCatalog`.

3.2.1.1 Operation: resolve

Return a summary of the catalog entries referenced by directory.

Input Parameters:

- **directory** - a `DirectoryURI` that references a set of concept domain catalog entries (Type: `ConceptDomainCatalogEntryDirectoryURI`).
- **queryControl**_{OPT} - parameters that control the ordering, timeout, and query behavior. (Type: `QueryControl`)
- **context**_{OPT} - parameters that control the language, date and other contextual variables (Type: `ReadContext`)

Return Type: ConceptDomainCatalogEntryDirectory**Exceptions:**

- **UnsupportedLanguage** - The `referenceLanguage` is not supported by the service
- **UnknownChangeSet** - The change set specified could either not be read or located by the service.
- **ChangeSetIsNotOpen** - The `changeSetContext` is recognized by the service, but its state is not `OPEN`.
- **UnsupportedContext** - One or more `changeSetContext` is not supported by the service
- **InvalidDirectoryURI** - The supplied directory URI is not valid.
- **InvalidDirectoryType** - The type represented by the supplied directory URI is not the one required by the service invocation.
- **UnsupportedMatchAlgorithm** - The `matchAlgorithm` is not supported by the service.
- **UnsupportedPredicate** - The predicate name or URI is not recognized by the service.
- **UnsupportedNamespaceName** - The supplied namespace name is not one that is known to the service.
- **UnsupportedModelAttribute** - The name or URI of a CTS2 model attribute is not recognized and/or supported by the service implementation.
- **MatchValueFormatException** - The match value does not meet the format or syntax required or the supplied match algorithm.
- **UnsupportedFormat** - The `format` is not supported by the service implementation.
- **QueryTimeout** - The `timeLimit` was exceeded by the service.

3.2.1.2 Operation: resolveAsList

Return a summary of the catalog entries referenced by directory.

Input Parameters:

- **directory** - a `DirectoryURI` that references a set of concept domain catalog entries (Type: `ConceptDomainDirectoryURI`).
- **queryControl**_{OPT} - parameters that control the ordering, timeout, and query behavior. (Type: `QueryControl`)
- **context**_{OPT} - parameters that control the language, date, and other contextual variables (Type: `ReadContext`)

Return Type: `ConceptDomainCatalogEntryList`**Exceptions:**

- **UnsupportedLanguage** - The `referenceLanguage` is not supported by the service
- **UnknownChangeSet** - The change set specified could either not be read or located by the service.
- **ChangeSetIsNotOpen** - The `changeSetContext` is recognized by the service, but its state is not `OPEN`.
- **UnsupportedContext** - One or more `changeSetContext` is not supported by the service
- **InvalidDirectoryURI** - The supplied directory URI is not valid.
- **InvalidDirectoryType** - The type represented by the supplied directory URI is not the one required by the service invocation.
- **UnsupportedMatchAlgorithm** - The `matchAlgorithm` is not supported by the service.
- **UnsupportedPredicate** - The predicate name or URI is not recognized by the service.
- **UnsupportedNamespaceName** - The supplied namespace name is not one that is known to the service.
- **UnsupportedModelAttribute** - The name or URI of a CTS2 model attribute is not recognized and/or supported by the service implementation.
- **MatchValueFormatException** - The match value does not meet the format or syntax required or the supplied match algorithm.
- **UnsupportedFormat** - The `format` is not supported by the service implementation.
- **QueryTimeout** - The `timeLimit` was exceeded by the service.

3.3 Concept Domain Catalog History Service

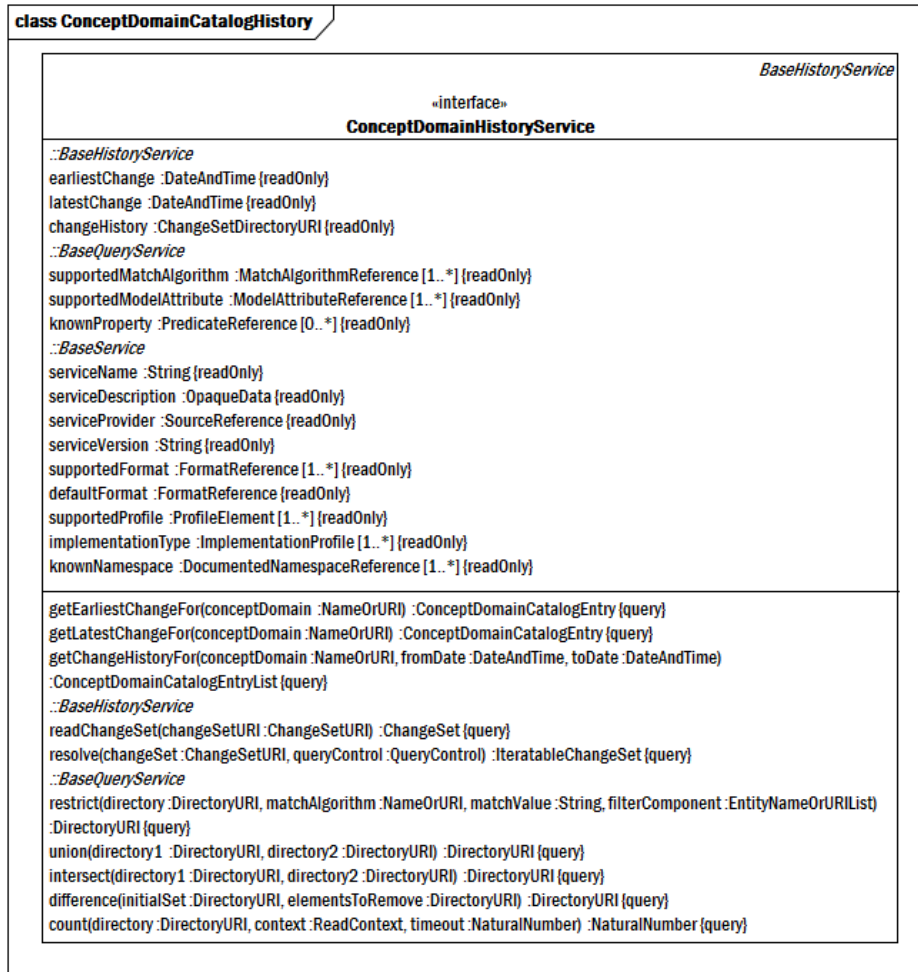


Figure 3.3 - Concept Domain Catalog History

3.3.1 Interface ConceptDomainHistoryService

Superclasses

- Every instance of ConceptDomainHistoryService is also an instance of BaseHistoryService.

3.3.1.1 Operation: getEarliestChangeFor

Retrieve the earliest change made to the catalog entry for the supplied concept domain.

Input Parameters

- conceptDomain** - the name or URI of a concept domain (Type: NameOrURI).

Return Type: ConceptDomainCatalogEntry

Exceptions

- **UnknownConceptDomain** - The named `conceptDomain` is not recognized by the service.

3.3.1.2 Operation: getLatestChangeFor

Return the latest known change to the catalog entry for the supplied concept domain.

Input Parameters

- **conceptDomain** - the name or URI of a concept domain (Type: `NameOrURI`)

Return Type: ConceptDomainCatalogEntry

Exceptions

- **UnknownConceptDomain** - The named `conceptDomain` is not recognized by the service.

3.3.1.3 Operation: getChangeHistoryFor

Return a list of records that reflects the change in the catalog entry over the specified time span. Records will be sorted from earliest to latest if (a) `fromDate` is omitted or (b) `toDate` is omitted, or (c) `fromDate` is earlier than `toDate`. In all other cases, records will be sorted from latest to earliest.

Input Parameters

- **conceptDomain** - the name or URI of a concept domain (Type: `NameOrURI`).
- **fromDate_{OPT}** - the earliest date to return changes for. If omitted, the history begins at the first known catalog entry (Type: `DateAndTime`).
- **toDate_{OPT}** - the last date to return changes for. If omitted, all changes up to the last one made are returned. (Type: `DateAndTime`)

Return Type: ConceptDomainCatalogEntryList

Exceptions

- **UnknownConceptDomain** - The named `conceptDomain` is not recognized by the service.

3.4 Concept Domain Catalog Maintenance Service

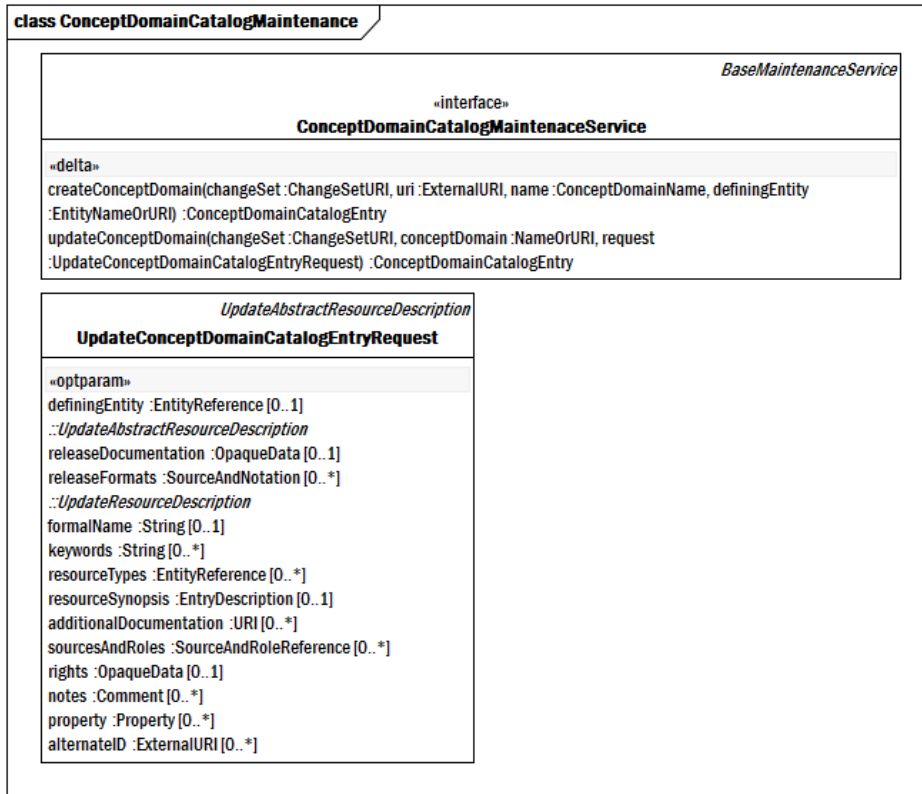


Figure 3.4 - Concept Domain Catalog Maintenance

3.4.1 Interface ConceptDomainCatalogMaintenanceService

A service that allows the creation, update, and deletion of Concept Domains. Note: the attributes and operations of the parent class, *BaseMaintenanceService*, are hidden in this diagram.

Superclasses

- Every instance of *ConceptDomainCatalogMaintenanceService* is also an instance of *BaseMaintenanceService*.

3.4.1.1 Operation: createConceptDomain

Create a new concept domain catalog entry.

This operation may alter the state of the service.

Input Parameters

- **changeSet** - the URI of an OPEN change set that will record the change (Type: *ChangeSetURI*).
- **uri** - the URI that of the concept domain referenced by the catalog entry (Type: *ExternalURI*).

- **name** - a label which uniquely identifies the new concept domain within the context of the implementing service (Type: `ConceptDomainName`).
- **definingEntity_{OPT}** - the namespace/name or URI of the entity (or “concept”) that defines the intent of the concept domain (Type: `EntityNameOrURI`).

Return Type: `ConceptDomainCatalogEntry`

Exceptions

- **UnsupportedNamespaceName** - The supplied namespace name is not one that is known to the service.
- **ChangeSetIsNotOpen** - The `changeSetContext` is recognized by the service, but its state is not OPEN.
- **DuplicateConceptDomainURI** - The supplied URI is already the about URI or alternate ID for another concept domain in the service.
- **UnknownChangeSet** - The change set specified could either not be read or located by the service.
- **DuplicateConceptDomainName** - The concept domain name is already used for another catalog entry.
- **DuplicateDefiningEntity** - More than one concept domain is defined by the same `definingEntity`.

3.4.1.2 Operation: `updateConceptDomain`

Update a concept domain catalog entry.

This operation may alter the state of the service.

Input Parameters

- **changeSet** - the URI of an OPEN change set that will record this change (Type: `ChangeSetURI`).
- **conceptDomain** - the name or URI of the concept domain to be updated (Type: `NameOrURI`).
- **request** - the set of parameters to update (Type: `UpdateConceptDomainCatalogEntryRequest`).

Return Type: `ConceptDomainCatalogEntry`

Exceptions

- **ChangeSetIsNotOpen** - The `changeSetContext` is recognized by the service, but its state is not OPEN.
- **UnknownChangeSet** - The change set specified could either not be read or located by the service.
- **UnknownConceptDomain** - The named `conceptDomain` is not recognized by the service.
- **DuplicateDefiningEntity** - More than one concept domain is defined by the same `definingEntity`.
- **UnsupportedNamespaceName** - The supplied namespace name is not one that is known to the service.
- **UnsupportedOntologyLanguage** - The supplied ontology language is not supported by the service.
- **UnsupportedStatus** - The name or URI of the Changeable status property is not recognized by the service.
- **UnsupportedSource** - The supplied source is not recognized by the service.
- **UnsupportedPredicate** - The predicate name or URI is not recognized by the service.

- **UnsupportedRole** - The role name or URI is not recognized by the service.
- **UnsupportedOntologySyntax** - The supplied ontology syntax is not supported by the service.

3.4.2 Class **UpdateConceptDomainCatalogEntryRequest**

Superclasses

- Every instance of `UpdateConceptDomainCatalogEntryRequest` is also an instance of `UpdateAbstractResourceDescription`.

Attributes

- **definingEntity** - the entity (concept) that defines the concept domain.

4 Concept Domain Binding Information Model

4.1 Concept Domain Binding

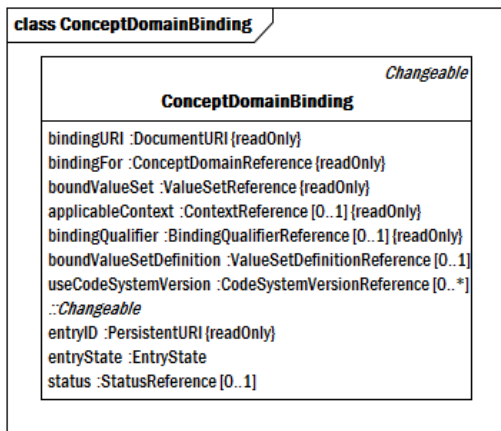


Figure 4.1 - Concept Domain Binding Model

A `ConceptDomainBinding` represents an association between a concept domain and a value set. The identity of a binding is the combination of the concept domain, the value set, the context (if present) and the binding qualifier (if present).

4.1.1 Class `ConceptDomainBinding`

The binding of a `ConceptDomain` and a `Value Set` that supplies the set of permissible value meanings in a given context.

`ConceptDomainBinding` can also bind specific value set definitions and/or specific code system versions where desired.

Superclasses

- Every instance of `ConceptDomainBinding` is also an instance of `Changeable`.

Attributes

- **bindingURI** - the unique identifier of this particular binding instance.
- **bindingFor** - the `ConceptDomain` being bound to a value set.
- **boundValueSet** - the bound value set.
- **applicableContext** - a realm or context in which the particular binding applies. If not present, the binding applies in any context not stated in another binding.
- **bindingQualifier** - additional information that qualifies the intent or purpose of the binding. In the HL7 case, this is intended to indicate “whether the binding is ‘overall,’ ‘minimum,’ or ‘maximum.’” The actual interpretation of the qualifier is outside of the scope of the CTS2 specification but, if present, `bindingQualifier` contributes to the identity of the specific binding.

- **boundValueSetDefinition** - the specific definition of the value set to be bound. If not specified, the definition that is used to determine the permissible values is specified when the concept domain is applied in the context.
- **useCodeSystemVersion** - the specific version(s) of the code systems to be used in the resolution of the value set definition. Note that it is also possible for value set definitions themselves to state which version of a code system is to be used. When this is the case, the code system version(s) specified in the ConceptDomainBinding do not override those stated in the value set definition - the value set definition version information takes precedence.

4.2 Concept Domain Binding Directory

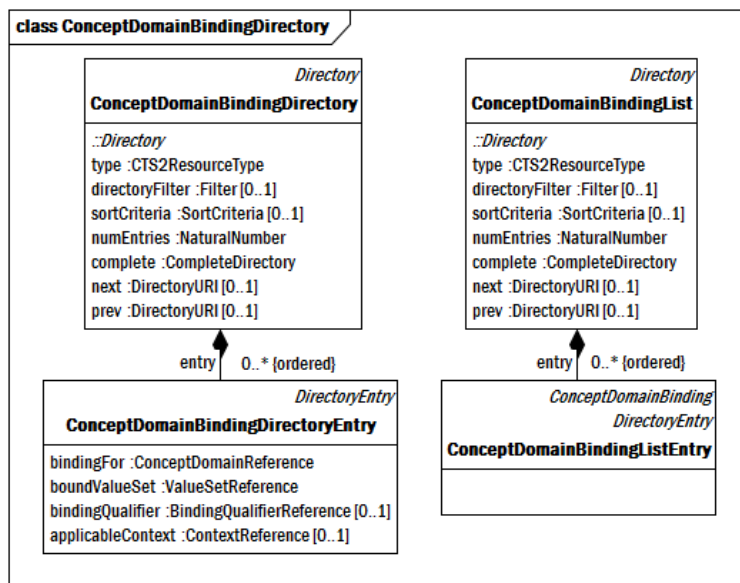


Figure 4.2 - Concept Domain Binding Directory

4.2.1 Class ConceptDomainBindingDirectory

A directory that summarizes a set of concept domain bindings.

Superclasses

- Every instance of **ConceptDomainBindingDirectory** is also an instance of *Directory*.

Attributes

- **entry** - an entry in a binding directory.

4.2.2 Class ConceptDomainBindingDirectoryEntry

A synopsis of a **ConceptDomainBinding** along with information about how to access the complete resource.

Superclasses

- Every instance of **ConceptDomainBindingDirectoryEntry** is also an instance of *DirectoryEntry*.

Attributes

- **bindingFor** - the `ConceptDomain` being bound to a value set.
- **boundValueSet** - the Value Set being bound.
- **bindingQualifier** - additional information that qualifies the intent or purpose of the binding.
- **applicableContext** - the context or realm in which the binding applies.

4.2.3 Class `ConceptDomainBindingList`

A collection of complete `ConceptDomainBinding` resources that meet a specified criteria.

Superclasses

- Every instance of `ConceptDomainBindingList` is also an instance of `Directory`.

Attributes

- **entry** - an entry in a binding list.

4.2.4 Class `ConceptDomainBindingListEntry`

A directory of a set of concept domain bindings.

Superclasses

- Every instance of `ConceptDomainBindingListEntry` is also an instance of `DirectoryEntry`.
- Every instance of `ConceptDomainBindingListEntry` is also an instance of `ConceptDomainBinding`.

5 Concept Domain Binding Services

5.1 Concept Domain Binding Read Services

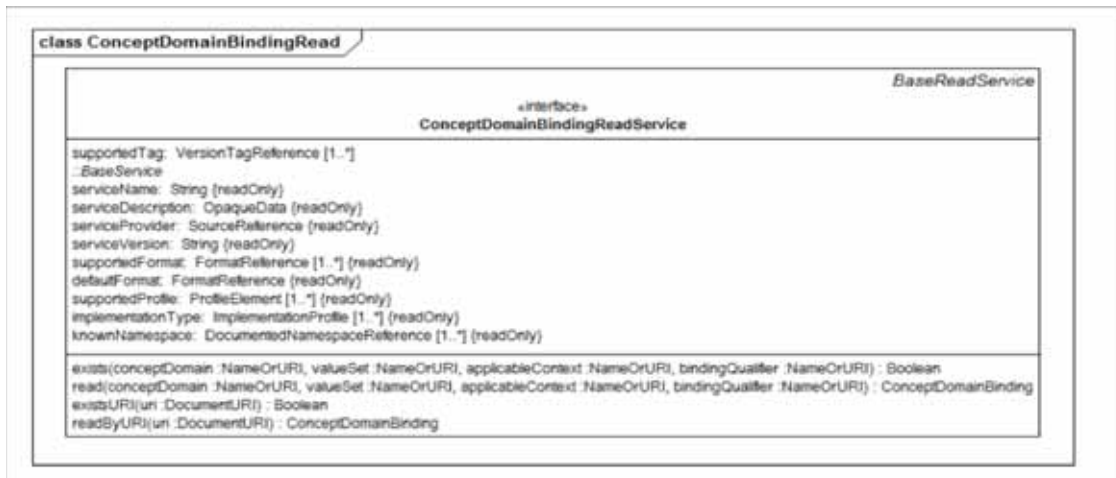


Figure 5.1 - Concept Domain Binding Read

5.1.1 Interface ConceptDomainBindingReadService

A service that provides direct read access to bindings that are asserted between concept domains and value sets.

Superclasses

- Every instance of `ConceptDomainBindingReadService` is also an instance of `BaseReadService`.

Attributes

- **supportedTag** - the set of version tags known to the service. All services must recognize the tag, `CURRENT`, the interpretation of which is service specific.

5.1.1.1 Operation: exists

Determine whether a concept domain binding exists for the specified domain, value set, realm, and context. Note that only the `conceptDomain` name and/or `valueSet` names must be validated. A service implementation may choose whether to validate the URIs or simply assume that, if not found in the service, they reference external elements.

Input Parameters

- **conceptDomain** - the name or URI of the bound concept domain. (Type: `NameOrURI`)
- **valueSet** - the name or URI of the bound value set. (Type: `NameOrURI`)
- **applicableContext**_{OPT} - the name or URI of a realm or context. If not supplied, only bindings with no context will be returned. (Type: `NameOrURI`)

- **bindingQualifier_{OPT}** - the name or URI of a binding qualifier. If not supplied, only bindings without qualifiers will be returned. (Type: NameOrURI)

Return Type: Boolean

Exceptions

- **UnknownConceptDomain** - The named conceptDomain is not recognized by the service.
- **UnsupportedContext** - One or more changeSetContext is not supported by the service.
- **UnsupportedBindingQualifier** - The bindingQualifier is not recognized by the system.
- **UnknownValueSet** - The value set name or URI is not recognized by the service.

5.1.1.2 Operation: read

Return the concept binding for the specified domain, value set, realm, and context. Note that only the conceptDomain name and/or valueSet names must be validated. A service implementation may choose whether to validate the URIs or simply assume that, if not found in the service, they reference external elements.

Input Parameters

- **conceptDomain** - the name or URI of the bound concept domain (Type: NameOrURI).
- **valueSet** - the name or URI of the bound value set (Type: NameOrURI).
- **applicableContext_{OPT}** - the name or URI of a realm or context. If not supplied, only bindings with no context will be returned (Type: NameOrURI).
- **bindingQualifier_{OPT}** - the name or URI of a binding qualifier. If not supplied, only bindings without qualifiers will be returned (Type: NameOrURI).
- **queryControl_{OPT}** - parameters that control the ordering, timeout, and query behavior (Type: QueryControl).

Return Type: ConceptDomainBinding

Exceptions

- **UnknownConceptDomainBinding** - The conceptDomainBinding URI is not recognized by the service.
- **UnknownConceptDomain** - The named conceptDomain is not recognized by the service.
- **UnsupportedContext** - One or more changeSetContext is not supported by the service.
- **UnsupportedBindingQualifier** - The bindingQualifier is not recognized by the system.
- **UnknownValueSet** - The value set name or URI is not recognized by the service.
- **UnsupportedMatchAlgorithm** - The matchAlgorithm is not supported by the service.
- **UnsupportedPredicate** - The predicate name or URI is not recognized by the service.
- **UnsupportedNamespaceName** - The supplied namespace name is not one that is known to the service.
- **UnsupportedModelAttribute** - The name or URI of a CTS2 model attribute is not recognized and/or supported by the service implementation.

- **MatchValueFormatException** - The match value does not meet the format or syntax required or the supplied match algorithm.
- **UnsupportedFormat** - The format is not supported by the service implementation.
- **QueryTimeout** - The timeLimit was exceeded by the service.

5.1.1.3 Operation: existsURI

Determine whether a concept domain binding with the supplied DocumentURI exists.

Input Parameters

- **uri** - the concept domain binding documentURI or an alternativeID (Type: DocumentURI).
- **context_{OPT}** - parameters that control the language, date and other contextual variables (Type: ReadContext)

Return Type: Boolean

Exceptions

- **UnsupportedNameOrURI** - The supplied NameOrURI is not recognized by the service.
- **UnsupportedLanguage** - The referenceLanguage is not supported by the service.
- **UnknownChangeSet** - The change set specified could either not be read or located by the service.
- **ChangeSetIsNotOpen** - The changeSetContext is recognized by the service, but its state is not OPEN.
- **UnsupportedContext** - One or more changeSetContext is not supported by the service.

5.1.1.4 Operation: readByURI

Return the concept domain binding with the supplied DocumentURI.

Input Parameters

- **uri** - the concept domain binding documentURI or an alternativeID (Type: DocumentURI).
- **queryControl_{OPT}** - parameters that control the ordering, timeout, and query behavior (Type: QueryControl).
- **context_{OPT}** - parameters that control the language, date, and other contextual variables (Type: ReadContext)

Return Type: ConceptDomainBinding

Exceptions

- **UnknownConceptDomainBinding** - The conceptDomainBinding URI is not recognized by the service.
- **UnsupportedMatchAlgorithm** - The matchAlgorithm is not supported by the service.
- **UnsupportedPredicate** - The predicate name or URI is not recognized by the service.
- **UnsupportedNamespaceName** - The supplied namespace name is not one that is known to the service.
- **UnsupportedModelAttribute** - The name or URI of a CTS2 model attribute is not recognized and/or supported by the service implementation.

- **UnknownConceptDomainBinding** - The conceptDomainBinding URI is not recognized by the service.
- **MatchValueFormatException** - The match value does not meet the format or syntax required or the supplied match algorithm.
- **UnsupportedFormat** - The format is not supported by the service implementation.
- **QueryTimeout** - The timeLimit was exceeded by the service.

5.2 Concept Domain Binding Query Services

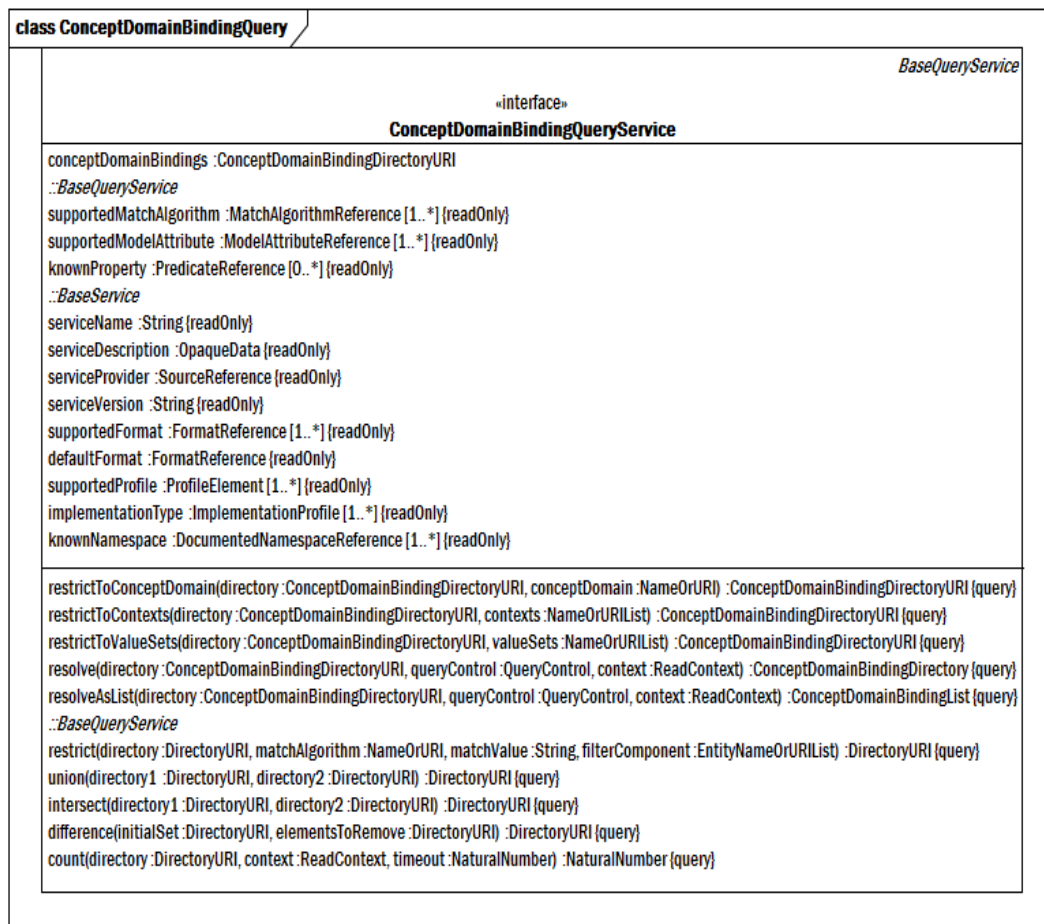


Figure 5.2 - Concept Domain Binding Query

The ConceptDomainBindingQueryService allows the query and filtering of the set of concept domain bindings known to the CTS2 service.

5.2.1 Interface ConceptDomainBindingQueryService

A service that allows the enumeration, query and filtering of the concept domain bindings known to the system.

Superclasses

- Every instance of `ConceptDomainBindingQueryService` is also an instance of `BaseQueryService`.

Attributes

- **conceptDomainBindings** - a `DirectoryURI` that resolves to the set of all concept domain bindings known to the service.

5.2.1.1 Operation: restrictToConceptDomain

Restrict the set of bindings referenced by directory to those that are bound to the supplied `conceptDomain`.

Input Parameters

- **directory** - a `DirectoryURI` that resolves to a set of concept domain bindings (Type: `ConceptDomainBindingDirectoryURI`).
- **conceptDomain** - the local identifier or URI of a specific concept domain (Type: `NameOrURI`).

Return Type: `ConceptDomainBindingDirectoryURI`

Exceptions

- **UnknownConceptDomain** - The named `conceptDomain` is not recognized by the service.
- **InvalidDirectoryURI** - The supplied directory URI is not valid.
- **InvalidDirectoryType** - The type represented by the supplied directory URI is not the one required by the service invocation.

5.2.1.2 Operation: restrictToContexts

Return a directory URI that references all of the concept domain bindings in directory that apply in one or more of the supplied contexts.

Input Parameters

- **directory** - a `DirectoryURI` that resolves to a set of concept domain bindings (Type: `ConceptDomainBindingDirectoryURI`).
- **contexts** - the name(s) or URI(s) of a set of realms or contexts (Type: `NameOrURIList`).

Return Type: `ConceptDomainBindingDirectoryURI`

Exceptions

- **UnsupportedContext** - One or more `changeSetContext` is not supported by the service.
- **InvalidDirectoryURI** - The supplied directory URI is not valid.
- **InvalidDirectoryType** - The type represented by the supplied directory URI is not the one required by the service invocation.

5.2.1.3 Operation: restrictToValueSets

Return a directory URI that references all of the concept domain bindings in directory that bind to the supplied value set(s).

Input Parameters

- **directory** - a `DirectoryURI` that resolves to a set of concept domain bindings (Type: `ConceptDomainBindingDirectoryURI`).
- **valueSets** - a list of local identifiers or URIs that name one or more value sets. (Type: `NameOrURI List`).

Return Type: `ConceptDomainBindingDirectoryURI`

Exceptions

- **UnknownValueSet** - The value set name or URI is not recognized by the service.
- **InvalidDirectoryURI** - The supplied directory URI is not valid.
- **InvalidDirectoryType** - The type represented by the supplied directory URI is not the one required by the service invocation.

5.2.1.4 Operation: resolve

Return a directory that summarizes the set of bindings referenced by the directory URI.

Input Parameters

- **directory** - a `DirectoryURI` that resolves to a set of concept domain bindings (Type: `ConceptDomainBindingDirectoryURI`).
- **queryControl**_{OPT} - parameters that control the ordering, timeout, and query behavior (Type: `QueryControl`).
- **context**_{OPT} - parameters that control the language, date, and other contextual variables (Type: `ReadContext`).

Return Type: `ConceptDomainBindingDirectory`

Exceptions

- **InvalidDirectoryURI** - The supplied directory URI is not valid.
- **InvalidDirectoryType** - The type represented by the supplied directory URI is not the one required by the service invocation.
- **UnsupportedLanguage** - The `referenceLanguage` is not supported by the service.
- **UnknownChangeSet** - The change set specified could either not be read or located by the service.
- **ChangeSetIsNotOpen** - The `changeSetContext` is recognized by the service, but its state is not OPEN.
- **UnsupportedContext** - One or more `changeSetContext` is not supported by the service.
- **UnsupportedMatchAlgorithm** - The `matchAlgorithm` is not supported by the service.
- **UnsupportedPredicate** - The predicate name or URI is not recognized by the service.

- **UnsupportedNamespaceName** - The supplied namespace name is not one that is known to the service.
- **UnsupportedModelAttribute** - The name or URI of a CTS2 model attribute is not recognized and/or supported by the service implementation.
- **MatchValueFormatException** - The match value does not meet the format or syntax required or the supplied match algorithm.
- **UnsupportedFormat** - The `format` is not supported by the service implementation.
- **QueryTimeout** - The `timeLimit` was exceeded by the service.

5.2.1.5 Operation: `resolveAsList`

Return the set of bindings referenced by the directory URI.

Input Parameters

- **directory** - a `DirectoryURI` that resolves to a set of concept domain bindings (Type: `ConceptDomainBindingDirectoryURI`).
- **queryControl**_{OPT} - parameters that control the ordering, timeout, and query behavior (Type: `QueryControl`).
- **context**_{OPT} - parameters that control the language, date, and other contextual variables (Type: `ReadContext`).

Return Type: `ConceptDomainBindingList`

Exceptions

- **InvalidDirectoryURI** - The supplied directory URI is not valid.
- **InvalidDirectoryType** - The type represented by the supplied directory URI is not the one required by the service invocation.
- **UnsupportedLanguage** - The `referenceLanguage` is not supported by the service.
- **UnknownChangeSet** - The change set specified could either not be read or located by the service.
- **ChangeSetIsNotOpen** - The `changeSetContext` is recognized by the service, but its state is not `OPEN`.
- **UnsupportedContext** - One or more `changeSetContext` is not supported by the service.
- **UnsupportedMatchAlgorithm** - The `matchAlgorithm` is not supported by the service.
- **UnsupportedPredicate** - The predicate name or URI is not recognized by the service.
- **UnsupportedNamespaceName** - The supplied namespace name is not one that is known to the service.
- **UnsupportedModelAttribute** - The name or URI of a CTS2 model attribute is not recognized and/or supported by the service implementation.
- **MatchValueFormatException** - The match value does not meet the format or syntax required or the supplied match algorithm.
- **UnsupportedFormat** - The `format` is not supported by the service implementation.
- **QueryTimeout** - The `timeLimit` was exceeded by the service.

5.3 Concept Domain Binding Maintenance Services



Figure 5.3 - Concept Domain Binding Maintenance

5.3.1 Interface ConceptDomainBindingMaintenanceService

A service that allows the creation, update, and deletion of concept domain bindings Superclasses:

- Every instance of ConceptDomainBindingMaintenanceService is also an instance of BaseMaintenanceService.

5.3.1.1 Operation: createConceptDomainBinding

Create a new concept domain binding.

Input Parameters

- **changeSet** - the URI of an OPEN change set which will contain this change (Type: ChangeSetURI).
- **uri_{OPT}** - the URI for this specific binding. This parameter is optional and may be returned by the service. (Type: DocumentURI)
- **bindingFor** - the local identifier or URI of the concept domain being bound (Type: NameOrURI).
- **boundValueSet** - the local or identifier of the value set being bound (Type: NameOrURI).
- **applicableContext_{OPT}** - the name or URI of the context in which the binding applies. If not supplied, the binding applies whenever a context is not supplied. (Type: NameOrURI)
- **bindingQualifier_{OPT}** - the local name or URI of a binding qualifier (Type: NameOrURI).

Return Type: ConceptDomainBinding

Exceptions

- **UnknownChangeSet** - The change set specified could either not be read or located by the service.
- **ChangeSetIsNotOpen** - The changeSetContext is recognized by the service, but its state is not OPEN.
- **UnknownValueSet** - The value set name or URI is not recognized by the service.
- **UnknownConceptDomain** - The named conceptDomain is not recognized by the service.
- **UnsupportedBindingQualifier** - The bindingQualifier is not recognized by the system.
- **UnsupportedContext** - One or more changeSetContext is not supported by the service.

5.3.1.2 Operation: updateConceptDomainBinding

Change one or more elements in the named concept domain binding and return the result of the change.

Input Parameters

- **changeSet** - the URI of an OPEN change set that will contain this change (Type: ChangeSetURI).
- **conceptDomainBinding** - the URI of the concept domain binding to be updated (Type: DocumentURI).
- **request** - the set of attributes to update (Type: UpdateConceptDomainBindingRequest).

Return Type: ConceptDomainBinding

Exceptions

- **UnknownConceptDomainBinding** - The conceptDomainBinding URI is not recognized by the service.
- **UnknownChangeSet** - The change set specified could either not be read or located by the service.
- **ChangeSetIsNotOpen** - The changeSetContext is recognized by the service, but its state is not OPEN.

- **UnknownValueSetDefinition** - The valueSetDefinition URI isn't recognized by the service.
- **UnknownCodeSystemVersion** - The referenced CodeSystemVersion is not recognized by the service.

5.3.2 Class UpdateConceptDomainBindingRequest

Attributes

- **boundValueSetDefinition** - the specific value set definition to be used in this binding.
- **useCodeSystemVersion** - the local identifiers for or URIs of a set of code system versions to be used in the binding.