Correspondence between ISO 25964 and SKOS/SKOS-XL Models

Contributors

This document was created by:

- ISO TC46/SC9/WG8 working group for the ISO 25964 standard about Thesauri
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Work was completed between 2012-02-20 and 2012-06-23, and during 2013-11.

Objective

This document is intended as a correction and/or update to the Appendix "Correspondences between ISO-2788/5964 and SKOS constructs" of the SKOS Simple Knowledge Organization System Primer. This update is needed because ISO 25964-1:2011 has been published, replacing the earlier ISO standards ISO 2788:1986 and ISO 5964:1985.

The new model correspondence presented in this document lists four columns:

- Column "In ISO 25964" identifies the UML ISO 25964 entity being mapped by name and by role. The UML model is presented and detailed in ISO 25964-1. A copy is included for reference and readability in ISO 25964 Thesaurus UML Model.
- Column "SKOS/SKOS-XL mapping or extension" details how the ISO model corresponds with the SKOS, with the SKOS-XL model and with an occasional mapping. The proposed mapping covers all aspects that can be mapped without ambiguity when comparing the formal semantics of the UML model in ISO 25964 against the formal definition in the SKOS Reference.
- Column "Comment (including mappings/ extensions for ISO class attributes)" gives the semantics of the mapping in a descriptive and human readable language.
- The column "MADS/RDF mapping (italics: for elements already in SKOS(-XL))" includes any comments on the related MADS/RDF mapping. Reference is made to the MADS/RDF Primer.

Change log

Date	Editor	Description
2012-10-21	Johan De Smedt	Originally published at NISO under: http://www.niso.org/schemas/iso25964/correspondencesSKOS/
2013-11-12	Johan De Smedt	1) Updated to have the base URI (http://purl.org/iso25964/skos-thes) specified for the ontology associated with the used namespace alias. 2) Correction to the formulation of chapter "The version History Proposal" to formulate it in terms of dataset instead of graph.. 3) Allow skos-xl:prefLabel for ISO node labels 4) iso-thes:splitAltLabel and inferred skos:altLabel is removed. 5) specialize skos:broader and skos:narrower for BTG/NTG, BTI/NTI and BTP/NTP.

Convention

Existing namespace alias

skos: http://www.w3.org/2004/02/skos/core#

skos-xl: http://www.w3.org/2008/05/skos-xl#

dct: http://purl.org/dc/terms/

dc: http://purl.org/dc/elements/1.1/

New (extension) namespace alias

iso-thes: http://purl.org/iso25964/skos-thes#

Typographic convention in this document

To avoid ambiguity in the mapping comment (last column of the mapping table) the following typography has been used for referenced entities:

Referred entity	Convention	example
ISO 25964 attribute	Bold and underlined	**identifier**
ISO 25964 association	Quoted	"contains"
proposed extension to skos	prefixed with iso-thes: and green background	iso-thes:status

Correspondence between ISO 25964 and SKOS/SKOS-XL and proposal for a SKOS/XL extension capturing the semantics defined by ISO 25964-1

In ISO 25964		SKOS/SKOS-XL mapping or extension	MADS/RDF mapping (italics: for elements already in SKOS(-XL))	Comment (including mappings/ extensions for ISO class attributes)
Feature of data model	**Role in model**			
Thesaurus	Class	skos:ConceptScheme	*madsrdf:MADSScheme*	The mandatory attribute **identifier** may be mapped to the Dublin Core property dc:identifier. A typical representation of a thesaurus should document a (scoped) relationship between an identifier of this thesaurus and the URI of the RDF Concept Scheme URI. For example, <dc:identifier>123 – this identifier has been used to generate the URI http://example.org/123 that is used for this Concept Scheme<dc:identifier> The mandatory attribute **lang** can be mapped to either of the Dublin Core properties dc:language or dct:language. The value space is defined by RFC 4646. For multilingual thesaurus, one **lang** attribute is needed per supported language. Typically these can be mapped to the corresponding Dublin Core dc: (or dct:) properties: – dc:contributor – dc:coverage – dc:creator – dct:created – dct:modified – dc:date – dc:description – dc:format – dc:publisher – dc:relation, dct:relation or a specialization – dc:rights – dc:source – dc:subject – dc:title – dc:type The association "hasVersion" is discussed in VersionHistory.

In ISO 25964		SKOS/SKOS-XL mapping or extension	MADS/RDF mapping (italics: for elements already in SKOS(-XL))	Comment (including mappings/ extensions for ISO class attributes)
Feature of data model	**Role in model**			
ThesaurusConcept	Class	skos:Concept	*madsrdf:Authority*	The mandatory attribute **identifier** may be mapped to the Dublin Core property dc:identifier. Attributes or associations not detailed below typically are mapped to dc: (or dct:) properties: – dct:created – dct:modified Proposed extension: – iso-thes:status (dataproperty - string)
isPartOf (and its inverse: *contains*)	Assoc	skos:inScheme	*madsrdf:isMemberOfMADSScheme*	Applies to any ISO 25964 "isPartOf" relation that targets the Thesaurus. Subjects of the skos:inScheme statements can be ISO 25964's ThesaurusConcept, ConceptGroup, and ThesaurusArray.
		skos:topConceptOf (or its inverse skos:hasTopConcept)	*madsrdf:isTopMemberOfMADSScheme (inverse of madsrdf:hasTopMemberOfMADSScheme)*	This mapping only applies to "isPartOf" of a ThesaurusConcept having its attribute **topConcept** = true.
contains	Assoc	inverse of skos:inScheme	*madsrdf:hasMADSSchemeMember*	Only applies to any ISO 25964 "contains" statements that have a Thesaurus as subject.
notation	Attr	skos:notation	*madsrdf:code*	Best practice in SKOS is to (RDF) type the notation value object. This allows multiple notation value types for the same concept or term to be distinguished. In ISO 25964, such typing is implicit in the thesaurus or it is part of the "notation" value.
hasTopConcept	Assoc	This attribute is not mapped to SKOS or SKOS-XL.		Shall be derived in SKOS from skos:broaderTransitive where the object of skos:broaderTransitive is a concept having the property skos:topConceptOf (i.e., a ThesaurusConcept having **topConcept** = true).
isTopConceptOf	Assoc	This attribute is not mapped to SKOS or SKOS-XL.		Shall be derived in SKOS from skos:narrowerTransitive where the skos:narrowerTransitive has as subject a concept that is object of a skos:hasTopConcept statement (i.e., a ThesaurusConcept having **topConcept** = true).
ThesaurusTerm	Class	skos-xl:Label	*possible sub-class: mads:Variant*	A ThesaurusTerm has mandatory attributes **lexicalValue** and **identifier**. **lexicalValue** can be mapped to skos-xl:literalForm. The value of identifier can be used as the URI of the skos-xl:Label or as the object of a dc:identifier statement on that skos-xl:Label. The optional ISO25964 **lang** attribute of ThesaurusTerm must be mapped to RDF language tag for RDF plain literals. Proposed extension: – iso-thes:status (dataproperty - string) Attributes or associations not detailed below typically are mapped to dc: (or dct:) properties: – dct:created – dct:modified – dc:source

In ISO 25964		SKOS/SKOS-XL mapping or extension	MADS/RDF mapping (italics: for elements already in SKOS(-XL))	Comment (including mappings/ extensions for ISO class attributes)
Feature of data model	**Role in model**			
hasPreferredLabel	Assoc	skos:prefLabel (as mapping of hasPreferredLabel/lexicalValue; cf. comment) OR skos-xl:prefLabel (with instance of PreferredTerm, see below)	*madsrdf:authoritativeLabel*	Basic SKOS allows labels (as simple literals) to be attached directly to Concepts using skos:prefLabel; this is the preferred simple scenario where label relations are not explicit. When a label is represented as skos-xl:Label, a skos:prefLabel statement is derived from the skos-xl:prefLabel one. (Likewise for altLabel and hiddenLabel.)
PreferredTerm	Class	Missing in SKOS. iso-thes:PreferredTerm a sub-class of skos-xl:Label		Instances of iso-thes:PreferredTerm are objects of skos-xl:prefLabel statements. Making the class explicit allows RDF/OWL consistency checks for CompoundEquivalence (detailed below).
hasNonPreferredLabel	Assoc	skos:altLabel (as mapping of hasNonPreferredLabel/lexicalValue; cf. comment) OR skos-xl:altLabel	*madsrdf:hasVariant*	Applies if the value of "hasNonPreferredLabel" is of class SimpleNonPreferredTerm with the Boolean attribute "hidden" either absent or with value false. See hasPreferredLabel for SKOS labels vs. SKOS-XL ones.
		skos:hiddenLabel (as mapping of hasNonPreferredLabel/lexicalValue; cf. comment) OR skos-xl:hiddenLabel	*madsrdf:hasHiddenVariant*	Applies if the value of "hasNonPreferredLabel" is of class SimpleNonPreferredTerm with the Boolean attribute "hidden" having value true. See hasPreferredLabel for SKOS labels vs. SKOS-XL ones.
SimpleNonPreferredTerm	Class	Missing in SKOS. iso-thes:SimpleNonPreferredTerm a sub-class of skos-xl:Label disjoint with iso-thes:PreferredTerm	possible super-class: mads:Variant	Instances of iso:SimpleNonPreferredTerm are object of either of skos-xl:altLabel or skos-xl:hiddenLabel statements.
SplitNonPreferredTerm	Class	Not represented in SKOS or SKOS-XL. iso-thes:SplitNonPreferredTerm a sub-class of skos-xl:Label disjoint with iso-thes:PreferredTerm and disjoint with iso-thes:SimpleNonPreferredTerm. The term represents some 'virtual' concept, distinct from the 'real' ThesaurusConcept in the thesaurus (Concept-Scheme). This label is provided by the object property iso-thes:plusUseTerm - domain: iso-thes:CompoundEquivalence - range: iso-thes:SplitNonPreferredTerm	possible super-class: mads:Variant	Making the class explicit allows RDF/OWL consistency checks for CompoundEquivalence (detailed below).

In ISO 25964		SKOS/SKOS-XL mapping or extension	MADS/RDF mapping (italics: for elements already in SKOS(-XL))	Comment (including mappings/ extensions for ISO class attributes)
Feature of data model	**Role in model**			
Relationships (between terms)				
Equivalence	Class	Not represented in SKOS or SKOS-XL.		In SKOS/-XL, Equivalence may be derived between the skos/skos-xl:prefLabel statements on one hand and the skos/skos-xl:altLabel or the skos/skos-xl:hiddenLabel statements on the other hand where: – the subject of all these statements is the same instance of skos:Concept, – the language of all the bound labels is the same, – the prefLabel has the role USE, and – the altLabel and hiddenLabel have the role UF.
CompoundEquivalence	Class	Not represented in SKOS or SKOS-XL. class iso-thes:CompoundEquivalence with object properties: – iso-thes:plusUF - exactly 1 with range iso-thes:SplitNonPreferredTerm – iso-thes:plusUse - minimum 2 with range iso-thes:PreferredTerm iso-thes:plusUseTerm sub-property of skos-xl:labelRelation – domain: iso-thes:SplitNonPreferredTerm – range: iso-thes:PreferredTerm iso-thes:plusUFTerm sub-property of skos-xl:labelRelation and inverse of iso-thes:plusUseTerm		iso-thes:plusUseTerm (and its inverse iso-thes:plusUFTerm) may be derived from iso-thes:CompoundEquivalence. For a iso-thes:CompoundEquivalence instance each derived iso-thes:plusUseTerm has as: – subject: the iso-thes:plusUF value – object: the iso-thes:plusUse value In special cases where the iso-thes:SplitNonPreferredTerm has more than one decomposition, the inverse inference may not be possible.
ThesaurusArray		iso-thes:ThesaurusArray a subclass of skos:Collection. Instances of ThesaurusArray should be instances of skos:OrderedCollection (a subclass of skos:Collection) if the value of the its Boolean attribute "ordered" is true.		The mapping is not bidirectional because not every skos:Collection is an array (see ConceptGroup). This is resolved with the extension iso-thes:ThesaurusArray. The mandatory attribute identifier can be mapped to the Dublin Core property **dc:identifier**. It is advised to use the skos:inScheme property on such a skos:Collection to relate it to its Thesaurus (see isPartOf).
NodeLabel	Class	Not required for the mapping.		See also hasNodeLabel.
hasNodeLabel	Assoc	Not represented in SKOS or SKOS-XL.		Use rdfs:label or skos-xl:prefLabel / skos-xl:literalForm to represent the information directly at the level of the ThesaurusArray. Other optional attributes or associations not detailed below typically are mapped to dc: (or dct:) properties: – dct:created – dct:modified These can be attached (if needed) to the skos-xl:Label object given by the skos-xl:prefLabel.

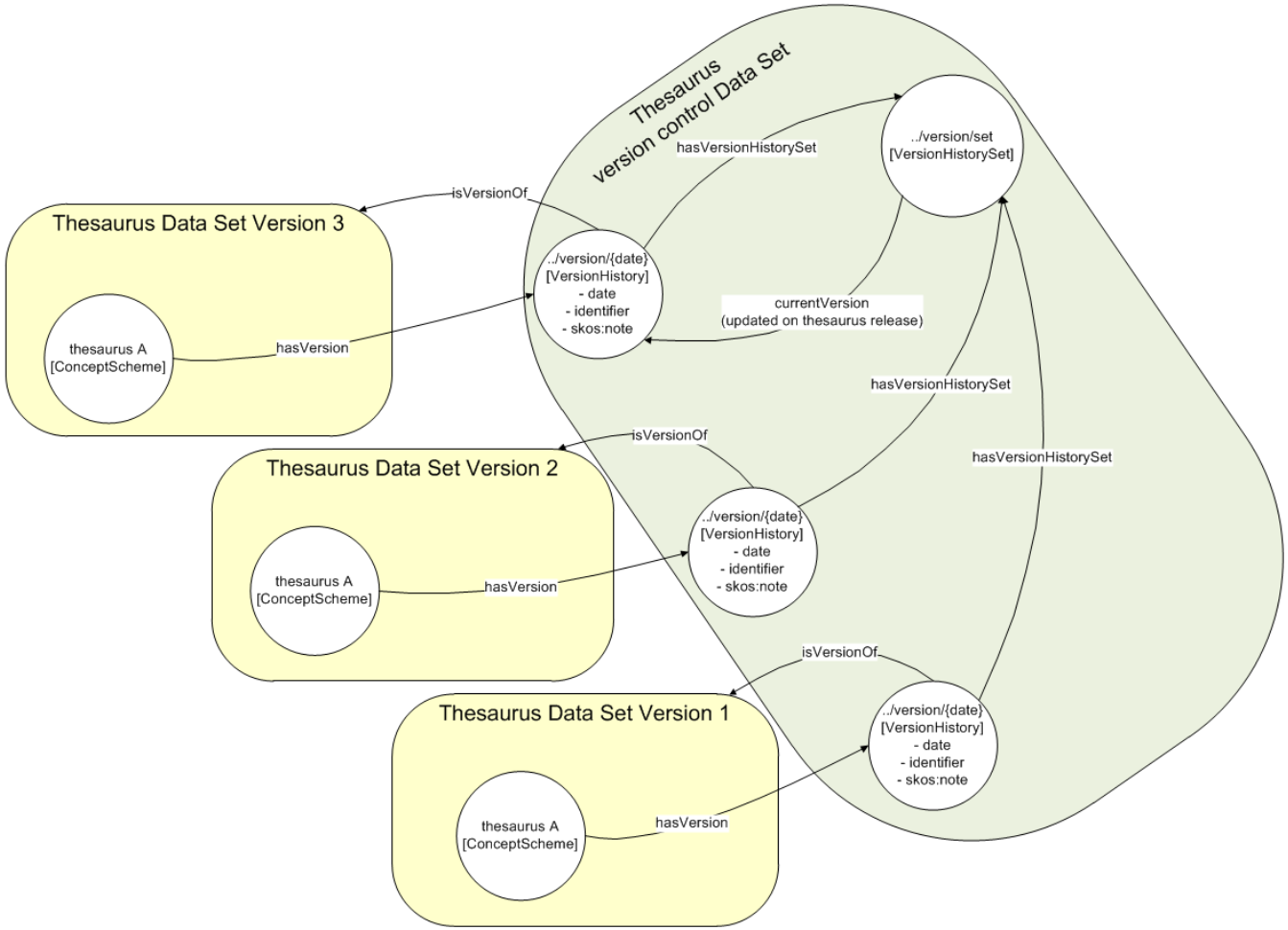
In ISO 25964		SKOS/SKOS-XL mapping or extension	MADS/RDF mapping (italics: for elements already in SKOS(-XL))	Comment (including mappings/ extensions for ISO class attributes)
Feature of data model	**Role in model**			
hasMemberArray<ordered>	Assoc	skos:member skos:memberList		If the Array is mapped to a (non-ordered) skos:Collection, the mapping of hasMemberArray to skos:member does not preserve the order.
hasMemberConcept<ordered>	Assoc			
hasSubordinateArray	Assoc	iso-thes:subordinateArray		Not in scope of SKOS or SKOS-XL. Explicitly links a concept to one or more subordinate arrays. Each array may either be composed of narrower concepts (using a characteristic division) or by concepts that need not be narrower terms (facet organization).
hasSuperOrdinateConcept	Assoc	iso-thes:superOrdinate		Inverse of iso-thes:subordinateArray.
ConceptGroup	Class	iso-thes:ConceptGroup a sub-class skos:Collection **Note**: Concept groups typically are constructed based on properties of the concepts. A complete overview is not in the scope of this mapping. In practice, a second thesaurus or classification system is sometimes used to tag the concepts of the thesaurus.	**madsrdf:MADSCollection** (a sub-class of skos:Collection)	The mapping could be confused with the mapping of ThesaurusArray. This is resolved with the extension iso-thes:ConceptGroup. It is advised to use the skos:inScheme property on such a skos:Collection to relate it to its Thesaurus (see isPartOf). Concept groups published as sub-thesauri (e.g., having conceptGroupType micro-thesaurus) use a sub-property of skos:inScheme, iso-thes:microThesaurusOf, with: – domain: iso-thes:ConceptGroup – range: skos:ConceptScheme Note that in this case the ConceptGroup is mapped to a skos:Collection and to a skos:ConceptScheme that have different URIs respectively. Depending on the value of **conceptGroupType** a sub-class of iso-thes:ConceptGroup should be defined.
ConceptGroupLabel	Class	Not required for the mapping.		See also hasConceptGroupLabel.
hasConceptGroupLabel	Assoc	Not represented in SKOS or SKOS-XL.		Use rdfs:label or skos-xl:prefLabel / skos-xl:literalForm. Other optional attributes or associations not detailed below typically are mapped to dc: (or dct:) properties: – dct:created – dct:modified These can be attached (if needed) to the skos-xl:Label value provided by the skos-xl:prefLabel.
hasSupergroup	Assoc	Not represented in SKOS or SKOS-XL. iso-thes:superGroup with domain and range = iso-thes:ConceptGroup.	sub-property of madsrdf:isMemberOfMADSCollection (which can be used between two MADSCollections)	
hasSubgroup	Assoc	Not represented in SKOS or SKOS-XL. iso-thes:subGroup with domain and range = iso-thes:ConceptGroup.	sub-property of madsrdf:hasMADSCollectionMember (which can be used between two MADSCollections)	
hasAsMember	Assoc	skos:member	sub-property of madsrdf:hasMADSCollectionMember (which can be used between a MADSCollection and an Authority)	

In ISO 25964		SKOS/SKOS-XL mapping or extension	MADS/RDF mapping (italics: for elements already in SKOS(-XL))	Comment (including mappings/ extensions for ISO class attributes)
Feature of data model	**Role in model**			
Note	Class	skos:note	*madsrdf:note*	In ISO 25964, some types of Note are associated with concepts, others with terms. In SKOS, all documentation notes are associated with concepts. In basic SKOS, notes are represented using simple annotation properties, which type captures the note type. However the SKOS annotation properties can also be used with structured representation of notes as fully-fledged resources. See http://www.w3.org/TR/skos-primer/#secdocumentation and http://www.w3.org/TR/skos-primer/#secadvanceddocumentation for examples of both approaches. Within a thesaurus the application of notes to concept and term is more restrictive than in SKOS. A note may be a structure. In general, this can be modelled using rdf:value (to represent **lexicalValue**) The language should be held in rdf:value. If this is an XMLLiteral, the language shall also be made available using dc:language (or dct:language). Note: Work is ongoing in the RDF group to type the content explicitly as HTML or XML In RDF1.1 (http://dvcs.w3.org/hg/rdf/raw-file/default/rdf-concepts/index.html#section-html). This would allow embedding relevant hyperlinks in notes. Additional attributes can be added to the note structure: – dct:created – dct:modified
ScopeNote hasScopeNote	Class Assoc	skos:scopeNote	*madsrdf:scopeNote*	In ISO 25964, "hasScopeNote" applies to a concept.
HistoryNote hasHistoryNote	Class Assoc	skos:historyNote	*madsrdf:historyNote*	In ISO 25964, "hasHistoryNote" can apply to a term or to a concept.
EditorialNote hasEditorialNote	Class Assoc	skos:editorialNote	*madsrdf:editorialNote*	In ISO 25964, "hasEditorialNote" applies to a term rather than to a concept.
Definition hasDefinition	Class Assoc	skos:definition	*madsrdf:definitionNote*	In ISO 25964, "hasDefinition" applies to a term rather than to a concept.
CustomNote hasCustomNote	Class Assoc	depending noteType a new custom property should be defined as a sub-property of skos:note (consider applicability of: skos:changeNote and skos:example)	*(madsrdf:note)*	In ISO 25964, "hasCustomNote" applies to a concept.
		skos:changeNote	*madsrdf:changeNote, deletionNote*	To provide this type of information following ISO 25964, either "EditorialNote" or "CustomNote" could be used.
		skos:example	*madsrdf:exampleNote*	To provide this type of information following ISO 25964, either "ScopeNote" or "CustomNote" could be used.
refersTo	Assoc	Not defined in SKOS.		May be an embedded and tagged link in the note value (e.g., as done for EuroVoc).

In ISO 25964		SKOS/SKOS-XL mapping or extension	MADS/RDF mapping (italics: for elements already in SKOS(-XL))	Comment (including mappings/ extensions for ISO class attributes)
Feature of data model	**Role in model**			
Relationships (between concepts of the same thesaurus)				
HierarchicalRelationship	Class	skos:broader skos:narrower	*madsrdf:hasBroaderAuthority* *madsrdf:hasNarrowerAuthority*	As an extension to SKOS, sub-properties of skos:broader and skos:narrower may be needed to model the different hierarchical relationships identified by the ISO 25964 attribute "role" The direct (i.e. one step) sub properties of skos:broader and skos:narrwore relating to BTP/NTP, BTI/NTI, BTG/NTG are provided by: iso-thes:broaderPartitive, iso-thes:narrowerPartitive, iso-thes:broaderInstantial, iso-thes:narrowerInstantial, iso-thes:broaderGeneric, iso-thes:narrowerGeneric respectively.
AssociativeRelationship	Class	skos:related	*madsrdf:hasReciprocalAuthority*	As an extension to SKOS, sub-properties of skos:related may be needed to model the different associative relationships identified by the ISO 25964 attribute "role".
TopLevelRelationship	Class			See hasTopConcept and isTopConceptOf.
CustomTermAttribute	Attr	Not represented in SKOS or SKOS-XL.		Best practice would be to define custom RDF data-type properties taking plain literal values. The property name depends on the customAttributeType.
CustomConceptAttribute	Attr	Not represented in SKOS or SKOS-XL.		Best practice would be to define custom RDF data-type properties taking plain literal values. The property name depends on the customAttributeType.

In ISO 25964		SKOS/SKOS-XL mapping or extension	MADS/RDF mapping (italics: for elements already in SKOS(-XL))	Comment (including mappings/ extensions for ISO class attributes)
Feature of data model	**Role in model**			
VersionHistory	Class	Not represented in SKOS or SKOS-XL.		Suggestion to add a new class capturing the version (release or publication of) a Thesaurus publication in a SPARQL end-point, an LOD publication or a dataset publication. See Version History Proposal proposing: – a version history set (iso-thes:VersionHistorySet) with fixed URI for its unique thesaurus version set instance, and – a version history instance (iso-thes:VersionHistory) with a thesaurus version specific URI corresponds the ISO 25964 VersionHistory. The iso-thes:VersionHistorySet has exactly one iso-thes:currentVersion object property to the version set detailing the last published version. The object of this property is the ISO 25964 VersionHistory with **currentVersion** = true. Each VersionHistory identifies its version History set with exactly one iso-thes:hasVersionHistorySet object property. The mandatory attribute **identifier** may be mapped to the Dublin Core property dc:identifier. The **date** attribute is mapped to the Dublin Core property dc:date. The versionNote can be mapped to skos:note. The Version History "isVersionOf" is mapped to the object property iso-thes:isVersionOf. The object of this property references to the Thesaurus publication points (SPARQL end-point, LOD, data-set, …). There can be any number of iso-thes:isVersionOf (depending on the physical publications made of that thesaurus version). The ISO 25964 association **hasVersion** is mapped to the iso-thes:hasVersion object property with, as range, the iso-thes:VersionHistory.

Version History Proposal



Usage:

The proposal outlined in the image above and the following paragraphs just presents some ideas. It is advised to await the RDF working group proposal in this area before making a concrete mapping proposal.

The (semantic) web publishing of a thesaurus provides a dataset containing the thesaurus (concept scheme) and a dataset providing the version management. A typical convention can be:

- Thesaurus 'my-thes' has URI: http://my-publishing-host/my-thes/thesaurus#
- The version history of 'my-thes' is identified by URI: http://my-publishing-host/my-thes/version/set
- The current/last history version of 'my-thes' can vary in time, however it has a fixed dataset URI: http://my-publishing-host/my-thes/version/last. References to any thesaurus URI will be rooted to this dataset.
- Each version history record of 'my-thes' has a specific dataset URI, e.g., version Vx has URI: http://my-publishing-host/my-thes/version/Vx
- Each thesaurus publication always includes the property 'hasVersion' referencing/identifying the version record of the thesaurus.

For the figure above, there would be four datasets. Three datasets each would hold a specific thesaurus version. A fourth dataset holds the version history and identification (a location) details of each Thesaurus Data Set version. It is an RDF equivalent of the ISO 25964 VersionHistory records.

ISO 25964 Thesaurus UML Model