bibliotek-o Content/Carrier/Media Type Pattern

NOTE: the following represents the direction taken by the LD4L Labs and LD4P Ontology Group in the development of bibliotek-o and may not be fully formed. This pattern document was used internally to define a direction and is shared with the intention of contextualizing a pattern found within the ontology; terms specified below may not fully align to the ontology as published. Further, discussion of BIBFRAME 2.0 may be out-of-date.

2016 December

Overview

- To categorize Content Types, assert applicable rdf:types on bf:Work instances with rdfs:subClasses of bf:Work (to be created) directly, rather than using the bf:content/bf:Content pattern.
    - If existing SKOS vocabularies are employed to designate types of bf:Works, we recommend using cidoc-crm:P2 to link the SKOS Concept to the Work. (Note: To support a single query path within our implementation, we will only be using Classes with rdf:type.)
- To categorize Carrier Types, assert applicable rdf:types on bf:Instance instances (possibly rdfs:subClasses of bf:Instance, to be created) directly, rather than using the bf:carrier/bf:Carrier pattern.
    - If existing SKOS vocabularies are employed to designate types of bf:Instances, we recommend using cidoc-crm:P2 to link the SKOS Concept to the Instance. (Note: To support a single query path within our implementation, we will only be using Classes with rdf:type.)
- To not capture Media Types separate from Carriers, but rather understand the Media through the definition of Carriers, e.g. StereographCards and StereographDiscs by definition require a Stereographic. The recommendation is to not use the bf:media/bf:Media pattern, but instead consider stating the required media directly in the Instance/Carrier type definition.
    - Note: This decision should be revisited if an Instance/Carrier type is identified that may require more than one media type depending on the circumstance.

Comments on implementation:

- OWL classes will be coined or reused based loosely on a combination of Library of Congress's Content Types (http://id.loc.gov/vocabulary/contentTypes) and RDA's Content Types (http://www.rdaregistry.info/termList/RDAContentType/)
    - These will be defined as rdfs:subClassOf bf:Work; or serve as types on bf:Work instances (without being defined as subclasses).

    - It is recommended that if new classes are created, terms should be designed for post-coordinated use, e.g do not create bf:TactileThreeDimensionalForm, instead assert a resource is of both types bib:Tactile and bf:Object.
    - Note: Currently http://id.loc.gov/vocabulary/contentTypes are defined as Owl Classes, MADS/RDF Authority, SKOS Concepts, and BF Categories. LD4L would like to avoid punning and crossing of SKOS and OWL streams[1] if possible.
- OWL classes will be coined or reused based loosely on a combination of Library of Congress's Carrier Types (http://id.loc.gov/vocabulary/carriers) and RDA's Carrier Types (http://www.rdaregistry.info/termList/RDACarrierType/)
    - These will be defined as rdfs:subClassOf bf:Instance; or serve as types on bf:Instance instances (without being defined as subclasses).
        - Consider stating the required media directly in the Instance/Carrier type definition
    - The need to rely on post-coordination is less clear for carriers. We initially thought that terms should not be created that combine content and carrier types, e.g. rather than making a term bf:AudioDisc, a bf:Disc (a potential Instance/Carrier type) should be related to a bf:Audio (a bf:Work). After further consideration, there was an acknowledgement that some carriers are specifically designed for certain content types; something can still be an audio disc without there being an Audio Work recorded on it.
    - Note: Like the LOC Content vocabulary described above, currently http://id.loc.gov/vocabulary/carriers are defined as Owl Classes, MADS/RDF Authority, SKOS Concepts, and BF Categories. Again, LD4L would like to avoid punning and crossing of SKOS and OWL streams if possible.
- Classes from other external ontologies referring to content or carrier types can be related through rdf:type directly on bf:Works, bf:Instances and bf:Items

Approach Moving Forward

- Request Library of Congress remove bf:content/bf:Content, bf:carrier/bf:Carrier, bf:media/bf:Media patterns to simplify the model and align with established patterns for declaring types of resources.
    - Recommend BIBFRAME use rdf:type with classes (defined within the BF namespace or externally) directly on bf:Work, bf:Instances, bf:Items.
    - If LOC plans to use vocabularies modeled as skos:Concept to describe types of bf:Works, bf:Instances, or bf:Items we recommend the reuse of cidoc-crm:P2 rather than bf:content and bf:carrier.

Summary of Recommendation Discussions

[1] Using OWL with SKOS, https://www.w3.org/2006/07/SWD/SKOS/skos-and-owl/master.html

This document focuses on the number of ways BIBFRAME provisions for stating a bf:Work, bf:Instance, or bf:Item is a of a particular type or category. In the W3C RDF Schema there is a built in property rdf:type, defined as “an instance of rdf:Property that is used to state that a resource is an instance of a class.” The phrase “an instance of a class” can be read as “something within a category”. The LD4L Labs / LD4P ontology group has identified at least two options in BIBFRAME 2.0 to more specifically categorize bf:Works, bf:Instances and bf:Items: through subclassing and through bf:content/bf:Content, bf:carrier/bf:Carrier, bf:media/bf:Media patterns.

Library cataloging practices, especially with the implementation of the RDA, has had a strong focus on capturing content, carrier, and media information about library resources. Library of Congress, having committed to producing bibliographic data according to RDA content standards, is understandably concerned with how BIBFRAME will provision for capturing this information. RDA is a content standard (independent of how it is serialized). There is nothing prescriptive in RDA explaining how to implement the content standard in MARC; similarly, we are left to decide how to implement it in BIBFRAME.

The BIBFRAME 2.0 model as it stands, encourages one to extend the model to describe more specific types through both subclassing for bf:Works, bf:Instances and bf:Items, and through the use of bf:content/bf:Content, bf:carrier/bf:Carrier, bf:media/bf:Media patterns. There are the built in bf:Work and bf:Instance subclasses, but clearly they are not sufficient to describe with specificity Work and Instance types. The bf:content/bf:Content, bf:carrier/bf:Carrier, bf:media/bf:Media patterns are flexible (and do not require deep subclassing within the BIBFRAME model), but they diverge from using the commonly understood linked data practice of using the rdf:type property to say some individual thing is of a certain type. By providing multiple patterns for asserting something is a particular type of thing, the model also requires implementers to use more complex queries than is necessary find all things of a given type.

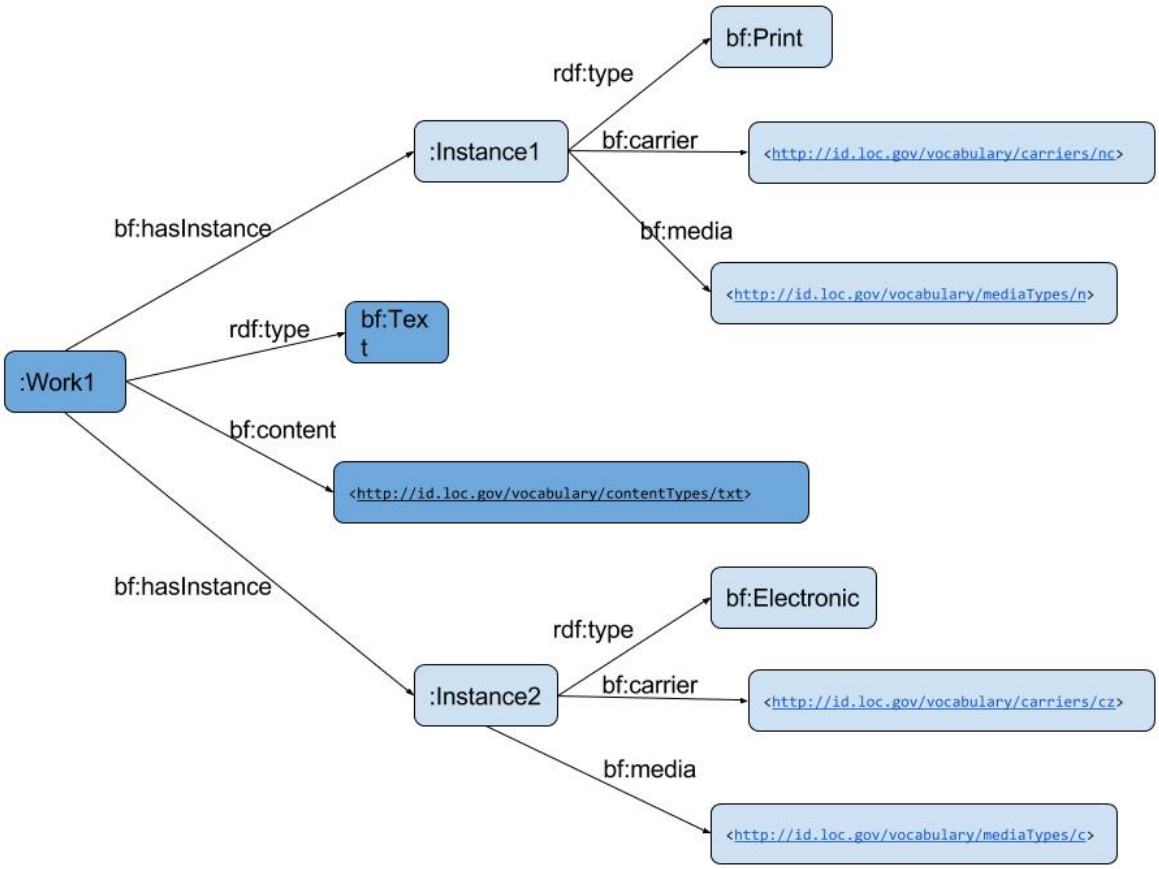
The LD4L Labs / LD4P preferred method for extending types for bf:Work, bf:Instances, bf:Items is through the use of classes/subclasses defined within the BIBFRAME namespace and/or external ontologies (including the LD4L namespace). We recommend the removal of the bf:content/bf:Content, bf:carrier/bf:Carrier, bf:media/bf:Media patterns, and use rdf:type directly on bf:Work, bf:Instance, and bf:Items entities. Capturing types corresponding to content and carrier directly on Works, Instances and Items through the use of rdf:type could still be interpreted as an RDA implementation pattern because it still captures content/carrier/media information about library resources.

Libraries, museums, and archives have traditionally created SKOS Vocabularies (rather than Class hierarchies) to mint terms related to categories of Content, Carrier, and Media types. Existing skos:Concepts of potential interest for extending in this manner include MARC Content Types, Carrier Types, Media Types, the Getty AAT, and RDA Content/Carrier Types. That said, LD4L would like support a single query path for types (through rdf:type and Classes) and avoid the use of punning and crossing of SKOS and OWL streams. Classes will be defined or reused

based on existing SKOS vocabularies; consideration of a strategy to sustainably link between analogous Classes and skos:Concepts has been identified as future work.

BF2 Approach to Content/Carrier/Media Type

Illustration



Involved Classes

bf:Carrier

Label: Carrier type
URI: http://id.loc.gov/ontologies/bibframe/Carrier
Subclass of: rdfs:Resource
Definition: "Categorization reflecting the format of the storage medium and housing of a carrier."
Dcterms:modified: "2016-04-21 (New)" .

bf:Content

Label: Content type
URI: http://id.loc.gov/ontologies/bibframe/Content
Subclass of: rdfs:Resource
Definition: "Categorization reflecting the fundamental form of communication in which the content is expressed and the human sense through which it is intended to be perceived."
Dcterms:modified: "2016-04-21 (New)" .

bf:Media

Label: Media type
URI: http://id.loc.gov/ontologies/bibframe/Media
Subclass of: rdfs:Resource
Definition: "Categorization reflecting the general type of intermediation device required to view, play, run, etc., the content of a resource."
Dcterms:modified: "2016-04-21 (New)" .

Involved Properties

bf:carrierType (object property)

Label: Carrier type
URI: http://id.loc.gov/ontologies/bibframe/carrier
Definition: "Categorization reflecting the format of the storage medium and housing of a carrier."
Domain: http://id.loc.gov/ontologies/bibframe/Instance
Range: http://id.loc.gov/ontologies/bibframe/Carrier
Dcterms:modified: "2016-04-21 (New)".

bf:contentType (object property)

Label: Content type
URI: http://id.loc.gov/ontologies/bibframe/content
Definition: "Categorization reflecting the fundamental form of communication in which the content is expressed and the human sense through which it is intended to be perceived."
Domain: http://id.loc.gov/ontologies/bibframe/Work
Range: http://id.loc.gov/ontologies/bibframe/Content
Dcterms:modified: "2016-04-21 (New)".

bf:mediaType (object property)

Label: Media type
URI: http://id.loc.gov/ontologies/bibframe/media
Definition: "Categorization reflecting the general type of intermediation device required to view, play, run, etc., the content of a resource."
Comment: "Used with Work or Instance"
Range: http://id.loc.gov/ontologies/bibframe/Media

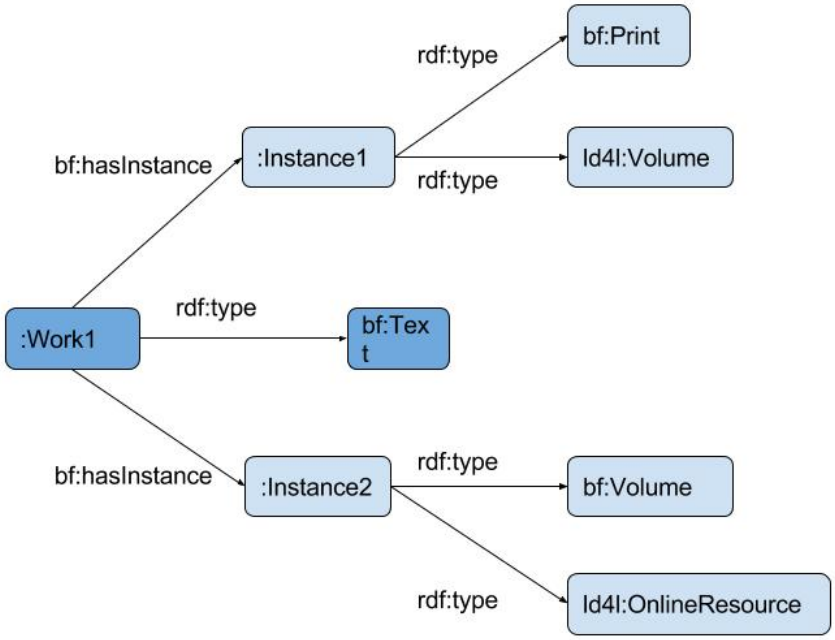
Dcterms:modified: "2016-04-21 (New)".

rdf:type

URI: http://www.w3.org/1999/02/22-rdf-syntax-ns#type
Definition: "rdf:type is an instance of rdf:Property that is used to state that a resource is an instance of a class."
Domain: rdfs:Resource

bibliotek-o Approach to Content/Carrier/Media Types:

Illustration



Note: references to the ld4l namespace in the above illustration should be in the bib namespace

Involved Properties

rdf:type

URI: http://www.w3.org/1999/02/22-rdf-syntax-ns#type
Definition: "rdf:type is an instance of rdf:Property that is used to state that a resource is an instance of a class."
Domain: rdfs:Resource
Range: rdfs:Class

Involved Classes BIBFRAME Work and Instance Subclasses

The proposal of classes below are loosely based on RDA Content and Carrier Types. Proposed class implementations and changes are listed in the “Proposed BIBFRAME Parallel” column; if LOC cannot make these changes in BF (namely, the many new classes proposed), LD4L will reflect these changes in the LD4L namespace and implementation pattern.

Admittedly, many of these carrier classes are not specific enough to be useful to know playback requirements for particular carrier. This hierarchy is a first pass at creating general classes, mainly to meet the use case of when a cataloger has an item in hand, and all they might know is that it has a particular general carrier type and/or that a particular carrier type is design to carry a particular content type. More specific classes (reflecting specific carrier models, e.g. Nintendo 64 Cartridge) should be added to the hierarchy in order to better understand items in our collection.

The entire hierarchy needs to be reviewed and tested; the classes highlighted in red below explicitly needs more discussion within their domain communities.

Content Types

RDA URI	RDA Label (@en)	RDA Definition	Proposed BIBFRAME Parallel
rdaco:1001	"cartographic dataset" @en	"A content type consisting of cartographic content expressed through a digitally encoded dataset intended to be processed by a computer." @en	bf:Cartography (subclass of bf:Work) & bf:Dataset (subclass of bf:Work)
rdaco:1002	"cartographic image" @en	"A content type consisting of cartographic content expressed through line, shape, shading, etc., intended to be perceived visually as a still image or images in two dimensions." @en	bf:Cartography (subclass of bf:Work) & bf:StillImage (subclass of bf:Work)
rdaco:100	"cartographic	"A content type	bf:Cartography (subclass of

3	moving image" @en	consisting of cartographic content expressed through images intended to be perceived as moving, in two dimensions." @en	bf:Work) & bf:MovingImage (subclass of bf:Work)
rdaco:1004	"cartographic tactile image" @en	"A content type consisting of cartographic content expressed through line, shape, and/or other forms, intended to be perceived through touch as a still image in two dimensions." @en	bf:Cartography (subclass of bf:Work) & bib:Tactile (subclass of bf:Work) : Tactile in RDA relates to the Expression level; should BIBFRAME have Tactile then at the Work level instead of the Instance. For works not inherently meant to be perceived through touch, but have instances that use tactile notation, use bf:notation/bf:TactileNotation on the related bf:Instance.
rdaco:1005	"cartographic tactile three-dimensional form" @en	"A content type consisting of cartographic content expressed through a form or forms intended to be perceived through touch as a three-dimensional form or forms." @en	The same as above except adding bf:Object (subclass of bf:Work)
rdaco:1006	"cartographic three-dimensional form" @en	"A content type consisting of cartographic content expressed through a form or forms intended to be perceived visually in three-dimensions." @en	bf:Cartography (subclass of bf:Work) and bf:Object (subclass of bf:Work)
rdaco:1007	"computer dataset" @en	"A content type consisting of content expressed through a digitally encoded dataset intended to be	bf:Dataset (subclass of bf:Work) & bf:Electronic (subclass of bf:Instance)

		processed by a computer." @en	
rdaco:1008	"computer program" @en	"A content type consisting of content expressed through digitally encoded instructions intended to be processed and performed by a computer." @en	bf:Multimedia is not recommended for use for this case Create subclass of bf:Work that is bib:Software, “A compiled executable binary file”. Create subclass of bf:Work, bf:Text that is bib:SourceCode, “A text listing of commands to be compiled or assembled into an executable computer program.”
rdaco:1009	"notated movement" @en	"A content type consisting of content expressed through a form of notation for movement intended to be perceived visually." @en	bib:NotatedMovement (subclass of bf:Work)
rdaco:1010	"notated music" @en	"A content type consisting of content expressed through a form of musical notation intended to be perceived visually." @en	bf:NotatedMusic (subclass of bf:Work)
rdaco:1011	"performed music" @en	"A content type consisting of content expressed through music in an audible form." @en	**Request creation of LD4All (or BIBFRAME2) bf:Work / bf:Audio subclass of bib:PerformedMusic** Audio alone doesn’t suffice to capture that it is a musical performance, and the musicMedium / MusicMedium property and class combination (which has domain bf:Work) doesn’t necessarily allow for inference that the Work is PerformedMusic (since it’s

			semantics + intent are different than declaring a bf:Work type).
rdaco:1012	"sounds" @en	"A content type consisting of content other than language or music, expressed in an audible form." @en	Request bf:Sounds that is a subclass of bf:Audio (which is a subclass of bf:Work).
rdaco:1013	"spoken word" @en	"A content type consisting of content expressed through language in an audible form." @en	Request bf:SpokenWord that is a subclass of bf:Audio (which is a subclass of bf:Work), and bf:Text is applied only when it is specifically a resource originally written down (i.e. an audiobook versus an oral history which was never written down originally).
rdaco:1014	"still image" @en	"A content type consisting of content expressed through line, shape, shading, etc., intended to be perceived visually as a still image or images in two dimensions." @en	bf:StillImage (subclass of bf:Work)
rdaco:1015	"tactile image" @en	"A content type consisting of content expressed through line, shape, and/or other forms, intended to be perceived through touch as a still image in two dimensions." @en	bib:Tactile (subclass of bf:Work* per discussions above) and bf:StillImage (subclass of bf:Work). See above comments on loosening Work/Instance affiliation of Tactile.
rdaco:1016	"tactile notated music" @en	"A content type consisting of content expressed through a form of musical notation intended to be perceived through touch." @en	bf:NotatedMusic (subclass of bf:Work), and bf:notation / bf:TactileNotation on the related bf:Instance.

rdaco:1017	"tactile notated movement" @en	"A content type consisting of content expressed through a form of notation for movement intended to be perceived through touch." @en	bf:NotatedMovement (subclass of bf:Work) and bf:notation / bf:TactileNotation on the related bf:Instance.
rdaco:1018	"tactile text" @en	"A content type consisting of content expressed through a form of notation for language intended to be perceived through touch." @en	bf:Text (subclass of bf:Work) and bf:notation / bf:TactileNotation on the related bf:Instance.
rdaco:1019	"tactile three-dimensional form"@en	"A content type consisting of content expressed through a form or forms intended to be perceived through touch as a three-dimensional form or forms." @en	bib:Tactile (subclass of bf:Work) and bf:Object (subclass of bf:Work).
rdaco:1020	"text" @en	"A content type consisting of content expressed through a form of notation for language intended to be perceived visually." @en	bf:Text (subclass of bf:Work) - RDA definition doesn't say anything about 'Spoken Form' as with BIBFRAME definition; however, this still may align depending on interpretation of spoken form (does it mean the Work is Audio or that language can serve the purpose also of being read aloud?). Perhaps if latter, we can request that LC remove that phrase.
rdaco:1021	"three-dimensional form" @en	"A content type consisting of content expressed through a form or forms intended to be perceived visually in three-dimensions."	bf:Object (subclass of bf:Work, and we requested change of class name - note that the label currently says 'Three Dimensional Object')

		@en	
rdaco:1022	"three-dimensional moving image" @en	"A content type consisting of content expressed through images intended to be perceived to be moving, and in three dimensions." @en	bf:MovingImage (subclass of bf:Work) with bf:Instance bf:projectionChracteristic bib:ThreeDimensionalProjectionCharacteristic. Consider relationship with http://rdaregistry.info/termList/rofid/T1002 Determine if keeping three-dimensional aspect at the bf:Instance level makes sense to the Moving Image experts.
rdaco:1023	"two-dimensional moving image"@en	"A content type consisting of content expressed through images intended to be perceived to be moving, and in two dimensions." @en	bf:MovingImage (subclass of bf:Work) with bf:Instance bf:projectionChracteristic bib:TwoDimensionalProjectionCharacteric. Consider relationship with http://rdaregistry.info/termList/rofid/T1002 Determine if keeping two-dimensional aspect at the bf:Instance level makes sense to the Moving Image experts.

Carrier Types

RDA URI	Label (@en)	RDA Definition	Proposed BIBFRAME Parallel
rdact:1001	"Audio carriers (Deprecated)" @en	@en *	Would not be actually assigned to a resource
rdact:1002	"audio cartridge" @en	"A carrier type consisting of a cartridge containing an audio tape." @en	bf:Audio (subclass of bf:Work) and Create bf:Instance (or ld4all if LC

			not on board) subclass bf:Cartridge with a subclass bf:AudioCartridge
rdact:1003	"audio cylinder" @en	"A carrier type consisting of a roller-shaped object on which sound waves are incised or indented in a continuous circular groove." @en	bf:Audio (subclass of bf:Work) and Create bf:Instance (or ld4all if LC not on board) bf:Cylinder, with a subclass bf:AudioCylinder
rdact:1004	"audio disc" @en	"A carrier type consisting of a disc on which sound waves, recorded as modulations, pulses, etc., are incised or indented in a continuous spiral groove." @en	bf:Audio (subclass of bf:Work) and Create bf:Instance (or ld4all if LC not on board) subclass bf:Disc, with a subclass of bf:AudioDisc
rdact:1005	"sound-track reel" @en	"A carrier type consisting of an open reel holding a length of film on which sound is recorded." @en	Create bf:Instance (or ld4all if LC not on board) subclass bf:Reel, with a subclass of bf:SoundTrackReel
rdact:1006	"audio roll" @en	"A carrier type consisting of a roll of paper on which musical notes are represented by perforations, designed to mechanically reproduce the music when used in a player piano, player organ, etc." @en	bf:Audio (subclass of bf:Work) and Create bf:Instance (or ld4all if LC not on board) subclass Roll, with a subclass bf:AudioRoll
rdact:1007	"audiocassette" @en	"A carrier type consisting of a cassette containing an audiotape." @en	bf:Audio (subclass of bf:Work) and Create bf:Instance (or ld4all if LC not on board) subclass bf:Cassette, with a subclass bf:AudioCassette. bf:AudioCassette is also a subclass of bib:Tape.

rdact:1008	"audiotape reel" @en	"A carrier type consisting of an open reel holding a length of audiotape to be used with reel-to-reel audio equipment." @en	bf:Audio (subclass of bf:Work) and Create bf:Instance (or ld4all if LC not on board) subclass bf:Reel, with a subclass bf:AudioTapeReel. bf:AudioTapeReel is also a subclass of bib:Tape.
rdact:1010	"Computer carriers (Deprecated)" @en	@en *	Top level terms not actually assigned to resources.
rdact:1011	"computer card" @en	"A carrier type consisting of a card containing digitally encoded data designed for use with a computer." @en	Create bf:Instance (or ld4all if LC not on board) subclass bf:Card with a subclass bf:ComputerCard that is also a subclass of bf:Electronic
rdact:1012	"computer chip cartridge"@en	"A carrier type consisting of a cartridge containing a miniaturized electronic circuit on a small wafer of semiconductor silicon, designed to provide additional processing, memory, or storage capacity." @en	Create bf:Instance (or ld4all if LC not on board) subclass bf:Cartridge, with a subclass bf:ComputerChipCartridge that is also a subclass of bf:ComputerChip. bf:ComputerChip proposed as a subclass of bf:Electronic
rdact:1013	"computer disc" @en	"A carrier type consisting of a disc containing digitally encoded data, magnetically or optically recorded." @en	Create bf:Instance (or ld4all if LC not on board) subclass bf:Disc, with a subclass of bf:ComputerDisc that is also a subclass of bf:Electronic
rdact:1014	"computer disc cartridge"@en	"A carrier type consisting of a cartridge containing one or more computer	Create bf:Instance (or ld4all if LC not on board) subclass bf:Cartridge, with

		discs." @en	a subclass bf:ComputerDiscCartridge that is also a subclass of bf:Electronic and bf:ComputerDisc.
rdact:1015	"computer tape cartridge"@en	"A carrier type consisting of a cartridge containing a computer tape." @en	Create bf:Instance (or ld4all if LC not on board) subclass bf:Cartridge, with a subclass bf:ComputerTapeCartridge that is also a subclass of bf:Electronic and bf:Tape
rdact:1016	"computer tape cassette"@en	"A carrier type consisting of a cassette containing a computer tape." @en	Create bf:Instance (or ld4all if LC not on board) subclass bf:Cassette, with a subclass bf:ComputerTapeCassette that is also a subclass of bf:Electronic and bf:Tape.
rdact:1017	"computer tape reel" @en	"A carrier type consisting of an open reel holding a length of computer tape to be used with a computer tape drive." @en	Create bf:Instance (or ld4all if LC not on board) subclass bf:Reel, with a subclass bf:ComputerTapeReel that is also a subclass of bf:Electronic and bf:Tape
rdact:1018	"online resource" @en	"A carrier type consisting of a digital resource accessed by means of hardware and software connections to a communications network." @en	Create bf:OnlineResource (or ld4all if LC not on board), a subclass of bf:Electronic, which is subclass of bf:Instance).
rdact:1020	"Microform carriers (Deprecated)" @en	@en *	Top level terms not actually assigned to resources.

rdact:1021	"aperture card" @en	"A carrier type consisting of a card with one or more rectangular openings or apertures holding frames of microfilm." @en	Create bf:Instance (or ld4all if LC not on board) subclass bf:ApertureCard (seems to vary from bf:Card as requested or as exists in RDA currently)
rdact:1022	"microfiche" @en	"A carrier type consisting of a sheet of film bearing a number of microimages in a two-dimensional array." @en	Create bf:Instance (or ld4all if LC not on board) subclass bf:Microform, and then subclasses of bf:Microform that are bf:Microfilm and bf:Microfiche. This pattern facilitates searching for all microform options.
rdact:1023	"microfiche cassette" @en	"A carrier type consisting of a cassette containing uncut microfiches." @en	Create bf:Instance (or ld4all if LC not on board) subclass bf:Cassette, with a subclass bf:MicroficheCassette. bf:MicroficheCassette is proposed also as a subclass of bf:Microfiche.
rdact:1024	"microfilm cartridge" @en	"A carrier type consisting of a cartridge containing a microfilm." @en	Create bf:Instance (or ld4all if LC not on board) subclass bf:Cartridge, with a subclass bf:MicrofilmCartridge. bib:MicrofilmCartridge is also a subclass of bib:Microfilm. bf:MicroficheCartridge is proposed also as a subclass of bf:Microfiche.
rdact:1025	"microfilm cassette" @en	"A carrier type consisting of a cassette containing a microfilm." @en	Create bf:Instance (or ld4all if LC not on board) subclass bf:Cassette, with a subclass bf:MicrofilmCassette.

			bf:MicrofilmCassette is proposed also as a subclass of bf:Microfilm.
rdact:1026	"microfilm reel" @en	"A carrier type consisting of an open reel holding a microfilm, to be threaded into a microfilm reader." @en	Create bf:Instance (or ld4all if LC not on board) subclass bf:Reel, with a subclass bf:MicrofilmReel. bf:MicrofilmReel is proposed also as a subclass of bf:Microfilm.
rdact:1027	"microfilm slip" @en	"A carrier type consisting of a short strip of microfilm cut from a roll." @en	Create bf:Instance (or ld4all if LC not on board) subclass bf:Microfilm with a subclass bf:MicrofilmSlip
rdact:1028	"microopaque" @en	"A carrier type consisting of a card or sheet of opaque material bearing a number of microimages in a two-dimensional array." @en	Create bf:Instance (or ld4all if LC not on board) subclass bf:Microform with a subclass bf:Microopaque
rdact:1029	"Microscopic carriers (Deprecated)" @en	@en *	Top level terms not actually assigned to resources.
rdact:1030	"microscope slide" @en	"A carrier type consisting of a small sheet of transparent material, with or without a protective mount, bearing a minute object designed for use with a device such as a microscope." @en	Create bf:Instance (or ld4all if LC not on board) subclass bf:Slide, and create a subclass of bf:Slide that is bf:Microscopic (see below in Media types).
rdact:1031	"Projected image carriers (Deprecated)" @en	@en *	Top level terms not actually assigned to resources.

rdact:1032	"film cartridge" @en	"A carrier type consisting of a cartridge containing a motion picture film." @en	Create bf:Instance (or ld4all if LC not on board) subclass bf:Cartridge, with a subclass bf:FilmCartridge. bf:FilmCartridge is proposed also as a subclass of bf:Film.
rdact:1033	"film cassette" @en	"A carrier type consisting of a cassette containing a motion picture film." @en	Create bf:Instance (or ld4all if LC not on board) subclass bf:Cassette, with a subclass bf:FilmCassette. bf:FilmCassette is proposed also as a subclass of bf:Film.
rdact:1034	"film reel" @en	"A carrier type consisting of an open reel holding a motion picture film to be used with a motion picture film projector." @en	Create bf:Instance (or ld4all if LC not on board) subclass bf:Reel, with a subclass bf:FilmReel. bf:FilmReel is proposed also as a subclass of bf:Film.
rdact:1035	"filmslip" @en	"A carrier type consisting of a short strip of film, usually in rigid format rather than rolled." @en	Create bf:Instance (or ld4all if LC not on board) subclass bf:Slip, with a subclass bf:FilmSlip. bf:FilmSlip is proposed also as a subclass of bf:Film.
rdact:1036	"filmstrip" @en	"A carrier type consisting of a roll of film, with or without recorded sound, containing a succession of images intended for projection one at a time." @en	Create bf:Instance (or ld4all if LC not on board) subclass bf:Film, with a subclass bf:Filmstrip.
rdact:1037	"filmstrip cartridge" @en	"A carrier type consisting of a cartridge containing	Create bf:Instance (or ld4all if LC not on board)

		a filmstrip." @en	subclass bf:Cartridge, with a subclass bf:FilmStripCartridge. bf:FilmStripCartridge is proposed also as a subclass of bf:Film.
rdact:1039	"overhead transparency"@en	"A carrier type consisting of a sheet of transparent material, with or without a protective mount, bearing an image designed for use with an overhead projector." @en	Create bf:Instance (or ld4all if LC not on board) subclass bf:OverheadTransparency
rdact:1040	"slide" @en	"A carrier type consisting of a small sheet of transparent material, usually in a protective mount, bearing an image designed for use with a slide projector or viewer." @en	Create bf:Instance (or ld4all if LC not on board) subclass bf:Slide
rdact:1041	"Stereographic carriers (Deprecated)" @en	@en *	Top level terms not actually assigned to resources.
rdact:1042	"stereograph card" @en	"A carrier type consisting of a card bearing stereographic images." @en	Create bf:Stereograph (or ld4all if LC not on board) as subclass of bf:StillImage (which is subclass of bf:Work). Create bf:StereographCard (or ld4all if LC not on board) as subclass of bf:Card at bf:Instance level. Request insight of those who know more about this format.
rdact:1043	"stereograph disc" @en	"A carrier type consisting of a disc with openings	Create bf:Stereograph (or ld4all if LC not on board)

		around the perimeter holding pairs of still images designed for use with a stereograph viewer." @en	as subclass of bf:StillImage (which is subclass of bf:Work). Create bf:StereographDisc (or ld4all if LC not on board) as subclass of bf:Disc at bf:Instance level. Request insight of those who know more about this format.
rdact:1044	"Unmediated carriers (Deprecated)" @en	@en *	Top level terms not actually assigned to resources.
rdact:1045	"card" @en	"A carrier type consisting of a small sheet of opaque material." @en	Create bf:Instance (or ld4all if LC not on board) subclass bf:Card
rdact:1046	"flipchart" @en	"A carrier type consisting of a hinging device holding two or more sheets designed for use on an easel." @en	Create bf:Instance (or ld4all if LC not on board) subclass bf:Flipchart
rdact:1047	"roll" @en	"A carrier type consisting of a wound length of paper, film, tape, etc." @en	Create bf:Instance (or ld4all if LC not on board) subclass bf:Roll
rdact:1048	"sheet" @en	"A carrier type consisting of a flat, thin piece of paper, plastic, etc." @en	Create bf:Instance (or ld4all if LC not on board) subclass bf:Sheet
rdact:1049	"volume" @en	"A carrier type consisting of one or more sheets bound or fastened together to form a single unit." @en	Create bf:Instance (or ld4all if LC not on board) subclass bf:Volume
rdact:1050	"Video carriers (Deprecated)" @en	@en *	Top level terms not actually assigned to resources.

rdact:1051	"video cartridge" @en	"A carrier type consisting of a cartridge containing a video tape." @en	Create bf:Instance (or ld4all if LC not on board) subclass bf:Cartridge, with a subclass bf:VideoCartridge. bfVideoCartridge is proposed also as a subclass of bf:Video and bib:Tape.
rdact:1052	"videocassette" @en	"A carrier type consisting of a cassette containing a video tape." @en	Create bf:Instance (or ld4all if LC not on board) subclass bf:Cassette, with a subclass bf:VideoCassette. bf:VideoCassette is proposed also as a subclass of bf:Video and bib:Tape.
rdact:1053	"videotape reel" @en	"A carrier type consisting of an open reel holding a video tape for use with reel-to-reel video equipment." @en	Create bf:Instance (or ld4all if LC not on board) subclass bf:Reel, with a subclass bf:VideotapeReel. bf:VideotapeReel is proposed also as a subclass of bf:Video and bib:Tape.
rdact:1056	"microfilm roll" @en	"A carrier type consisting of a wound length of microfilm." @en	Create bf:Instance (or ld4all if LC not on board) subclass bf:Microfilm, with a subclass bf:MicrofilmRoll. bf:MicrofilmRoll is proposed also as a subclass of bf:Roll.
rdact:1059	"object" @en	"A carrier type consisting of a three-dimensional artifact, a replica of an artifact, or a naturally-occurring object." @en	n/a - declared at the bf:Work level.
rdact:1060	"videodisc" @en	"A carrier type consisting	Create bf:Instance (or

		of a disc on which video signals, with or without sound, are recorded." @en	ld4all if LC not on board) subclass bf:Disc, with a subclass bf:VideoDisc. bf:VideoDisc is proposed also as a subclass of bib:Video.
rdact:1069	"film roll" @en	"A carrier type consisting of a wound length of film." @en	Create bf:Instance (or ld4all if LC not on board) subclass bf:Film, with a subclass bf:FilmRoll. bf:FilmRoll is proposed also as a subclass of bf:Roll.
rdact:1070	"audio belt" @en	"A carrier type consisting of a loop of flexible plastic or magnetic film on which audio signals are mechanically recorded, commonly known under the trade name Dictabelt." @en	Create bf:Instance (or ld4all if LC not on board) subclass bf:Belt, with a subclass bf:AudioBelt. Brings up question of if 'film' counts for only movingImagecontent, or can be captured audio or image on a film medium.
rdact:1071	"audio wire reel" @en	"A carrier type consisting of a reel or spool of steel or stainless steel wire upon which audio signals are magnetically recorded." @en	Create bf:Instance (or ld4all if LC not on board) subclass bf:Reel, with a subclass bf:AudioWireReel. If more than audio sounds are found to be capture on wire, consider minting bib:Wire and making bib:AudioWireReel a subclass.

Media Types

RDA URI	Label (@en)	RDA Definition	Proposed BIBFRAME Parallel
damt:1001	audio" @en	A media type used to store recorded sound, designed for use with a playback device such as a turntable, audiocassette player, CD player, or MP3 player." @en	Captured at the bf:Work level. Needed players to playback the Item are captured elsewhere in BIBFRAME systemRequirements and bf:Instance subclass definitions)
damt:1002	microform" @en	A media type used to store reduced-size images not readable to the human eye, designed for use with a device such as a microfilm or microfiche reader." @en	Request subclass of bf:Instance (bf:Microform with subclasses bf:Microfilm, bf:Microfiche, and possibly bf:Microopaque)
damt:1003	computer" @en	A media type used to store electronic files, designed for use with a computer." @en	Captured at bf:Instance level through bf:Electronic.
damt:1004	microscopic" @en	A media type used to store minute objects, designed for use with a device such as a microscope to reveal details invisible to the naked eye." @en	Request subclass of bf:Instance that is bf:Microscopic. Different from bf:Microform due to type of materials captured. Update Microscope slide request in carrier types.
damt:1005	projected" @en	A media type used to store moving or still images, designed for use with a projection device such as a motion picture film projector, slide projector, or overhead projector." @en	Request creation of bf:Instance subclass of bf:Projected ; move appropriate Carrier types made into bf:Instance subclasses (see above) that intend use by projection to be subclasses of bf:Projected ; kick to AV folks for review

			nd clarification.
damt:1006	stereographic" @en	A media type used to store airs of still images, designed or use with a device such as a tereoscope or stereograph iewer to give the effect of hree dimensions." @en	Create a subclass of bf:Work f bf:Stereographic ; open to iscussions with AV folks if his should be at bf:Instance evel instead.
damt:1007	unmediated" @en	A media type used to store ontent designed to be erceived directly through one r more of the human senses ithout the aid of an ntermediating device." @en Status: "Deprecated"	Future work: consider equesting bf:Unmediated as ubclass of bf:Instance for he sake of knowing omething doesn't require ne a projector or is not one f the above, relevant types. This field's presence ndicates active review of the esource for declaring no eed of equipment instead of eaving open to interpretation hat the item was just not fully ataloged (i.e. this field not resent and dropped from se). Can we translate the OCLC Macro for generating XX fields (especially, for apturing this unmediated eld where relevant) to ative-RDF cataloging lients? Might encourage use nd is an implementation uestion.
damt:1008	video" @en	A media type used to store noving or still images, esigned for use with a layback device such as a ideocassette player or DVD layer." @en	Request subclass of f:Instance for bf:Video.

Side by Side Examples

A book with a print and electronic instance

```
# BIBFRAME2
:w1 a bf:Text ;
   bf:content <http://id.loc.gov/vocabulary/contentTypes/txt> ;
   bf:hasInstance :i1 , :i2 .

:i1 a bf:Print ;
   bf:carrier <http://id.loc.gov/vocabulary/carriers/nc>
   bf:media <http://id.loc.gov/vocabulary/mediaTypes/n> .

:i2 a bf:Electronic ;
   bf:carrier <http://id.loc.gov/vocabulary/carriers/cz> ;
   bf:media <http://id.loc.gov/vocabulary/mediaTypes/c> .

# “a” used as a property is an abbreviation convention for the property “rdf:type”.
```

```
# bibliotek-o version 2
:w1 a bf:Text ;
   bf:hasInstance :i1 : :i2.

:i1 a bf:Print , bib:Volume .

:i2 a bf:Electronic , bib:OnlineResource .
```

Future Work

- Consider a strategy for alignment of BIBFRAME and bibliotek-o Classes with existing skos:Concepts and existing external classes.
- Consider a strategy for minted more specific (more useful) Instance subclasses, that make it clear the type of resource and any playback requirements.
- This discussion paper focuses on IS-a patterns (types of things). For related HAS-a patterns (characteristics of things, not things themselves) there are currently a number of “characteristic” properties (bf:digitalCharacteristic, bf:soundCharacteristic, bf:videoCharacteristic, bf:grooveCharacteristic, bf:projectionCharacteristic).
    - Investigate whether a general hasCharacteristic property would be preferable for things like bf:FileSize, bf:EncodedBitrate, or reuse existing (seemingly only) datatype properties from other ontologies?
    - Some bf:DigitalCharacteristic subclasses (bf:EncodingFormat, bf:FileType, maybe others) might be considered types of bf:Work/bf:Instance/bf:Item. Review with related extension groups to decide their treatment. Are some of these formats IS-a relationships, or HAS-a relationships?

- Not specific to Content/Carrier/Media necessarily, but engage with LOC on how they publish their linked data (sometimes using the same URI for both the webpage and the thing, often/always describing the entity differently depending on the format chosen)