Crossref 4.4.2 XML Elements and Attributes

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For anyone trying to understand both the basics and the full range of options available when making a DOI metadata submission to Crossref, this linked table of XML element and attribute descriptions gives one small publisher's best understanding of the most recent version of Crossref's metadata submission elements and attributes. As of April 2021, the most recent version of Crossref XML files is 4.4.2. This table provides definitions for the six Crossref XML Schema Definition (xsd) files that include the most commonly used description elements of a DOI submission: crossref4.4.2.xsd, common4.4.2.xsd, fundref.xsd, AccessIndicators.xsd, clinicaltrials.xsd, and relations.xsd. The table also includes a brief description of the main features of the externally defined jats:abstract (JATS) element. This table focuses not on XML syntax but on the intent and structure of the elements from a small publisher perspective. This table is one small publisher's interpretation of Crossref XML and is not authoritative in any way. It will inevitably contain errors, and the author takes no responsibility for its use, which is necessarily and entirely at your own risk. Any submissions created with information from this table should be verified for correctness against the official automated documentation and tools at the Crossref submission site. Note, however, that occasional errors and inconsistencies in those Crossref XML files were uncovered during the creation of this table. Every effort has been made here both to document inconsistencies in the original files and in this interpretation of those files. Important links to Crossref documentation, including comment on the apparent status of Crossref web pages, are provided in the References section after the table on the last document page.

This is about: Crossref, DOI, XML, metadata

Element or Attribute	Description	Element Content Options	Attribute Content Options
crossref4.4.2	Along with common4.4.2, this is the Crossref file that defines most of the XML elements and attributes described in this table.	URL https://www.crossref.org/schemas/crossref4.4.2.xsd	
doi_batch	This the top-level element used when submitting metadata to Crossref, so it marks the start and end of a metadata submission XML file. The version number is fixed at 4.4.2, which is version of the most recent (as of April 2021) Crossref schema.	SEQUENCE OF **head REQUIRED** **body REQUIRED**	*version* attribute is type string value is fixed to 4.4.2
head	The container for information related to the DOI batch submission. This element uniquely identifies the batch deposit to Crossref and contains information that will be used as a reference in error messages sent by Crossref. Successful submissions result in updates to the Crossref MDDB, or Metadata Database. The latest state of the MDDB is posted openly and regularly in a single large online file called the XML Journal List, which has the filename mddb.xml.	SEQUENCE OF **doi_batch_id REQUIRED** **timestamp REQUIRED** **depositor REQUIRED** **registrant REQUIRED**	
body	The container for the main body of a DOI record submission. Note that the body of any given submission can only contain only *one* type of record, although any number of records for multiple items of that type can	CHOICE OF **ONE AND ONLY ONE** of **journal** as many as needed **book** as many as needed	

[*]*This document uses Kenobi versioning. The online name always points to the most recent document version, while ob1, ob2,… suffixes indicate obsolete releases of the document.*

Element or Attribute	Description	Element Content Options	Attribute Content Options
	be submitted within that single submission. This restriction is somewhat counterintuitive, and for that reason should be observed carefully. The types of records include **journal**, **book**, **conference** (meaning conference proceedings), or any of a variety of stand-alone component records types.	**conference** as many as needed **sa_component** as many as needed **dissertation** as many as needed **report-paper** as many as needed **standard** as many as needed **database** as many as needed **peer_review** as many as needed **pending_publication** as many as needed **posted_content** as many as needed	
journal	The container for all information about a single journal and the articles being registered within the journal. **journal** is the core container for information about a single journal and articles submitted for registration from that journal. Within a **journal** instance, you may register articles from a single issue, detailed in **journal_issue**. If you want to register items from more than one issue, you must use multiple **journal** instances, which can be done within a single batch submission. If you have articles that have not been assigned to an issue, you may register them within a single **journal** instance. In this case, do not include a **journal_issue**. You may choose to submit only top-level **journal_metadata** and **journal_issue** metadata for any journal or issue, allowing you to register DOIs for an entire journal, or any issue or volume within a journal.	SEQUENCE OF **journal_metadata** **REQUIRED** **journal_issue** optional **journal_article** optional, or as many as needed	
journal_metadata	The container for metadata that defines a **journal**.	SEQUENCE OF **full_title** **REQUIRED** at least 1 as many as 10 **abbrev_title** optional, or as many as 10 **issn** optional, or as many as 6 **coden** optional **archive_locations** optional **doi_data** optional	
full_title	The full title by which a **journal** is commonly known or cited. **full_title** and **abbrev_title** must both be submitted even if they are identical. NOTE: Beginning with Crossref version 4.1.0 up to 10 occurrences of **full_title** are allowed. The addition occurrences can be used for title changes over time, translations, and common misspellings. NOTE: As of March 2021, journals as summarized in the online Crossref XML Journal file **mddb.xml** (metadata database) appear to use only one full title per journal, with an unlimited number of abbreviations that are mostly aliases for that title, rather than true abbreviations. This appears to be an adapted use of the abbreviations field that is not specified in the actual Crossref 4.4.2 XML code. In effect, the meaning of the abbreviations field has been altered to mean "aliases", since the names included there may be very long, as well as true abbreviations. However,	string of 1 to 255 characters	

Element or Attribute	Description	Element Content Options	Attribute Content Options
	it is not clear from looking at **mddb.xml** data exactly how Crossref populates the published database abbreviations field. It is much longer than the **abbrev_title** field below. Since the most popular journals have the longest lists of aliases, Crossref may simply be capturing different spellings as they are submitted for an ISSN.		
abbrev_title	This element contains the common abbreviation or abbreviations used when citing this journal. It is preferred, but not required, that periods be included after abbreviated words within the title. **full_title** and **abbrev_title** must both be submitted, and they can be identical. If you do not know the abbreviated title for a specific journal, please supply the full title in the **abbrev_title** element. Note: In version 4.1.0 and later, this element is no longer required in **journal_metadata** because some journals do not have abbreviated journal names.	string of 1 to 150 characters	

journal_issue	This element contains the metadata that defines a single issue of a journal, including if desired an issue-level DOI number.
	
	For special issues or supplements, use **contributors** to list the of special issue or supplement editors. It permits linking from a reference such as: R. Glaser, L. Bond (Eds.), Testing: concepts and research, American Psychologist 36 (10-12) (1981) (special issue). Note that **contributors** should *not* be used for the regular editors of ordinary issues.
	
	For special issues or supplements, use **special_numbering** to enter any special numbering for supplements or special issues. The special numbering entry should include a brief text label (e.g. "suppl") to explain what type of special numbering it is.
	
	Optionally, if you want to assign a DOI number to the entire **journal_issue**, use **doi_data** to define the number. Be sure to use a numbering scheme that avoids conflicts between issue-level and article-level DOI numbers.
		SEQUENCE OF
		    contributors optional
		    titles optional
		    publication_date as many as 10
		    journal_volume optional
		    issue optional
		    special_numbering optional
		    archive_locations optional
		    doi_data optional	

journal_volume	The container for the journal volume and DOI assigned to an entire journal volume. You may register a DOI for an entire volume by including **doi_data** in **journal_volume**.	SEQUENCE OF
		    volume REQUIRED
		    publisher_item optional
		    archive_locations optional
		    doi_data optional	

special_numbering	Issue level numbering for supplements or special issues. Text defining the type of special issue (e.g. "suppl") should be included in this element along with the number.	string of 1 to 15 characters	

Element or Attribute	Description	Element Content Options	Attribute Content Options

journal_article	The container for all information about a single journal article. A journal article is required to have at least one **title** (within **titles**) and **doi_data**. All other information is optional. When registering items that do not have titles, use the appropriate heading from the journal section or table of contents (e.g. "Errata") in title. **journal_article** allows for multiple titles per entity. In some cases it may be helpful to submit multiple titles. For example, if an erratum carries title of the original article and the heading "Errata", both should be submitted by using two titles elements.	SEQUENCE OF
		    titles **REQUIRED** at least 1 as many as 20
		    contributors optional
		    jats:abstract optional, or as many as needed
		    publication_date optional as many as 10
		    acceptance_date optional
		    pages optional
		    publisher_item optional
		    CHOICE OF optional
		        crossmark optional
		        SEQUENCE OF optional
		            fr:program optional
		            ai:program optional
		            ct:program optional
		    rel:program optional
		    archive_locations optional
		    scn_policies optional
		    doi_data **REQUIRED**
		    citation_list optional
		    component_list optional	

conference	The container for all information about a single conference and its proceedings. conference is the core container for information about a single conference and its proceedings. If a conference proceedings spans multiple volumes, each volume must be contained in a unique conference element. You may choose to submit only top-level **contributors**, **event_metadata** and **proceedings_metadata** for any conference, or you may choose to submit these elements along with metadata for each **conference_paper**. It is not necessary to submit metadata for all items listed on the proceedings table of contents. You may choose to drop items of lesser significance such as front and back matter. NOTE: The Crossref system currently uses the **proceedings_title** and **conference_acronym** in the query matching process. This system can cause problems when the proceedings have a simple non-changing title (e.g. Proceedings of SPIE) and the conference event name, **conference_name**, is used to differentiate conference topics (e.g. Optoelectronic Integrated Circuits II). To avoid this problem, Crossref recommends that you make sure the **conference_acronym** accurately reflects the event name (e.g. OpIC II in this example).	SEQUENCE OF
		    contributors optional
		    event_metadata **REQUIRED**
		    CHOICE OF **REQUIRED**
		        proceedings_series_metadata
		        proceedings_metadata
		    conference_paper optional, or as many as needed	

event_metadata	A container for all information that applies to a conference event. **event_metadata** captures information about a conference event. Data about conference proceedings is captured in **proceedings_metadata**. NOTE: The Crossref system currently uses the **proceedings_title** and **conference_acronym** in the query matching process. This system can	SEQUENCE OF
		    conference_name **REQUIRED**
		    conference_theme optional
		    conference_acronym optional	

Element or Attribute	Description	Element Content Options	Attribute Content Options
	cause problems when the proceedings have a simple non-changing title (e.g. Proceedings of SPIE) and the conference event name, **conference_name**, is used to differentiate conference topics (e.g. Optoelectronic Integrated Circuits II). To avoid this problem, Crossref recommends that you make sure the **conference_acronym** accurately reflects the event name (e.g. OpIC II in this example).	**conference_sponsor** optional, or as many as 10 **conference_number** optional **conference_location** optional **conference_date** optional	

conference_name	The official name of the conference. **conference_name** does not include "Proceedings of". For example, "The 23rd Annual Meeting of the American Society for Information Science" is a correct conference name. It is quite common for a conference name to include the conference number or subject. When any of these metadata items appear in the conference name, they should be included in this element, and also in the respective sub-element, **conference_number** or **proceedings_subject**. The following example shows incorrect tagging of a conference name and then the corrected version:
	
	INCORRECT:
	
	<**event_metadata**>
	  <**conference_name**>the second international conference</**conference_name**>
	  <**conference_acronym**>IEA/AIE '89</**conference_acronym**>
	  <**conference_number**>1989</**conference_number**>
	  <**conference_location**>Tullahoma, TN</**conference_location**>
	  <**conference_date** *start_year*="1989"/>
	</**event_metadata**>
	
	<**proceedings_metadata** language="en">
	  <**proceedings_title**>Proceedings of the second international conference on Industrial and engineering applications of artificial intelligence and expert systems - IEA/AIE'89</**proceedings_title**>
	  <**proceedings_subject**>Industrial and engineering applications of artificial intelligence and expert systems</**proceedings_subject**>
	</**proceedings_metadata**>
	
	CORRECT:
	
	<**event_metadata**>
	  <**conference_name**>The second international conference on Industrial and engineering applications of artificial intelligence and expert systems</**conference_name**>
	  <**conference_acronym**>IEA/AIE '89</**conference_acronym**>
	  <**conference_number**>2</**conference_number**>
		string of 3 to 512 characters	

Element or Attribute	Description	Element Content Options	Attribute Content Options

	`<conference_location>`Tullahoma, TN`</conference_location>`
	`<conference_date start_year="1989"/>`
	`</event_metadata>`
	
	`<proceedings_metadata language="en">`
	`<proceedings_title>`Proceedings of the second international conference on Industrial and engineering applications of artificial intelligence and expert systems - IEA/AIE '89`</proceedings_title>`
	`<proceedings_subject>`Industrial and engineering applications of artificial intelligence and expert systems`</proceedings_subject>`
	`</proceedings_metadata>`
	
	Authors commonly cite a conference by the official name, so it is important to provide this information as accurately as possible.		

conference_theme	The theme is the slogan or special emphasis of a conference in a particular year. The theme is the slogan of the conference. It differs from the subject of a conference in that the subject is stable over the years while the theme may vary from year to year. For example, the American Society for Information Science and Technology conference theme was "Knowledge: Creation, Organization and Use" in 1999 and "Defining Information Architecture" in 2000.	string of 1 to 255 characters	
conference_acronym	The popularly known as or jargon name (e.g. SIGGRAPH for "Special Interest Group on Computer Graphics"). Authors commonly cite the conference acronym rather than the full conference or proceedings name, so it is best to include this element when it is available. The conference acronym often includes the year of the conference (e.g. SGML '97) or, less often, the conference number. It is preferred, but not required, that submission of metadata exclude number or year information from the conference acronym. It is better to include such information in **conference_number**, or **conference_date**, respectively.	string of 1 to 127 characters	
conference_sponsor	The sponsoring organization(s) of a conference. Multiple sponsors may be given if a conference is hosted by more than one organization.	string of 1 to 255 characters	
conference_number	The number of a conference. **conference_number** should include only the number of the conference without any extra text. For example, "The 24th Annual Conference on..." should be tagged as shown in the example above, and "th" should not be included. Roman numerals are acceptable. When a conference is named such that the year of the conference indicates the number (e.g. "SGML 1994"), the year appears in **conference_name**, **conference_date**, and **conference_number**.	string of 1 to 15 characters	

Element or Attribute	Description	Element Content Options	Attribute Content Options

	For example:
	
	<**conference_name**>SGML 1994</**conference_name**>
	<**conference_acronym**>SGML</**conference_acronym**>
	<**conference_number**>1994</**conference_number**>
	<**conference_date**
	    start_day="07" *start_month*="11" *start_year*="1994"
	    end_day="10" *end_month*="11" *end_year*="1994">November 7-10,
	    1994</**conference_date**>		

conference_location	The location of the conference. The city and country of the conference. If the conference is in the United States, the appropriate state should also be provided, and the country may be omitted. If the conference is in Canada, the province should be provided, and the country may be omitted. The specific venue or address within a city (e.g. conference center, hotel, etc.) should not be provided.	string of 2 to 255 characters	
conference_date_t (type)		string of 0 to 100 characters	

conference_date	The start and end dates of a conference event. **conference_date** may be used in three ways:
	
	1. Publishers who do not have parsed date values should enter the conference dates in text form, using the date from the proceedings title page.
	
	2. Publishers who have parsed date values should provide them in the attributes.
	
	3. Publishers who have both parsed date values and the date text available should both. This is the preferred of the three date options. For example:
	
	<**conference_date**
	    start_month="01" *start_year*="1997" *start_day*="15"
	    end_year="1997" *end_month*="01"
	end_day="17">Jan. 15-17, 1997</**conference_date**>
		based on type **conference_date_t**	*start_day* attribute is type **xrefDay** optional
			start_month attribute is type **xrefMonth** optional
			start_year attribute is type **xrefYear** optional
			end_day attribute is type **xrefDay** optional
			end_month attribute is type **xrefMonth** optional
			end_year attribute is type **xrefYear** optional

proceedings_metadata	A container for all information that applies to a non-series conference proceeding. **proceedings_metadata** captures information about conference proceedings. Data about conference events is captured in **event_metadata**	SEQUENCE OF
		    proceedings_title REQUIRED
		    proceedings_subject optional
		    publisher REQUIRED at least 1 as many as 5
		    publication_date REQUIRED at least 1 as many as 10
		CHOICE OF
		    isbn as many as 6	

Element or Attribute	Description	Element Content Options	Attribute Content Options
		noisbn **publisher_item** optional **archive_locations** optional **doi_data** optional	

proceedings_series_metad ata	A container for all information that applies to a specific conference proceeding that is part of a series. A conference proceedings published as a series can sometimes look just like a journal in that there is no volume information (no volume title, no ISBN). In these cases the conference proceeding may be deposited as a journal (which more accurately *should* have been called a "series_publication"). To allow for the use of a consistent XML hierarchy we will allow a **proceedings_series_metadata** root element to also describe such a publication. Note: this structure is organized to allow backward compatibility with previous schema versions by maintaining the prior sequence of elements.	SEQUENCE OF
		   series_metadata **REQUIRED**
		   CHOICE OF **REQUIRED**
		     SEQUENCE OF
		       CHOICE OF
		         SEQUENCE OF
		           proceedings_title
		           volume optional
		         volume
		       proceedings_subject optional
		       publisher at least 1 as many as 5
		       publication_date at least 1 as many as 10
		       CHOICE OF
		         isbn at least 1 as many as 6
		         noisbn
		     SEQUENCE OF
		       proceedings_subject optional
		       publisher at least 1 as many as 5
		       publication_date at least 1 as many as 10
		   publisher_item optional
		   archive_locations optional
		   doi_data optional	

proceedings_title	The title of the conference proceedings as printed on title page of the published conference proceedings. **proceedings_title** is the undifferentiated title of a conference proceedings. It should generally be the title as it appears on the cover of the printed proceedings. In some cases, **proceedings_title** may differ from **conference_name** only in that the text "Proceedings of" often appears at the start of the **proceedings_title**, and it this text should never be included in **conference_name**. In other cases, the **proceedings_title** and **conference_name** may be quite different.	string of 1 to 511 characters	
proceedings_subject	The subject of the printed conference proceedings, e.g. "Computer Graphics" is the subject matter of SIGGRAPH. This element is useful because an author may cite a conference paper by the conference subject. For example, "Proceedings of the 1999 ACM Conference on Computer Graphics"	string of 1 to 255 characters	

Element or Attribute	Description	Element Content Options	Attribute Content Options

conference_paper	The container for all information about a single conference paper. A conference paper is required to have **contributors**, title and **doi_data**. All other information is optional.	SEQUENCE OF
		    contributors optional
		    titles REQUIRED
		    jats:abstract optional, or as many as needed
		    publication_date optional, or as many as 10
		    acceptance_date optional
		    pages optional
		    publisher_item optional
		    CHOICE OF optional
		        crossmark optional
		        SEQUENCE OF optional
		            fr:program optional
		            ai:program optional
		            ct:program optional
		    rel:program optional
		    archive_locations optional
		    scn_policies optional
		    doi_data REQUIRED
		    citation_list optional
		    component_list optional	

book	The container for all information about a single book. book is the core container for information about a specific book. Books may be in the form of edited books (i.e. a contributed volume with one or more editors), monographs (single-authored works), or reference works (e.g. encyclopedias).
	
	If a book contains multiple volumes, each volume must be contained in a unique book element. You may choose to submit only top-level **contributors** and **book_metadata** for any book, or you may choose to submit these elements along with metadata for each **content_item**. A content item is typically any entity that is listed on the table of contents such as a chapter, section, etc. It is not necessary to submit metadata for all items listed on the table of contents. You may choose to drop items of lesser significance such as front and back matter.
	
	Book-level metadata is captured within **book_metadata**, **book_series_metadata**, or **book_set_metadata**. If a book is a single-volume work, use **book_metadata**. If the book is a volume from a multi-volume work that is also a serial publication (and therefore has an ISSN), use **book_series_metadata**. If the book is a volume of non-serial publication, then it is considered a set and you should use **book_set_metadata.**
		SEQUENCE OF
		    CHOICE OF **REQUIRED**
		        book_metadata
		        book_series_metadata
		        book_set_metadata
		    content_item optional, or as many as needed
			book_type required attribute
			    permitted values are
			        edited_book
			        monograph
			        reference
			        other

Element or Attribute	Description	Element Content Options	Attribute Content Options
	The *book_type* attribute should be set to "monograph" when the same author or authors wrote the majority of the content. It should be set to "edited_book" when a book primarily consists of contributed chapters, each chapter written by different authors. It should be set to "reference" for major reference works such as encyclopedias. Use "other" when the author of the content does not fit any of the other categories.		
book_metadata	A container for all information that applies to a monograph. It does not include metadata about individual chapters. The language of the book should be specified in the *language* attribute. If a book contains items in multiple languages this attribute should be set for the predominant language of the book. Individual items may have their language specified in **content_item**. If all content items are the same language, it is only necessary to specify the language of the book in this element. The contributors are the author(s) or editor(s) of the entire work. When using **book_metadata**, specify the title of the book within **book_metadata**. **edition_number**, when given, should include only a number and not additional text such as "edition" or "ed". **publisher_item**, when given, specifies this information for the entire book or volume. This element also appears in **content_item**. **doi_data** is required for each book or volume that you submit. It is not possible to submit DOI information for individual chapters without assigning a DOI to the entire work. NOTE: **citation_list** should only be used in **book_metadata**. It should be used instead of **content_item** when the reference list is a separate section of the book, and there are no **content_item**s in the deposit. This could happen for example if you are depositing a book with a bibliography, but not the chapters of the book. When depositing a historical volume it can be difficult to obtain an ISBN. In this and other rare situations, publishers should use the **noisbn** element to indicate the omission of an ISBN was deliberate. Since absence of an ISBN can adversely impact matching, this element should be used only when no other option is feasible for depositing the volume.	SEQUENCE OF 　**contributors** optional 　**titles** REQUIRED 　**jats:abstract** optional, or as many as needed 　**edition_number** optional 　**publication_date** REQUIRED at least 1 as many as 10 　**acceptance_date** optional 　CHOICE OF **REQUIRED** 　　**isbn** at least 1 as many as 6 　　**noisbn** 　**publisher** REQUIRED 　**publisher_item** optional 　CHOICE OF optional 　　**crossmark** optional 　　SEQUENCE OF 　　　**fr:program** optional 　　　**ai:program** optional 　**rel:program** optional 　**archive_locations** optional 　**doi_data** optional 　**citation_list** optional	
book_series_metadata	A container for all information that applies to an individual volume of a book series. It does not include metadata about individual chapters. The language of the book should be specified in the **book_series_metadata** language attribute. If a book contains items in multiple languages this attribute should be set for the predominant language of the book. Individual items may have their language specified in **content_item**. If all content items are the same language, it is only necessary to specify the language of the book in this element.	SEQUENCE OF 　**series_metadata** REQUIRED 　CHOICE OF **REQUIRED** 　　SEQUENCE OF 　　　**contributors** optional 　　　CHOICE OF 　　　　SEQUENCE OF 　　　　　**titles** 　　　　　**jats:abstract** optional, or as many as needed	

Element or Attribute	Description	Element Content Options	Attribute Content Options

	The contributors are the author(s) or editor(s) of the entire work. If a multi-volume work has separate editors for each volume, those editors should be specified in this element, and the series editors are listed in the **series_metadata** contributors.
	
	Series titles should be specified within **series_metadata**. Volume titles (when present) are captured in **book_series_metadata**. If the volumes of a series only have volume numbers and not individual titles, you may specify the volume number within **volume_metadata**, and no title is required.
	
	volume and **edition_number**, when given, should include only a number and not additional text such as "volume" or "edition". For example, you should submit "3", not "third edition".
	
	If a work spans multiple volumes with a unique ISBN for each volume and the whole series, you should specify the series ISBN in **isbn** in **series_metadata** and the volume ISBN in **isbn** in **book_series_metadata**.
	
	WARNING: Care must be taken when submitting books with series! If a series title is submitted and no book title is supplied but an ISBN is supplied at the **book_series_metadata** level and not with the series title, the Crossref system will index a series title with no ISBN and an ISBN with no title. Please take care to associate the ISBN at the correct level of the XML hierarchy.
	
	publisher_item, when given, specifies this information for the entire book or volume. This element also appears in **content_item**.
	
	doi_data is required for each book or volume that you submit. It is not possible to submit DOI information for individual chapters without assigning a DOI to the entire work.
	
	citation_list should only be used in **book_series_metadata** instead of **content_item** when the reference list is a separate section of the book. **content_item**s should not be included in the deposit. For example, you can deposit a bibliography with a book with, but not the chapters of a book.
	
	Normally book content that is published as a series is required to have a series title with an ISSN and a book title and/or a book volume number along with a book ISBN. An exception is when book chapters are published on line first prior to being assigned to a specific book in which case only the series title (and ISSN) is known at time of DOI registration.
		volume optional
		volume
		edition_number optional
		publication_date at least 1 as many as 10
		CHOICE OF
		    isbn at least 1 as many as 6
		    noisbn
		publication_date at least 1 as many as 10
		publisher REQUIRED
		publisher_item optional
		CHOICE OF optional
		    crossmark optional
		    SEQUENCE OF optional
		    fr:program optional
		    ai:program optional
		rel:program optional
		archive_locations optional
		doi_data optional
		citation_list optional	

Element or Attribute	Description	Element Content Options	Attribute Content Options
	Element **unassigned_content** is used as a placeholder to force recognition of this condition and thus prevent accidental omission of book level title information.		

book_set_metadata	A container for all information that applies to an individual **volume** of a book set. It does not include metadata about individual chapters. A set is a finite series, and does not have an ISSN.
	
	The language of the book should be specified in the **book_set_metadata** language attribute. If a book contains items in multiple languages this attribute should be set for the predominant language of the book. Individual items may have their language specified in **content_item**. If all content items are the same language, it is only necessary to specify the language of the book in this element.
	
	The contributors are the author(s) or editor(s) of the entire work. If a multi-volume work has separate editors for each volume, those editors should be specified in this element, and the series editors are listed in the **series_metadata** contributors.
	
	When using **book_set_metadata**, specify the title of the entire set and the **isbn** of the set. Specify the title of the volume in **volume_metadata**. If the volumes of a set only have volume numbers and not individual titles, you may specify the volume number within **volume_metadata**, and no title is required.
	
	volume and **edition_number**, when given, should include only a number and not additional text such as "volume" or "edition". For example, you should submit "3", not "third edition". If a work spans multiple volumes with a unique ISBN for each volume and the whole series, you should specify the series ISBN in **isbn** in **series_metadata** and the volume ISBN in **isbn** in **book_series_metadata**.
	
	publisher_item, when given, specifies this information for the entire book or volume. This element also appears in **content_item**. **doi_data** is required for each book or volume that you submit. It is not possible to submit DOI information for individual chapters without assigning a DOI to the entire work.
	
	NOTE: **citation_list** should only be used in **book_series_metadata** instead of **content_item** when the reference list is a separate section of the book, and **content_item**s are not included in the deposit (e.g. you are depositing a book with a bibliography, but not the chapters of the book)
		SEQUENCE OF
		  set_metadata REQUIRED
		  contributors optional
		  CHOICE OF **REQUIRED**
		    SEQUENCE OF
		      titles
		      jats:abstract optional, or as many as needed
		      volume optional
		    volume
		  edition_number optional
		  publication_date REQUIRED at least 1 as many as 10
		  CHOICE OF **REQUIRED**
		    isbn as many as 6
		    noisbn
		  publisher **REQUIRED**
		  publisher_item optional
		  CHOICE OF optional
		    crossmark optional
		    SEQUENCE OF optional
		      fr:program optional
		      ai:program optional
		  rel:program optional
		  archive_locations optional
		  doi_data optional
		  citation_list optional	

Element or Attribute	Description	Element Content Options	Attribute Content Options

content_item	An entity in a book, such as a chapter, for which a DOI is being registered. A content item is typically an entity listed on the table of contents. There need not be a one-to-one correlation between content listings and content items (e.g. you may choose not to register front and back matter items listed in the table of contents).
	
	The language of a **content_item** only need be set if it differs from the language of **book_metadata**.
	
	The *component_type* attribute indicates the type of content item you are registering. Please see the example of a book submission in this documentation for a better understanding of how this attribute may be used in nested tables of contents.
	
	The *level_sequence_number* attributes indicates the level of nesting for content items. For example, you may use it to indicate when one content item, such as a chapter, is actually inside another content item, such as a section. Please see the example of a book submission in this documentation for a better understanding of how this attribute may be used in nested tables of contents.
	
	NOTE: Because the Crossref schema uses a flat model to indicate hierarchically nested content items, there is an implicit assumption that content items will be listed in the Crossref submission in the same order in which they appear in the table of contents. Please follow this protocol when submitting DOI data for books. This order is not required for journal and conference data.
	
	contributors for a **content_item** need not be listed if all items in a book have the same **contributors** listed in **book_metadata**. In other words, **contributors** must be listed for edited books, but they should not be listed for each **content_item** in a monograph. The exception case is when a content item such as a Preface or Forward for a monograph has a different author from that of the monograph. In this case, the **contributors** should be given.
	
	The title of each content item must be submitted. If, however, you are submitted data for a monograph that simply has "Chapter 1", "Chapter 2", etc., you should put this information in **component_number**, not titles.
		SEQUENCE OF
		    contributors optional
		    titles optional
		    jats:abstract optional, or as many as needed
		    component_number optional
		    publication_date optional, or as many as 10
		    acceptance_date optional
		    pages optional
		    publisher_item optional
		    CHOICE OF optional
		        crossmark optional
		        SEQUENCE OF optional
		            fr:program optional
		            ai:program optional
		            ct:program optional
		    rel:program optional
		    archive_locations optional
		    scn_policies optional
		    doi_data REQUIRED
		    citation_list optional
		    component_list optional
			component_type **REQUIRED**
			    attribute
			    permitted values are
			        chapter
			        section
			        part
			        track
			        reference_entry
			        other
			level_sequence_number
			    attribute default value is 1
			    1-digit integer with values
			        from 1 to 9

series_metadata	The container for metadata about a series publication. When a book, conference proceeding, or report consists of multiple volumes, **series_metadata** is used to describe information about the entire series. If a work spans multiple volumes, you should use titles in **series_metadata**. If a work spans multiple volumes with a unique title for	SEQUENCE OF
		    contributors optional
		    titles REQUIRED
		    jats:abstract optional, or as many as needed
		        NOTE: The abstract element allows	

Element or Attribute	Description	Element Content Options	Attribute Content Options

	each volume and the whole series, you should specify the series title in titles in **series_metadata** and the volume title in titles in **book_series_metadata**. If a unique ISBN has been assigned to the entire series (as opposed to the individual volumes), it should be given in **series_metadata**. You may assign and register a DOI that encompasses an entire series by adding **doi_data** in **series_metadata**. This element is optional for a series.	depositors to include abstracts extracted from NLM or JATS XML in Crossref deposits. The jats: namespace prefix must be included.
		issn REQUIRED at least 1 as many as 6
		coden optional
		series_number optional
		publisher_item optional
		CHOICE OF optional
		    crossmark optional
		    SEQUENCE OF
		        fr:program optional
		        ai:program optional
		archive_locations optional
		doi_data optional	

set_metadata	When a book consists of multiple volumes that are not part of a serial publication (series), **set_metadata** is used to describe information about the entire set.	SEQUENCE OF
		    titles REQUIRED
		    CHOICE OF **REQUIRED**
		        isbn as many as 6
		        noisbn
		    contributors optional
		    part_number optional
		    publisher_item optional
		    archive_locations optional
		    doi_data optional	

series_number	The series number within a specific published conference discipline. The series number is different from the volume number. A volume number is the number of a book in a physically printed set and typically appears in sequence. The series number is not tied to the physical manifestation of the printed volume and need not be strictly in sequence. It is most commonly used in "Lectures" published by Springer-Verlag. This element is available in **series_metadata**, however it should only be used for conference proceedings, not for books.	string of 1 to 15 characters	
part_number	The part number of a given volume. Deposited within **book_set_metadata**. In some cases, a book set will have multiple parts, and then one or more volumes within each part. The part number of a given volume should be deposited in this element.	string of 1 to 15 characters	

publisher	A container for information about the publisher of a book or conference proceedings.	SEQUENCE OF
		    publisher_name REQUIRED
		    publisher_place optional	

Element or Attribute	Description	Element Content Options	Attribute Content Options
publisher_place	The city where the publisher of this work is located. **publisher_place** gives the primary city location of the publisher. When the location is a major city (e.g. New York, Amsterdam), no qualifying country, U.S. state, or Canadian province need be given. If the city is not a major city, the appropriate country, U.S. state, or Canadian province should be added.	string of 2 to 255 characters	
publisher_name	The name of the publisher of a book or conference proceedings. **publisher_name** is the imprint of the publication (what the author will likely cite), not the organization registering the DOI, if for any reason they are different. When registering a translation, the translation publisher, not the original publisher, should be given.	string of 1 to 255 characters	
publisher_item	A container for item identification numbers set by a publisher. **item_number** within **publisher_item** may also be used to provide an article number when a **first_page** is not available or applicable. In certain cases it may be deemed in-appropriate to 'misuse' the **first_page** element to provide a value that has meaning in an on-line only publication and does not convey a form of page number. In these circumstances the attribute <**item_number** *item_number_type*="article-number"> will instruct the Crossref system to treat the value of **item_number** in the same manner as **first_page**. This value then becomes a critical part of the query process. If both <**item_number** *item_number_type*="article-number"> and **first_page** are present, **first_page** will take precedence.	SEQUENCE OF **item_number** optional, or as many as 3 **identifier** optional, or as many as 10	
item_number_t (type)		string of 1 to 32 characters	
item_number	A publisher identifier that can be used to uniquely identify the entity being registered. This identifier is a publisher-assigned number that uniquely identifies the entity being registered. This element should be used for identifiers based on publisher internal standards. Use identifier for a publisher identifier that is based on a public standard such as PII or SICI. If the **item_number** and **identifier** are identical, there is no need to submit both. In this case, the preferred element to use is **identifier**. Data may be alpha, numeric or a combination. **item_number** has an optional attribute, *item_number_type*. It is assigned by the publisher to provide context for the data in **item_number**. If **item_number** contains only a publisher's tracking number, this attribute need not be supplied. If the **item_number** contains other data, this attribute can be used to define the content. For example, if a journal is published online (i.e. it has no page numbers), and each article on the table of contents is assigned a sequential number, this article number can be placed in **item_number**, and the *item_number_type* attribute can be set to *article_number*. Although Crossref has not provided a set of enumerated types for this attribute, please check with Crossref before using this attribute to determine if a standard attribute has already been defined for your	based on type **item_number_t**	*item_number_type* attribute is type string optional

Element or Attribute	Description	Element Content Options	Attribute Content Options
	specific needs. If a **dissertation** DAI has been assigned, it should be deposited in the **identifier** element with the *id_type* attribute set to "dai". If an institution has its own numbering system, it should be deposited in **item_number**, and the *item_number_type* should be set to "institution" If the report number of an item follows Z39.23, the number should be deposited in the **identifier** element with the *id_type* attribute set to "Z39.23". If a report number uses its own numbering system, it should be deposited in the **identifier** element, and the *id_type* should be set to "report-number" The designation for a standard should be placed inside the **identifier** element with the *id_type* attribute set to "ISO-std-ref" or "std-designation" (more generic label)		
identifier_t (type)		string of 1 to 255 characters	
identifier	A public standard **identifier** that can be used to uniquely identify the entity being registered. This identifier is a publisher-assigned number that uniquely identifies the entity being registered. This element should be used for identifiers based on public standards. Use **item_number** for a publisher identifier that is based on a publisher's internal systems rather than on a public standard. The supported standards are: PII - Publisher Item Identifier SICI - Serial Item and Contribution Identifier DOI - Digital Object Identifier	based on type **identifier_t**	*id_type* required attribute permitted values are pii sici doi dai Z39.23 ISO-std-ref std-designation report-number pmid other

dissertation	**dissertation** is the top-level element for deposit of metadata about one or more dissertations. The **dissertation** element does not have publisher, or **issn** elements. It is expected that the **dissertation** element will be used for deposit of items that have not been published in books or journals. If a **dissertation** is published as a book or within a serial, it should be deposited using the top-level element for the appropriate publication type. If a DAI has been assigned, it should be deposited in the **identifier** element with the *id_type* attribute set to "dai". If an institution has its own numbering system, it should be deposited in **item_number**, and the *item_number_type* should be set to "institution"	SEQUENCE OF
		  CHOICE OF **REQUIRED**
		    person_name at least 1 as many as needed
		    contributors
		  titles REQUIRED
		  jats:abstract optional, or as many as needed
		  approval_date REQUIRED at least 1 as many as 10
		  institution REQUIRED at least 1 as many as 6
		  degree optional, or as many as 10
		  isbn optional, or as many as 6
		  publisher_item optional
		  CHOICE OF optional
		    crossmark optional
		    SEQUENCE OF optional
		      fr:program optional
		      ai:program optional
		  rel:program optional	

Element or Attribute	Description	Element Content Options	Attribute Content Options
		archive_locations optional scn_policies optional doi_data **REQUIRED** citation_list optional component_list optional	

report-paper	report-paper is the top-level element for deposit of metadata about one or more reports or working papers. component_list is included in report-paper to handle items that have components but do not have content_item elements (i.e. a report that is not divided into multiple chapters). If an item has content_item elements, then component_list inside of content_item must be used rather than the element available in report-paper	SEQUENCE OF
		    CHOICE OF **REQUIRED**
		        report-paper_metadata
		        report-paper_series_metadata
		    content_item optional, or as many as needed
		    component_list optional	

report-paper_metadata	report-paper_metadata is used as a wrapper for the metadata related to a Technical Report or Working Paper. **report-paper_metadata** is almost identical to **book_metadata**. It differs only in that **report-paper_metadata** removes the volume number and adds the elements **institution** and **contract_number**. Please see the comments for **book_metadata** about the usage of most elements in **report-paper_metadata**. Reports and Working Papers are often sponsored by either universities or by a non-academic organization (corporate or government). Such institutions are not typically considered "publishers" and so the item may be deposited using the **institution** element. Multiple element instances are permitted so the sponsoring institution and publishing institution can both be deposited as authors may cite either. If the report number of an item follows Z39.23, the number should be deposited in the **identifier** element with the *id_type* attribute set to "Z39.23". If a report number uses its own numbering system, it should be deposited in **item_number**.	SEQUENCE OF
		    contributors optional
		    titles **REQUIRED**
		    edition_number optional
		    jats:abstract optional, or as many as needed
		    publication_date **REQUIRED** at least 1 as many as 10
		    approval_date optional, or as many as 10
		    isbn optional, or as many as 6
		    publisher optional
		    institution optional, or as many as 5
		    publisher_item optional
		    contract_number optional
		    CHOICE OF optional
		        crossmark optional
		        SEQUENCE OF
		            fr:program optional
		            ai:program optional
		    rel:program optional
		    archive_locations optional
		    scn_policies optional
		    doi_data optional
		    citation_list optional	

report-paper_series_metadata	report-paper_series_metadata is used as a wrapper for the metadata related to a Technical Report or Working Paper that is part of a series. **report-paper_series_metadata** is almost identical to **book_series_metadata**. It differs only in that **report-paper_metadata** removes the volume number and adds the elements **institution** and **contract_number**. Please see the comments for **book_series_metadata** about the usage of most elements in **report-**	SEQUENCE OF
		    series_metadata **REQUIRED**
		    contributors optional
		    CHOICE OF **REQUIRED**
		        SEQUENCE OF
		            titles	

Element or Attribute	Description	Element Content Options	Attribute Content Options
	paper_series_metadata. Reports and Working Papers are often sponsored by either universities or by a non-academic organization (corporate or government). Such institutions are not typically considered "publishers" and so the item may be deposited using the **institution** element. Multiple element instances are permitted so the sponsoring institution and publishing institution can both be deposited as authors may cite either. If the report number of an item follows Z39.23, the number should be deposited in the **identifier** element with the *id_type* attribute set to "Z39.23". If a report number uses its own numbering system, it should be deposited in **item_number**.	**jats:abstract** optional, or as many as needed **volume** optional **volume** **edition_number** optional **publication_date** **REQUIRED** at least 1 as many as 10 **approval_date** optional, or as many as 10 **isbn** optional, or as many as 6 **publisher** optional **institution** optional, or as many as 5 **publisher_item** optional **contract_number** optional **archive_locations** optional **doi_data** optional **citation_list** optional **rel:program** optional	
standard	**standard** is the top-level element for deposit of metadata about standards developed by Standards Development Organizations (SDOs) or Consortia. It is the responsibility of each standards organization (not Crossref) to decide whether a standards revision or reaffirmation should be assigned a new DOI. As of schema version 4.3.3, Crossref recommends that the full standard designation be placed in the appropriate "as_published" element within **std_designator**. For backwards compatibility, the full designation may also be included in the **identifier** element with the *id_type* attribute set to "ISO-std-ref". In addition, Crossref requires that the publisher of the standard be included in **standards_body_name**, and the acronym within **standards_acronym**. The **as_published** and **standards_acronym** elements will be combined to identify a standard for query matching. **component_list** is included in **standard** to handle items that have components but do not have **content_item** elements (i.e. a standard that is not divided into multiple chapters). If an item has **content_item** elements, then **component_list** inside of **content_item** must be used rather than the parent standard element.	SEQUENCE OF CHOICE OF **REQUIRED** **standard_metadata** **content_item** optional, or as many as needed **component_list** optional	
standard_metadata	The **standard_metadata** is used as a wrapper for the metadata related to a standard that is not part of a series. **standard_metadata** is similar to **book_metadata**. It differs in that **standard_metadata** adds the elements **institution** and **approval_date**. **contributors** contains the author(s) of the standard. In most cases, it is expected that the organization element	SEQUENCE OF **contributors** optional **titles** **REQUIRED** **jats:abstract** optional, or as many as needed **designators** **REQUIRED**	*publication_status* optional attribute permitted values are released withdrawn

Element or Attribute	Description	Element Content Options	Attribute Content Options

	will be used rather than **person_name** element for standards. However in some cases, standards are cited by their individual authors. In such cases, individual authors should be deposited with **person_name**, and the SDO or consortia name should be deposited with the organization element in **contributors** and also the **standards_body_name** element in **standards_body** Note that when the organization element is used in **contributors**, it should have the name of the committee (when appropriate) that developed the standard, not the name of the Standards Development Organization (SDO) or consortia. The SDO or consortia name should be placed in the **publisher** or **standards_body** element (as appropriate) Standards more often have version numbers than edition numbers. However the **edition_number** element can be used for deposit of the version number of a standard **approval_date** should be used for the date that a standard has been accepted or re-affirmed if different from the date of publication. Both may be provided even if identical Within **publisher_item**, the designation should be placed inside the **item_number** element, and the *id_type* should be set to "designation" to indicate a standard designation. Standards are typically sponsored or hosted by SDOs or Consortia. In some cases standards are published by a traditional publisher rather than by the owning organization. Such cases may be deposited with one or more publishers.	**edition_number** optional
		approval_date optional
		isbn optional, or as many as 6
		publisher optional
		standards_body
		publisher_item optional
		CHOICE OF optional
		   crossmark optional
		   SEQUENCE OF optional
		      fr:program optional
		      ai:program optional
		rel:program optional
		archive_locations optional
		doi_data **REQUIRED**
		citation_list optional	

database	database is the top-level element for deposit of metadata about one or more datasets or records in a database. Database structures allow for the assignment of DOIs to entire databases at the aggregate level and at two lower levels. The top-level may be a physical/functional database or a logical abstraction acting as a collection much the same as a journal is a collection of articles. The need to assign specific fields of metadata at each level depends on the nature of the top level (e.g. publication date may be appropriate at the top level for a physical object but only at lower levels for an abstract top-level object) The first sub-level is the dataset which may be a basic record of the top-level object or a collection in its own right. In either case dataset must represent a physical construct. A third level is provided in the **component_list**.
	
	NOTE: **component_list** in \<database\> (rather than in dataset may be used as a second level when no third level is required and the second level objects derive most of their qualities from the parent.
	
	NOTE: This model is not intended to show relationships between different dataset entries in the form of a relational database. However in the future it is possible that multiple resolution may be used to express such relationships.
		SEQUENCE OF
		   database_metadata **REQUIRED**
		   CHOICE OF optional
		      dataset optional, or as many as needed
		      component_list optional	

Element or Attribute	Description	Element Content Options	Attribute Content Options

database_metadata	**database_metadata** contains metadata about the database. **contributors** contains the author(s) of the database. In most cases, it is expected that the organization element will be used rather than **person_name** element for the primary database authoring information. **contributors** should not be confused with publisher and **institution**.
	
	In many cases, databases are more likely to have one or both of the latter elements rather than **contributors** at the top-level (**dataset** elements are more likely to have **contributors**). In most cases, the **institution** element may be the best choice to deposit the database host organization because it includes the **institution_acronym** element along with the name. The titles element is used to capture the name of the database.
	
	description can be used to capture a fuller description of the nature of the database than might be inferred from the title.
	
	database_date should be used to capture the date that a database was first created. Whenever updated records are deposited with Crossref, the **update_date** should be set to the date of the most recent Crossref deposit. **publisher_item** may be used to record an identifying number for the database other than the DOI.
		SEQUENCE OF
		    contributors optional
		    titles REQUIRED
		    description optional
		    database_date optional, or as many as 10
		    publisher optional
		    institution optional, or as many as 10
		    publisher_item optional
		    archive_locations optional
		    doi_data optional
		    rel:program optional	

dataset	**dataset** is used to capture information about one or more database records or collections. The *dataset_type* attribute should be set to either "record" or "collection" to indicate the type of deposit. The default value of this attribute is "record".
	dataset entries are not intended to contain the entire database record or collection. They are only intended to contain the metadata for each database record or collection. This metadata can include:
	
	contributors: the author(s) of a database record or collection titles: the title of a database record or collection
	
	database_date: the creation date, publication date (if different from the creation date) and the date of last update of the record
	
	publisher_item: the record number of the **dataset** item. In this context it can be used for the record number of each item in the database.
	
	description: a brief summary description of the contents of the database
	
	format: the format type of the **dataset** item if it includes files rather than just text. Note the **format** element here should not be used to describe the format of items deposited as part of the **component_list**
		SEQUENCE OF
		    contributors optional
		    titles optional
		    database_date optional, or as many as 10
		    publisher_item optional
		    description optional
		    format optional
		    CHOICE OF optional
		        crossmark optional
		        SEQUENCE OF optional
		            fr:program optional
		            ai:program optional
		    rel:program optional
		    archive_locations optional
		    doi_data REQUIRED
		    citation_list optional
		    component_list optional
			dataset_type attribute default value is record permitted values are
			    record
			    collection
			    crossmark_policy
			    other

Element or Attribute	Description	Element Content Options	Attribute Content Options
	doi_data: the DOI of the item. **citation_list**: a list of items (e.g. journal articles) cited by the **dataset** item. For example, **dataset** entry from a taxonomy might cite the article in which a species was first identified. **component_list**: a list of components included in the **dataset** item such as supporting figures		

publication	Used to define a publication (book, journal, etc.) for pending publication content. A title must be supplied, as well as an ISSN, ISBN, or title-level DOI	SEQUENCE OF
		  full_title REQUIRED at least 1 as many as 10
		  CHOICE OF **REQUIRED**
		    SEQUENCE OF
		      CHOICE OF
		        issn
		        isbn
		    SEQUENCE OF
		      doi
		      CHOICE OF
		        issn optional
		        isbn optional	

peer_review	The **peer_review** content type is intended for assigning DOIs to the reports and other artifacts associated with the review of published content.	SEQUENCE OF
		  contributors optional
		  titles REQUIRED
		  review_date REQUIRED
		  institution optional, or as many as 5
		  competing_interest_statement optional
		  running_number optional
		  ai:program optional
		  rel:program REQUIRED at least 1
		  scn_policies optional
		  doi_data REQUIRED
			stage optional attribute
			  permitted values are
			    pre-publication
			    post-publication
			type optional attribute
			  permitted values are
			    referee-report
			    editor-report
			    author-comment
			    community-comment
			    manuscript
			    aggregate
			    recommendation
			recommendation optional attribute
			  permitted values are
			    major-revision
			    minor-revision
			    reject
			    reject-with-resubmit
			    accept
			    accept-with-reservation

Element or Attribute	Description	Element Content Options	Attribute Content Options
			revision-round optional attribute is type integer NOTE: Required attribute. First submission defined as revision round zero

pending_publication	Pending publication (formerly known as Pre-register or early content registration) DOIs are used to create a DOI for a content item that is not yet available online or in print. The intended use is for a publisher to create the DOI upon manuscript acceptance where publication might not occur for some period. This establishes the acceptance date and intent to publish and provides on online presence that allows confirmation of intent to publish.
	
	The URL for early content DOIs will point to a page maintained by Crossref. Early content registration is intended for titles that have already been deposited at Crossref. Thus the publication data provided must identify a title (journal or book) that already exists within the Crossref system.
		SEQUENCE OF
		  contributors optional
		  publication REQUIRED
		  titles optional
		  acceptance_date REQUIRED
		  institution optional, or as many as 5
		  item_number optional, or as many as 3
		  intent_statement optional
		  jats:abstract optional, or as many as needed
		  CHOICE OF optional
		    crossmark optional
		    SEQUENCE OF optional
		      fr:program optional
		      ai:program optional
		  rel:program optional
		  doi REQUIRED	

posted_content	Posted-content is for the assignment of DOIs to content that may subsequently be formally published. Non-DOI identifiers associated with the content may be recorded in the **item_number** element. Crossref encourages including an abstract.
	
	The Relation element (**rel:program**) should be used to link this content item to other DOIs including the DOI of the published version of record.
	
	Pre-print should not be used to assign DOIs to accepted manuscripts.
	
	A DOI may be assigned to an accepted manuscript using the content type appropriate for early registration.
	
	DOIs assigned to accepted manuscripts should be reused (e.g. reassigned to the published article).
	
	Posted-content DOIs must be continuously supported by maintaining their metadata and the URL at which the content is available.
		SEQUENCE OF
		  group_title optional
		  contributors optional
		  titles REQUIRED
		  posted_date REQUIRED
		  acceptance_date optional
		  institution optional, or as many as 5
		  item_number optional, or as many as 3
		  jats:abstract optional, or as many as needed
		  fr:program optional
		  ai:program optional
		  rel:program optional
		  scn_policies optional
		  doi_data REQUIRED at least 1
		  citation_list optional
			type attribute
			  default value is preprint
			  permitted values are
			    preprint
			    working_paper
			    letter
			    dissertation
			    report
			    review
			    other

group_title	Prepublication content items may be organized into groupings within a given publisher. This element provides for naming the group. It is expected that publishers will have a small number of groups each of which reflect a topic or subject area.	string of 1 to 1024 characters	

Element or Attribute	Description	Element Content Options	Attribute Content Options

institution	Wrapper element for information about an organization that sponsored or hosted an item but is not the publisher of the item. The **institution** element should be used to deposit metadata about an organization that sponsored or hosted the research or development of the published material but was not actually the publisher of the information.
	
	The **institution** is distinct from the publisher because it may not be a publishing organization. It is typically an organization such as a university, corporation, government agency, NGO or consortia. If the content was published by an organization other than the sponsor, the use of both the publisher and **institution** elements is encouraged because authors may cite either one in a reference, and the availability of both may allow for more precise matching in queries.
		SEQUENCE OF
		   institution_name **REQUIRED**
		   institution_acronym optional, or as many as 6
		   institution_place optional, or as many as 6
		   institution_department optional, or as many as 6	

institution_name	The full name of an institution. Examples are: World Health Organization; University of California, Davis. Corresponding **institution_acronym** content for these organizations would be WHO and UCD, respectively.	string of 1 to 1024 characters	
institution_acronym	The acronym of the institution. Note that authors often cite with acronyms and this information can be important in matching a query Examples: WHO, UCDavis, UCD Note: as shown above, an institution may be known by multiple acronyms, in which case all common acronyms should be deposited.	string of 1 to 255 characters	
institution_place	The primary city location of the institution. **institution_place** gives the primary city location of the institution. When the location is a major city (e.g. New York, Amsterdam), no qualifying country or U.S. state need be given. If the city is not a major city, the appropriate country and/or state or province should be added.	string of 2 to 255 characters	
institution_department	The department within an institution. **institution_department** gives the department within an institution. A common use is the department under which a **dissertation** was completed. Note that the **institution_department** is repeatable. If multiple departments are to be deposited, each one should be given in a unique **institution_department** element. Example: Department of Psychology	string of 2 to 255 characters	
degree	The degree(s) awarded for a **dissertation**.	string of 2 to 255 characters	
contract_number	The contract number under which a report or paper was written.	string of 2 to 255 characters	
common4.4.2	The Crossref file that defines components shared by multiple DOI elements. Shared components are described below.	URL https://www.crossref.org/schemas/common4.4.2.xsd	

Element or Attribute	Description	Element Content Options	Attribute Content Options

publication_type (attribute)		default value is full_text, permitted values are
		    abstract_only
		    full_text
		    bibliographic_record	

media_type (attribute)		default value is print, permitted values are
		    print
		    electronic	

sequence (attribute)		**REQUIRED**, permitted values are
		    first
		    additional	

contributor_role (attribute)		**REQUIRED**, permitted values are
		    author
		    editor
		    chair
		    reviewer
		    review-assistant
		    stats-reviewer
		    reviewer-external
		    reader
		    translator	

name-style (attribute)		optional, permitted values are
		    western
		    eastern
		    islensk
		    given-only	

language (attribute)	Language attributes are based on ISO 639	optional, permitted values are
		    aa, ab, ae, af, ak, am, an, ar, as, av, ay, az, ba,
		    be, bg, bh, bi, bm, bn, bo, br, bs, ca, ce, ch, co,
		    cr, cs, cu, cv, cy, da, de, dv, dz, ee, el, en, eo,
		    es, et, eu, fa, ff, fi, fj, fo, fr, fy, ga, gd, gl, gn, gu,
		    gv, ha, he, hi, ho, hr, ht, hu, hy, hz, ia, id, ie, ig,
		    ii, ik, io, is, it, iu, ja, jw, ka, kg, ki, kj, kk, kl, km,
		    kn, ko, kr, ks, ku, kv, kw, ky, la, lb, lg, li, ln, lo,
		    lt, lu, lv, mg, mu, mi, mk, ml, mn, mr, ms, mt,
		    my, na, nb, nd, ne, ng, nl, nn, no, nr, nv, ny, oc,
		    oj, om, or, os, pa, pi, pl, ps, pt, qu, rm, rn, ro,
		    ru, rw, sa, sc, sd, se, sg, si, sk, sl, sm, sn, so,
		    sq, sr, ss, st, su, sv, sw, ta, te, tg, th, ti, tk, tl, tn,	

Element or Attribute	Description	Element Content Options	Attribute Content Options
		to, tr, ts, tt, tw, ty, ug, uk, ur, uz, ve, vi, vo, wa, wo, xh, yi, yo, za, zh	
mime_type (attribute)	Media / mime types for component format. For mime types refer to http://www.iana.org/assignments/media-types/	optional string, permitted values are text/css, text/csv, text/enriched, text/html, text/plain, text/richtext, text/rtf, text/sgml, text/tab-separated-values, text/xml, text/xml-external-parsed-entity, multipart/mixed, multipart/alternative, multipart/digest, multipart/parallel, multipart/appledouble, multipart/header-set, multipart/form-data, multipart/report, multipart/voice-message, multipart/signed, multipart/encrypted, multipart/byteranges, application/eps, application/epub+zip, application/octet-stream, application/postscript, application/rtf, application/applefile, application/mac-binhex40, application/wordperfect5.1, application/pdf, application/x-gzip, application/zip, application/gzip, application/macwriteii, application/msword, application/sgml, application/cals-1840, application/pgp-encrypted, application/pgp-signature, application/pgp-keys, application/sgml-open-catalog, application/rc, application/xml, application/xml-external-parsed-entity, application/xml-dtd, application/batch-SMTP, application/ipp, application/ocsp-request, application/ocsp-response, application/vnd.wolfram.mathematica, application/vnd.wolfram.mathematica.package, application/vnd.wolfram.player, application/vnd.oasis.opendocument.text, application/vnd.oasis.opendocument.presentation, application/vnd.oasis.opendocument.spreadsheet, application/vnd.ms-asf, application/vnd.ms-excel, application/vnd.ms-powerpoint, application/vnd.openxmlformats-officedocument.presentationml.presentation, application/vnd.openxmlformats-officedocument.spreadsheetml.sheet, application/vnd.openxmlformats-officedocument.wordprocessingml.document, application/epub+zip, application/regex.clinical-	

Element or Attribute	Description	Element Content Options	Attribute Content Options
		trial-number, image/fits, image/jpeg, image/gif, image/ief, image/g3fax, image/tiff, image/Graphics-Metafile, image/png, audio/basic, audio/32kadpcm, audio/mpeg, audio/parityfec, audio/MP4A-LATM, audio/mpa-robust, video/x-ms-wmv, video/avi, video/mpeg, video/quicktime, video/pointer, video/parityfec, video/MP4V-ES, video/mp4, chemical/x-alchemy, chemical/x-cache-csf, chemical/x-cactvs-binary, chemical/x-cactvs-binary, chemical/x-cactvs-binary, chemical/x-cdx, chemical/x-cerius, chemical/x-chemdraw, chemical/x-cif, chemical/x-mmcif, chemical/x-chem3d, chemical/x-cmdf, chemical/x-compass, chemical/x-crossfire, chemical/x-cml, chemical/x-csml, chemical/x-ctx, chemical/x-cxf, chemical/x-daylight-smiles, chemical/x-embl-dl-nucleotide, chemical/x-galactic-spc, chemical/x-gamess-input, chemical/x-gaussian-input, chemical/x-gaussian-checkpoint, chemical/x-gaussian-cube, chemical/x-gcg8-sequence, chemical/x-genbank, chemical/x-isostar, chemical/x-jcamp-dx, chemical/x-kinemage, chemical/x-macmolecule, chemical/x-macromodel-input, chemical/x-mdl-molfile, chemical/x-mdl-rdfile, chemical/x-mdl-rxnfile, chemical/x-mdl-sdfile, chemical/x-mdl-tgf, chemical/x-mif, chemical/x-mol2, chemical/x-molconn-Z, chemical/x-mopac-input, chemical/x-mopac-graph, chemical/x-ncbi-asn1, chemical/x-ncbi-asn1-binary, chemical/x-pdb, chemical/x-swissprot, chemical/x-vamas-iso14976, chemical/x-vmd, chemical/x-xtel, chemical/x-xyz, model/stl, model/x.stl-binary, model/x.stl-ascii, model/vrml, audio/x-wav, video/x-flv, Data/spcvue.htm	

reference_distribution_opts (attribute)	Use to flag references for distribution. "none" is the default and follows current protocol - references are only distributed to everyone if the prefix level permission is set, otherwise reference distribution is limited to the DOI owner. Setting the value to "query" releases references to anyone making a query request (this overrides any established prefix level permission). Value "any" allows bulk distribution to anyone (using a	optional string no default value
		    none
		    query
		    any	

Element or Attribute	Description	Element Content Options	Attribute Content Options
	Crossref query account) using the OAI-PMH protocol, and also releases references to anyone making a query request.		
xrefFaces		type definition is CHOOSE optional, or as many as needed from group **face_markup**	
face_markup	The following are basic data types for face markup. Face markup that appears in the **title**, **subtitle**, and **original_language_title** elements should be retained when depositing metadata. Face markup in other elements (e.g. small caps in author names) must be dropped. Face markup support includes bold (b), italic (i), underline (u), over-line (ovl), superscript (sup), subscript (sub), small caps (scp), and typewriter text (tt). See https://support.crossref.org/hc/en-us/articles/214532023. MathML may also be included using the 'mml' namespace prefix.	is a group of types CHOICE OF **b**, **i**, **em**, **strong**, **u**, **ovl**, **sup**, **sub**, **scp**, **tt**, **font**, **mml:math**	
b, i, em, strong, u, ovl, sup, sub, scp, tt, font		are type **xrefFaces**	
a	An anchor element **a** is the element that contains a browser-accessible web address (URL) to some site on the Internet. It is usually followed immediately by the *href* attribute that contains the string of characters for the web address, e.g. "https://www.crossref.org/". Anchors cannot be nested.	based on type string	*href* attribute is type **anyURI**
xrefYear	The year of a date, expressed as a 4-digit integer in the range 1400 to 2200.	4-digit integer from 1400 to 2200	
xrefMonth	The month, season, or quarter of a date, expressed as a 2-digit integer. If the month is known, it should be entered using the numbers 01 to 12: 01 - January 02 - February 03 - March 04 - April 05 - May 06 - June 07 - July 08 - August 09 - September 10 - October 11 - November 12 - December	2-digit integer from 01 to 34	

Element or Attribute	Description	Element Content Options	Attribute Content Options

	If the month of publication is not known, the season can be entered instead using the numbers 21 to 24:
	
	    21 - Spring
	    22 - Summer
	    23 - Autumn
	    24 - Winter
	
	If neither the month nor season is known, the quarter can be entered using the numbers 31 to 34:
	
	    31 - First Quarter
	    32 - Second Quarter
	    33 - Third Quarter
	    34 - Fourth Quarter
	
	The values 13 to 20 and 25 to 30 are not defined and should not be used. The values 00 and 35 to 99 are errors outside of the permitted range.		

xrefDay	The day of the month of a date, expressed as a 2-digit integer from 01 to 31.	2-digit integer from 01 to 31	
doi_batch_id	The publisher must create and ensure the uniqueness of this 4-to-100-character doi_batch_id for every DOI batch they submit to Crossref. If a DOI batch submission results in errors, this ID will be used to identify the batch that caused the error. The publisher can also use the DOI batch ID to track the status of a batch submission. NOTE: Every successful DOI batch submission updates the online status summary for its journal. A failed DOI batch submission will result in error messages that use the doi_batch_id to identify the batch. Crossref continually updates and openly posts the status summaries for all of its tracked journals within a single large file called the XML Journal List, filename mddb.xml. Crossref also refers to the XML Journal List as the metadata database or MDDB.	string of 4 to 100 characters	
timestamp	Indicates version of a batch file instance or DOI. timestamp is used to uniquely identify batch files and DOI values when a DOI has been updated one or more times. timestamp is an integer representation of date and time that serves as a version number for the record that is being deposited. Because Crossref uses it as a version number, the format need not follow any public standard and therefore the publisher can determine the internal format. The schema format is a double of at least 64 bits, ensuring that a fully qualified date/time stamp of 19 digits can be submitted. When depositing data, Crossref will check to see if a DOI has	is type nonNegativeInteger	

Element or Attribute	Description	Element Content Options	Attribute Content Options
	already been deposited for the specific doi value. If the newer data carries a time stamp value that is equal to or greater than the old data based on a strict numeric comparison, the new data will replace the old data. If the new data value is less than the old data value, the new data will not replace the old data. timestamp is optional in **doi_data** and required in head. The value from the head instance timestamp will be used for all instances of **doi_data** that do not include a timestamp element.		

depositor	Information about the organization submitting DOI metadata to Crossref	SEQUENCE OF
		    depositor_name REQUIRED
		    email_address REQUIRED	

depositor_name	Name of the organization registering the DOIs. The name placed in this element should match the name under which a depositing organization has registered with Crossref.	string of 1 to 130 characters	

email_address	e-mail address to which batch success and/or error messages are sent. It is recommended that this address be unique to a position within the organization submitting data (e.g. "doi@...") rather than unique to a person. In this way, the alias for delivery of this mail can be changed as responsibility for submission of DOI data within the organization changes from one person to another.	string of 6 to 200 characters
		    pattern
		        "[\p{L}\p{N}!/+\-_]+(\.[\p{L}\p{N}!/+\-_]+)*@[\p{L}\p{N}!/+\-_]+(\.[\p{L}_-]+)+"	

registrant	The organization that owns the information being registered.	string of 1 to 255 characters	
component_number	The chapter, section, part, etc. number for a content item in a book. Unlike **volume** and **edition_number**, **component_number** should include any additional text that helps identify the type of component. In the example above, the text "Section 8" appeared on the table of contents and it is reflected here. "8" is also acceptable, however the former treatment is preferred. The type of the component is given the **component_type** attribute of **content_item**.	string of 1 to 50 characters	
edition_number	The edition number of a book. **edition_number** should include only a number and not additional text such as "edition". For example, you should submit "3", not "third edition" or "3rd edition". Roman numerals are acceptable. Publishers will update a print edition with a new edition number when more than ten percent of the content has changed. However, publishers expect to continuously update online editions of books without changing the edition number. NOTE: The ability to update the electronic version independent of the print version could be problematic for researchers. For example, if a research article cites the print version of a chapter, and a researcher subsequently links to the online version of the same chapter, the content	string of 1 to 15 characters	

Element or Attribute	Description	Element Content Options	Attribute Content Options
	may be different from the print version without the typical indication of a new edition. This topic requires further discussion outside of the scope of this specification.		

issue	The issue number in which an article is published. Only one issue name should be used for the issue. The issue number takes precedence over any other name. For example, if an issue has only a seasonal name, then the season should be listed in issue. However, if an issue has a number and a season, then only the number should be listed in issue, and the season should be placed in month (see the table in month, below, for proper encoding of the season) if the specific month of publication is not known. Do not include the words "issue", "No" or "number" in this element. When submitting DOIs for journal articles published online ahead of print, you should submit the issue number, when known, even if the pagination information for the entity is not yet known. Data may be alpha, numeric or a combination.
	
	Examples:
	
	74(3):1999
	
	<journal_issue>
	  <publication_date media_type="print">
	    <year>1999</year>
	  </publication_date>
	  <journal_volume>
	    <volume>74</volume>
	  </journal_volume>
	  <issue>3</issue>
	</journal_issue>
	
	Volume 74, Spring 1999
	
	<journal_issue>
	  <publication_date media_type="print">
	    <year>1999</year>
	  </publication_date>
	  <journal_volume>
	    <volume>74</volume>
	  </journal_volume>
	  <issue>Spring</issue>
	</journal_issue>
	
	Volume 74, issue 3 Spring 1999
		string of 1 to 32 characters	

Element or Attribute	Description	Element Content Options	Attribute Content Options

	`<journal_issue>`
	    `<publication_date` *media_type*`="print">`
	        `<month>`21`</month>`
	        `<year>`1999`</year>`
	    `</publication_date>`
	    `<journal_volume>`
	        `<volume>`74`</volume>`
	    `</journal_volume>`
	    `<issue>`3`</issue>`
	`</journal_issue>`		

doi_data	The container for elements related directly to a DOI. **doi_data** contains the doi, timestamp (version) and corresponding resource (URI) data for the doi. Cases of single-resolution (i.e. one DOI with a single corresponding URI) should be tagged with a doi/resource pair in **doi_data**. If additional resources are to be proved the collection element may also be used. The single URL provided in the resource is mandatory and serves as the single resolution target for the DOI. Note: A timestamp value placed inside **doi_data** will override any timestamp value placed in the **head** element.	SEQUENCE OF
		    doi REQUIRED
		    timestamp optional
		    resource REQUIRED
		    collection optional, or as many as needed	

resource	This element is the one that associates a specific web address (URI) with a DOI. It is based on type **resource_t**, meaning it should contain a web address of up to 2048 characters that begins with any of the common case-indifferent prefixes http:, https, or ftp:. With one exception, only one resource is allowed per **doi_data**. The exception is that collection elements may contain multiple resource elements. Cases of single-resolution (i.e. one DOI with a single corresponding URI) should be tagged with a doi/resource pair in **doi_data**. Values for the **content_version** attribute are vor (version of record) and am (advance manuscript). NOTE: URLs are referred to as resources in the 2.0 Crossref schema because they can be any valid URI.	based on type **resource_t**	*content_version* attribute
			    string
			        vor
			        am

resource_t (type)	An element of this type is a sequence of characters that can be read and used by ordinary web browsers. Such a string is often called a URL (Universal Resource Locator). A URL maybe thought of as a restriction of the slightly more generic concept of a URI (Uniform Resource Identifier), which is a sequence of characters that can also identify real-world resources (e.g. people) that are not directly accessible to a web browser. The existence of such seemingly picky distinctions, including similar terms such as URN (Uniform Resource Name), plays a vital role in protecting the integrity of the Internet by giving committees of people with nothing better to do topics about which they can debate endlessly without doing any actual harm the real functioning of the real Internet.	based on type **anyURI**
		    from 1 to 2048 characters
		    pattern
		        "([hH][tT][tT][pP]|[hH][tT][tT][pP][sS]|[fF][tT][pP]):\/\/.*"	

Element or Attribute	Description	Element Content Options	Attribute Content Options

	To be a valid resource_t (or URL-type) element, its text value must begin with one of the following very common case-indifferent "protocol" prefixes:
	  http: Hypertext Transfer Protocol, the most common form of web address in the past
	  https: Hypertext Transfer Protocol Secure, the now-preferred and more secure version of http
	  ftp: File Transfer Protocol, and older but still widely used address used only for transferring files (versus displaying web pages)		

anyURI (XML base type)	Any character string used to uniquely identify a resource on the Internet	1 to any number of characters	

collection	A collection is a container for one or more items each holding a doi or a resource (URI) which is related to the DOI in the ancestor **doi_data** element. A collection must be qualified by a property attribute or the multi-resolution attribute. The permitted values of the property attribute are:
	
	  list-based: uses an interim page and presents the list of items to the user (via Multiple Resolution)
	
	  country-based: proxy picks destination based on the country code of the user's location
	
	  crawler-based: identifies resource to be crawled by the specified crawlers.
	
	  text-mining: identifies resource to be used for text and data mining
	
	  unspecified: identifies resource with unspecified usage
	
	  syndication: identifies resource to be used for syndication
	
	  link-header: identifies resource to be used as an endpoint.
	
	The multi-resolution attribute may be used to lock or unlock DOIs for multiple resolution.
		SEQUENCE OF
		  item optional, or as many as needed
			property required attribute
			  permitted values are
			    list-based
			    country-based
			    crawler-based
			    text-mining
			    unspecified
			    syndication
			    link-header
			multi-resolution attribute
			  permitted values are
			    lock
			    unlock

item	A container used to associate a collection, doi, or resource (URI) with zero or more property elements.	SEQUENCE OF
		  CHOICE OF optional
		    doi
		    resource
			crawler optional attribute
			  permitted values are
			    google
			    msn
			    scirus
			    yahoo
			    iParadigms
			label optional attribute

Element or Attribute	Description	Element Content Options	Attribute Content Options
			string of 3 to 128 characters *country* optional attribute permitted values are AD, AE, AF, AG, AI, AL, AM, AN, AO, AQ, AR, AS, AT, AU, AW, AX, AZ, BA, BB, BD, BE, BF, BG, BH, BI, BJ, BL, BM, BN, BO, BQ, BR, BS, BT, BV, BW, BY, BZ, CA, CC, CD, CF, CG, CH, CI, CK, CL, CM, CN, CO, CR, CS, CU, CV, CX, CY, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, EH, ER, ES, ET, FI, FJ, FK, FM, FO, FR, GA, GB, GD, GE, GF, GG, GH, GI, GL, GM, GN, GP, GQ, GR, GS, GT, GU, GW, GY, HK, HM, HN, HR, HT, HU, ID, IE, IL, IM, IN, IO, IQ, IR, IS, IT, JE, JM, JO, JP, KE, KG, KH, KI, KM, KN, KP, KR, KW, KY, KZ, LA, LB, LC, LI, LK, LR, LS, LT, LU, LV, LY, MA, MC, MD, ME, MF, MG, MH, MK, ML, MM, MN, MO, MP, MQ, MR, MS, MT, MU, MV, MW, MX, MY, MZ, NA, NC, NE, NF, NG, NI, NL, NO, NP, NR, NU, NZ, OM, PA, PE, PF, PG, PH, PK, PL, PM, PN, PR, PS, PT, PW, PY, QA, RE, RO, RS, RU, RW, SA, SB, SC, SD, SE, SG, SH, SI, SJ, SK, SL, SM, SN, SO, SR, SS, ST, SV, SX,

Element or Attribute	Description	Element Content Options	Attribute Content Options
			SY, SZ, TC, TD, TF, TG, TH, TJ, TK, TL, TM, TN, TO, TR, TT, TV, TW, TZ, UA, UG, UM, US, UY, UZ, VA, VC, VE, VG, VI, VN, VU, WF, WS, YE, YT, ZA, ZM, ZW *link_header_relationship* attribute permitted values are dul
property_t (type)		string of 0 to 2048 characters	
property	This element is not currently in use. Its intent is to qualify the semantic meaning of an item or collection. A property element is a type/value pair where the property type is found in the type attribute and the value is found in the element content.	based on type **property_t**	*type* attribute is type string required

contributors	The container for all who contributed to authoring or editing an entity.	SEQUENCE OF
		    CHOICE OF as many as needed
		        organization
		        person_name
		        anonymous	

organization_t (type)		string of 1 to 511 characters white space will be collapsed	
organization	The name of an organization (as opposed to a person) that contributed to authoring an entity. If multiple organizations authored an entity, each one should be captured in a unique organization element. If an entity was authored by individuals in addition to one or more organizations, **person_name** and organization may be freely intermixed within **contributors**. **contributor_role** should be set, as appropriate, to author or editor. When a contributor translated a work, set **contributor_role** to "translator". "chair" should only be used for conference proceedings to indicate a conference chair.	based on type **organization_t**	

person_name	The name of a person (as opposed to an organization) that contributed to authoring an entity. Authors with name suffixes should have the suffix captured in suffix, not in surname. Author prefixes such as "Dr.", "Prof.", or "President" should not be included in **person_name** or any other element. Author degrees (e.g. M.D., Ph.D.) also should not be included in Crossref submissions. **contributor_role** should be set, as appropriate, to	SEQUENCE OF
		    given_name optional
		    surname REQUIRED
		    suffix optional
		    affiliation optional, or as many as 5
		    ORCID optional	

Element or Attribute	Description	Element Content Options	Attribute Content Options
	author or editor. When a contributor translated a work, set **contributor_role** to "translator". "chair" should only be used for conference proceedings to indicate a conference chair.	**alt-name** optional	
anonymous		SEQUENCE OF **affiliation** optional, or as many as 5	

given_name	A contributor's given name. The given_name, combined with surname, forms the name of an author or editor. given_name may be submitted as either initials or a full name. Do not place given_name within the surname unless it is unclear how to distinguish the given name from the surname, as may be the case in non-Western names. Do not include titles such as "Dr.", "Prof.", or "President" in given_name. These titles should not be submitted to Crossref.	string of 1 to 60 characters
		    pattern
		        "[^\d\?]*"
		    white space will be collapsed	

surname	The surname of an author or editor. The surname, combined with given_name, forms the name of an author or editor. Whenever possible, the given name should not be included in the surname element. In cases where the given name is not clear, as may happen with non-Western names or some societies in which surnames are not distinguished, you may place the entire name in surname, e.g.: <surname>Leonardo da Vinci</surname> If an author is an organization, you should use organization, not surname. Suffixes should be tagged with suffix. Author degrees (e.g. M.D., Ph.D.) should not be included in Crossref submissions.	string of 1 to 60 characters
		    pattern
		        "[^\d\?]*[^\?\s]+[^\d]*"
		    white space will be collapsed	

suffix	The suffix of an author name, e.g. junior or senior. A name suffix, that typically denotes a generation distinction, is tagged with suffix. Author degrees (e.g. M.D., Ph.D.) should not be included in Crossref submissions.	string of 1 to 10 characters	

orcid_t (type)		string
		    pattern
		        "https?://orcid.org/[0-9]{4}-[0-9]{4}-[0-9]{4}-[0-9]{3}[X0-9]{1}"	

ORCID	The ORCID for an author. The schema performs basic pattern validation, checksum validation is performed upon deposit via a system check.	based on type **orcid_t** authenticated is type boolean default value is false	
affiliation	The institution(s) with which a contributor is affiliated. This element may hold the name and location of an affiliation with which a contributor is affiliated. Please note the following points when using this element:	string of 1 to 512 characters	

Element or Attribute	Description	Element Content Options	Attribute Content Options

	1. A contributor may have up to five affiliations. Each affiliation should be in a unique affiliation element. The following is correct:
	
	    \<**affiliation**>University of New Mexico\</**affiliation**>
	    \<**affiliation**>Sandia National Laboratories\</**affiliation**>
	
	The following is NOT correct:
	
	    \<**affiliation**>University of New Mexico; Sandia National
	        Laboratories\</**affiliation**>
	
	2. The name of the institution is required in this element. The location is optional. Both of the following are correct:
	
	    \<**affiliation**>Harvard University\</**affiliation**>
	    \<**affiliation**>Harvard University, Cambridge, MA\</**affiliation**>
	
	3. Additional address information such as a URL or email address should NOT be deposited in this element
	
	4. Visual linking indicators used in publication to connect authors with their affiliations such as footnote symbols or initials should NOT be included in the affiliation element
	
	5. If you have only a single string that has the affiliation for multiple contributors to a work and that string is not broken out into the individual affiliations for each author, please do NOT deposit the affiliation information. This element is to be used only for affiliation information that is directly connected to the author with whom this information is included within the **person_name** element.		

alt-name		CHOICE OF optional, or as many as needed
		    name
		    string-name	

name		SEQUENCE OF
		    CHOICE OF **REQUIRED**
		        SEQUENCE OF
		            surname
		            given_name optional
		        given_name
		    prefix optional
		    suffix optional
			content-type attribute
			name-style attribute default
			    value is western
			    permitted values are
			        western
			        eastern
			        islensk
			        given-only
			specific-use attribute

Element or Attribute	Description	Element Content Options	Attribute Content Options

string-name		CHOICE OF optional, or as many as needed
		degrees
		given_name
		prefix
		surname
		suffix
			content-type attribute
			name-style attribute default
			    value is western
			    permitted values are
			        western
			        eastern
			        islensk
			        given-only
			specific-use attribute

prefix			*content-type* attribute *specific-use* attribute
degrees			*content-type* attribute *specific-use* attribute

titles	A container for the title and original language title elements.	SEQUENCE OF
		    SEQUENCE OF **REQUIRED**
		        title
		        subtitle optional
		    SEQUENCE OF optional
		        original_language_title
		        subtitle optional	

title	The title of the entity being registered. When a title contains a subtitle, it is preferable to capture the subtitle portion in the subtitle element. Only minimal face markup is supported, see https://support.crossref.org/hc/en-us/articles/214532023	CHOICE OF optional, or as many as needed **face_markup**	
original_language_title	The title of an entity in its original language if the registration is for a translation of a work. When providing the original language of a title, you should set the language attribute.	CHOICE OF optional, or as many as needed **face_markup**	
subtitle	The subtitle portion of an entity title. When possible, it is better to tag a title and subtitle with separate elements. If this information is not available, it is acceptable to submit the title and subtitle all within the title element with punctuation (preferably a colon) used to separate the subtitle from the title. When a subtitle is tagged, the space and punctuation between the title and subtitle text should not be included. The following examples illustrate correct and incorrect tagging practices: Correct, and also recommended: <**title**>The Human Brain</**title**> <**subtitle**>A Handbook</**subtitle**>	CHOICE OF optional, or as many as needed **face_markup**	

Element or Attribute	Description	Element Content Options	Attribute Content Options

	This one uses internal punctuation to separate the title and subtitle. It is correct but not recommended because it makes the title and the subtitle less machine-interpretable and thus harder to research:
	
	    <title>The Human Brain: A Handbook**</title>**
	
	Finally, redundantly including internal punctuation with explicit title and subtitle elements is never correct, so these two examples are wrong:
	
	    <title>The Human Brain: **</title>**
	    <subtitle>A Handbook**</subtitle>**
	
	    <title>The Human Brain**</title>**
	    <subtitle>: A Handbook**</subtitle>**		

month	The numeric month (01-12), season (21-24), or quarter (31-34) of publication. Season or quarter entries should only be used if there is no month. January through September should be written with preceding zeros as 01 through 09.
	
	The month codes are:
	
	    01 - January
	    02 - February
	    03 - March
	    04 - April
	    05 - May
	    06 - June
	    07 - July
	    08 - August
	    09 - September
	    10 - October
	    11 - November
	    12 - December
	
	The season codes are:
	
	    21 - Spring (late March to late June)
	    22 - Summer (late June to late September)
	    23 - Autumn (late September to late December)
	    24 - Winter (late December to late March
	
	The quarter codes are:
	
	    31 - First Quarter (January, February, March)
		is type **xrefMonth**	

Element or Attribute	Description	Element Content Options	Attribute Content Options
	32 - Second Quarter (April, May, June) 33 - Third Quarter (July, August, September) 34 - Fourth Quarter (October, November, December) Codes 13 to 20 and 25 to 30 are not defined and should not be used. Codes 00 and 35 to 99 are errors.		
day	The two-digit day of publication in a date. The first nine days should be entered with leading zeros as 01 to 09.	is type **xrefDay**	
year	The four-digit year of publication. Year as far back as 1400 or as far ahead as 2200 are permitted.	is type **xrefYear**	

database_date	**database_date** records key dates in the life of a database or dataset item. Within **database_date**, creation_date is the date the item was first created, **publication_date** is the date the item was first published, and **update_date** is the date the item was last updated.	SEQUENCE OF
		   creation_date optional
		   publication_date optional
		   update_date optional	

creation_date	The date a database or dataset item was created.	based on type **date_t**	
content_date	The date a content item was created.	based on type **date_t**	
posted_date	The date a pre-print was posted to a repository.	based on type **date_t**	
acceptance_date	The date a manuscript was accepted for publication.	based on type **date_t**	
update_date	The date a database or dataset item was updated.	based on type **date_t**	
publication_date	The date of publication. In all cases, multiple dates are allowed to allow for different dates of publication for online and print versions. This element was previously called date, but was renamed **publication_date** to distinguish more clearly from **conference_date**.	based on type **date_t**	

date_t (type)		SEQUENCE OF
		   month optional
		   day optional
		   year REQUIRED
			media_type attribute default
			   value is print
			   permitted values are
			      online
			      print
			      other

review_date	The date a review was published to a repository.	SEQUENCE OF
		   month REQUIRED
		   day REQUIRED
		   year REQUIRED	

Element or Attribute	Description	Element Content Options	Attribute Content Options

pages	The container for information about page ranges. When an entity has non-contiguous page information, you should capture the first page range in **first_page** and last_page. Any additional page information should be captured in other_pages. Punctuation is only allowed in other_pages. It should not appear in **first_page** and last_page. Page number letter prefixes or suffixes should be included. Roman numeral pages are permitted in both upper case and lower case. Data may be alpha, numeric or a combination.	SEQUENCE OF
		    first_page REQUIRED
		    last_page optional
		    other_pages optional	

first_page	First page number where an entity is located. Data may be alpha, numeric or a combination.	string of 1 to 32 characters	
last_page	The last page number of an entity. last_page should not be used when the last page number is the same as the first page number (i.e. when the entire entity fits on one page). Do not include punctuation for a page range in last_page. If the entity has non-contiguous paging, use last_page for the last page of the first range and place all other page information into other_pages. Data may be alpha, numeric or a combination.	string of 1 to 32 characters	
other_pages	Used to capture additional page information when items do not encompass contiguous page ranges. When an entity has non-contiguous page information, you should capture the first page range in **first_page** and last_page. Any additional page information should be captured in other_pages. You should include commas or hyphens to express discrete pages or page ranges. endash entities should be converted to ASCII hyphens. Spaces should not be included. Note that punctuation should never appear in **first_page** and last_page. Data may be alpha, numeric or a combination.	string of 1 to 100 characters	

doi_t (type)		string of 6 to 2048 characters
		    pattern
		        "10\.[0-9]{4,9}/.{1,200}"	

doi	DOI for an entity being registered with Crossref. In 2008 Crossref restricted DOI suffix characters to the following: "a-z", "A-Z", "0-9" and "-._;()/" Existing DOIs with suffix characters outside of the allowed set are still supported. For additional information on DOI syntax, see https://support.crossref.org/hc/en-us/articles/214669823	based on type **doi_t**	

cm_domain		type definition is
		    string of at least 4 up to 1024 characters
		    pattern
		        "[A-Za-z0-9_]+([-.][A-Za-z0-9_]+)*\.[A-Za-z0-9_]+([-.][A-Za-z0-9_]+)*"	

Element or Attribute	Description	Element Content Options	Attribute Content Options

cm_update_type		type definition is
		    permitted values are
		        addendum
		        clarification
		        correction
		        corrigendum
		        erratum
		        expression_of_concern
		        new_edition
		        new_version
		        partial_retraction
		        removal
		        retraction
		        withdrawal	

cm_assertion		type definition is string of 2 to 1024 characters	

cm_assertion_name		type definition is
		    NCName
		        up to 150 characters
		        at least 2 characters	

cm_assertion_label		type definition is string of 2 to 150 characters	

**cm_assertion_group_nam
e**
		type definition is
		    NCName
		        up to 150 characters
		        at least 2 characters	

cm_assertion_group_label		type definition is string of 2 to 150 characters	

isbn_t		type definition is
		    string of 10 to 17 characters
		        pattern
		            "(978-)?\d[\d \-]+[\dX]"	

isbn	The ISBN assigned to an entity. If a multi-volume work has one ISBN per volume and a unique ISBN for the series, all may be registered. The ISBN for the series must be in **series_metadata**, and the ISBN for each volume in **proceedings_metadata**, or **book_metadata**, respectively. The text "ISBN" should not be included in the ISBN element in Crossref	based on type **isbn_t**	

Element or Attribute	Description	Element Content Options	Attribute Content Options
	submissions. Although not required, the ISBN number should retain spaces or hyphens that appear in the formatted number because they aid in human-readability. For more information, please see http://www.isbn.org/standards/home/isbn/international/hyphenation-instructions.asp or http://www.isbn.org.		
noisbn	Identifies books or conference proceedings that have no ISBN assigned. In very limited cases a book may never have an ISBN, this is particularly true for older texts. Conference proceedings, however, may regularly have a volume number but no ISBN or volume title.		*reason* required attribute permitted values are archive_volume monograph simple_series
issn_t		type definition is string of 8 to 9 characters pattern "\d{4}-?\d{3}[\dX]"	
issn	An ISSN is an 8-digit code used to identify newspapers, journals, magazines and periodicals of on both printed and electronic media. An ISSN must be requested from and assigned by the International Standard Serial Number organization, https://www.issn.org/ or one of its international centers. Journals with both print and electronic editions need a separate ISSNs for each medium. Only the first seven digits are used to identify an entity, with the last digit providing verification to help ensure that numbers read from printed media were copied correctly. Because the last digit is used for verification only, ISSN derives it using mathematical rules and may be 0-9 or the capital letter X, which is the Roman number letter for 10. Printed or displayed versions of an ISSN usually have the word "ISSN" in front of them, and often a hyphen to break the ISSN into two groups of four digits. For Crossref submission, only the eight digits should be used, without any preceding text, blanks, delimiters, or the internal hyphen. If the last digit is an X it should be a capital X, not a lowercase x. Crossref validates all ISSNs supplied in deposits, so only valid ISSNs from the ISSN organization will be accepted. To verify the registration and validity of an ISSN, please use the international ISSN portal at https://portal.issn.org/. For more information about the ISSN organization and its resources see https://www.isn.org/.	based on type **issn_t**	
coden	Optionally, if a journal or conference proceedings has an American Chemical Society (ACS) CODEN assigned to it, you can use this element to record it. A CODEN is a six-letter code (initially four when created circa 1957) intended to provide a unique machine-readable name for journals.	string of 1 to 6 characters	

Element or Attribute	Description	Element Content Options	Attribute Content Options
	In 1975 the American Chemical Society, the main remaining user of CODONs, took over CODEN management. While CODONs are still available by request for non-ACS publications, they are no longer typically used for non-ACS publications.		
volume	The volume number of a published journal, or the number of a printed volume for a book or conference proceedings. A journal volume is contained in the **journal_volume** element to allow for the assignment of a DOI to an entire journal volume. Do not include the words "Volume" or "vol." in this element. Data may be alpha, numeric or a combination. Roman numerals are acceptable.	string of 1 to 32 characters	
archive_locations	Container element for archive.	SEQUENCE OF **archive** optional, or as many as needed	

archive	The required name attribute of this element specifies the name of the archiving organization(s) for an item. The allowed string values are: CLOCKSS, LOCKSS, Portico, KB, Internet Archive, and DWT (for Deep Web Technologies).		*name* required attribute is
			    string
			    permitted values are
			        CLOCKSS
			        LOCKSS
			        Portico
			        KB
			        Internet Archive
			        DWT

approval_date	The date on which: a) a **dissertation** was accepted by the **institution** awarding the **degree**, or b) a report was approved, or c) a **standard** was accepted. **approval_date** includes the same elements as **publication_date** but has no attributes. It is a distinct element from **publication_date** to reflect that an important but different semantic meeting from **publication_date**	based on type **date_t**	
citation_list	A list of articles, books, and other items cited by the parent item for which the DOI in the **doi_data** is being deposited. Some articles may have multiple lists of citations (e.g. main reference list, appendix reference list, etc.). All citations for one article should be included in a single **citation_list** regardless of whether one or more citation lists were in the original item.	SEQUENCE OF **citation** optional, or as many as needed	

Element or Attribute	Description	Element Content Options	Attribute Content Options
	When combining multiple reference lists from an item into one **citation_list** element, be sure to give each citation a unique key attribute value. For example, if an appendix in an item has a separate citation list that restarts numbering at 1, these citations should be given key attributes such as "ab1" rather than "b1". Some articles may contain "Further Reading" or "Bibliography" lists. The distinguishing factor in these lists is that the references have not been cited from the article — they only provide a list of additional related reading material. It will be left to the discretion of the publisher if these items are to be considered citations and should be deposited. NOTE: If a **citation_list** element is given and is empty then all citations for the given DOI will be deleted, otherwise any existing citations for the given DOI are left intact in the database. It is quite common that a publisher wants to fix the DOI's metadata without resubmitting the citations. Leaving out the **citation_list** element will do that. Also note that any given citations will override older citations, rather than add to them. Each submission thus should contain the complete list of both old and newly added citations.		

citation_t		type definition is
		    issn optional
		    journal_title optional
		    author optional
		    volume optional
		    issue optional
		    first_page optional
		    elocation_id optional
		    cYear optional
		    doi optional
		    isbn optional
		    series_title optional
		    volume_title optional
		    edition_number optional
		    component_number optional
		    article_title optional
		    std_designator optional
		    standards_body optional no more than 1
		    unstructured_citation optional	

citation	citation is used to deposit each citation in the reference list of the item for which the DOI is being deposited. For details see: https://crossref.zendesk.com/hc/en-us/articles/215578403	based on type **citation_t** uses attribute group **citation_key.atts**	

Element or Attribute	Description	Element Content Options	Attribute Content Options
citation_key.atts	**citation_key** allows the publisher to assign a unique ID to each citation that is deposited. It is recommended that this attribute be given the reference number if the publication uses reference numbers. For those publications that use name/date style citations, it is recommended that this attribute be used to indicate the sequential number of the citation in the reference list. However, some schema must be utilized as this is a required attribute. The system will use this key value to track the specific reference query and will return this value along with the DOI.	attribute group	*key* required attribute string of 1 to 128 characters NOTE: White space will be collapsed
unstructured_citation	Use an **unstructured_citation** to deposit references that do not follow the Crossref citation model and thus have no available structural information.	CHOICE OF optional as many as needed of **face_markup**	
journal_title	Journal title in a citation. This element is used only by the citation element. Either the full or abbreviated name of the journal can be entered, with no need to distinguish between them in an attribute. Both of the examples below thus are valid **journal_title** entries: <**journal_title**>Proc. Natl. Acad. Sci. U.S.A.</**journal_title**> <**journal_title**>Proceedings of the National Academy of Sciences of the United States of America</**journal_title**>	is type string	
series_title	Book series title in a citation. Only used in the citation element. **series_title** is an element for the deposit of book or conference series titles in citations without the hierarchy required by the **series_metadata** element. Note that face markup is not permitted when this element is deposited as part of a citation.	is type string	
volume_title	Book volume title in a citation. Only used in the citation element. **volume_title** is an element for the deposit of book or conference volume titles in citations without the hierarchy required by the **titles** element. Note that face markup is not permitted when this element is deposited as part of a citation.	is type string	
author	First author in a citation. This element is used only in the citation element. It tags one author name in a citation, without requiring a hierarchy of **contributors** or **person_name** elements. Only the first author should be deposited for each item. The author surname is required. Author initials may be added, but are not recommended because queries work best when only the last name is provided. Thus while first author "John Doe" could be submitted either as <**author**>Doe</**author**> or as <**author**>Doe J</**author**>, only the first style is recommended.	is type string	

Element or Attribute	Description	Element Content Options	Attribute Content Options
	If the author of a work is an organization rather than a person, the organization may be used: <**author**>World Health Organization</**author**>		
cYear	Year of publication in citation. Unlike the year element, cYear has a loose text model that can accommodate non-standard years such as year ranges such as "1998-1999". Note that years such as "1998a" or "1999b" should be deposited without the letter, e.g. "1998" or "1999". The letter is used for internal source document linking in name/date (Harvard) style documents rather than external cross reference linking to the original item.	is type string	
article_title	Article title in a citation. Use care to remove face markup (such as italic applied to genus or species names) from article titles as this markup is not supported by Crossref.	is type string	
elocation_id	article number or other page identifier for an article that does not have page numbers, used typically for electronic-only journals.	is type string	

sa_component	The element for depositing a stand-alone component. The parent DOI must already exist (created in an earlier deposit or via some other registration process).	SEQUENCE OF
		    component_list
			parent_doi **REQUIRED** attribute
			    string of 6 to 2048 characters

component_list	The wrapper element for including a group of components under a journal article, conference proceeding, book chapter, stand-alone component, **dissertation**, technical report or working paper, **standard**, or database.	SEQUENCE OF **component** optional, or as many as needed	

component	A container element that allows registration of supplemental information for a journal article, book chapter, or conference paper such as figures, tables, videos, or data sets. Currently, the deposit of components primarily achieves only the first objective as the Crossref system is not setup yet to support queries for components. The metadata associated with a component is intended to enable simple lookup searches of components in the future. When deposited as part of the metadata for a higher level work the parent DOI is implicitly known via the XML hierarchy. When deposited separately the DOI of the higher-level work must be provided explicitly (see **sa_component**) All descriptive elements are optional allowing for the creation of simple anonymous DOIs. The *parent_relation* attribute is mandatory and refers to the DOI described in the component's direct parent.	SEQUENCE OF
		    titles optional
		    contributors optional
		    publication_date optional
		    description optional
		    format optional
		    ai:program optional
		    CHOICE OF **REQUIRED**
		        doi_data
		        doi
			parent_relation **REQUIRED** attribute
			    permitted values are
			        isPartOf
			        isReferencedBy
			        isRequiredBy
			        isTranslationOf
			reg-agency optional attribute
			    type string
			component_size attribute
			    type nonNegativeInteger

unassigned_content	Normally book content that is published as a series is required to have a series title with an ISSN and a book title and/or a book volume number along with a book ISBN. An exception is when book chapters are published on line first prior to being assigned to a specific book in which		*type* required attribute
			    permitted values are
			        aheadOfPrint

Element or Attribute	Description	Element Content Options	Attribute Content Options
	case only the series title (and ISSN) is known at time of DOI registration. Element **unassigned_content** is used as a placeholder to force recognition of this condition and thus prevent accidental omission of book level title information. When **unassigned_content** is present the system will allow omission of the ISBN. If **unassigned_content** is not present the system will require an ISBN for the book title.		
description	A narrative description of a file (e.g. a figure caption or video description) which may be independent of the host document context. The **description** element may be present more than once to provide alternative language values.	CHOICE OF optional, or as many as needed **face_markup**	
intent_statement	Publisher's custom statement for their intent to publish content for which a pre-register DOI has been created	CHOICE OF optional, or as many as needed **b**, **i**, **u**, **a**	
competing_interest_state ment	Statement of competing interest supplied by a review author during the review process.	CHOICE OF optional, or as many as needed **face_markup**	
running_number	Running numbers to specify the various reports (ex: RC1 to RC4)	is type string	
format_t (type)	The XML data type for **format**.	string of 0 to 130 characters	
format	A narrative description of a component's file format and/or the file extension (for mime types refer to http://www.iana.org/assignments/media-types/) The **format** element may contain only the *mime_type* attribute, or in addition it may contain a narrative description of the file format. Be sure to use the narrative portion to describe only the format of the component, not its actual content. To describe the component's content use the **description** element.	based on type **format_t**	*mime_type* attribute
crossmark	CrossMark is an **optional**, XML-intensive, and labor-intensive program in which Crossref members commit to adding and maintaining document links and supporting metadata to help online easily determine when their documents are updated. Participation in is indicated by adding standard CrossMark link buttons to all publications, combined with maintaining the necessary metadata to make them work. Crossref recommends either fully committing to CrossMark for all publications or not using it at all. Note that the elements **fr:program** (Funding References), **ai:program** (Access Indicators), **ct:program** (Clinical Trials), and **rel:program** (Relationship) and their subelements are all part of CrossMark, and thus are only relevant to publishers who choose to participate in CrossMark. These optional elements and subelements are defined in separate XML files. Their meanings are described at the end of this table	SEQUENCE OF optional **crossmark_version** optional **crossmark_policy** **crossmark_domains** optional, or as many as needed **crossmark_domain_exclusive** optional SEQUENCE OF optional **updates** optional **custom_metadata** optional	

Element or Attribute	Description	Element Content Options	Attribute Content Options
	A brief discussion of why many small publishers may not have the technical and capacity resources to implement CrossMark is available at: https://www.crossref.org/education/crossmark/participating-in-crossmark/ The Crossref requirement to write and then implement and support a custom CrossMark Policy page in order to participate in CrossMark — which again is entirely optional — is discussed here: https://www.crossref.org/education/crossmark/crossmark-policy-page/ The original Crossref rationale for creating CrossMark is provided here: https://www.crossref.org/education/crossmark/		
crossmark_policy	A DOI which points to a publisher's CrossMark policy document. Publishers may have different policies for different publications.	is type **doi_t**	
crossmark_version		is type string	
crossmark_domains	This is the container for **crossmark_domain** elements. It should contain the full list of domains where the publisher maintains, updates, and corrects their published content. As a minimum, it should include the Internet domain name of the publisher's web site or web sites. If the publisher also used third-party aggregators such as Ebsco or IngentaConnect, or archives with which the publisher has agreements to update the content, these in general should also be listed within this container.	SEQUENCE OF **crossmark_domain** as many as needed	

crossmark_domain	This element helps identify whether a referring web address (URL) is coming from a recognized CrossMark domain. It consists of two subelements, **domain** and **filter**. The first subelement, **domain**, is required. It is a simple Internet domain name or subdomain name such as "www.psychoceramics.org" or "psychoceramics.org" that identifies a CrossMark domain. The **filter** subelement is optional. It is used only when the **domain** site includes content from multiple publishers or publications, e.g. when the domain is an aggregator serving multiple publishers. In such cases, **filter** should contain a text string (shorter is better) that uniquely identifies which web address paths (URLs) for that domain belong to the publisher. For example, if all of the CrossMark domain content is resides in a top-level domain folder named "alpsp", setting **filter** to that text string is sufficient to identify the CrossMark content uniquely.	SEQUENCE OF
		      domain **REQUIRED**
		      filter optional	

domain	Required. This should be a simple Internet domain name or subdomain name (e.g. www.psychoceramics.org or psychoceramics.org). It is used to identify when a referring URL is coming from a CrossMark domain.	is type **cm_domain**	

Element or Attribute	Description	Element Content Options	Attribute Content Options
filter	Optional. The filter element is used to disambiguate content in situations where multiple publishers share the same host (e.g. when on an aggregated platform). It should contain a substring of the path that can be used to uniquely identify a publisher's or publication's content. For instance, using the string "alpsp" here would help the CrossMark system distinguish between ALPSP publications on the Ingenta Connect host and other publications on the same host.	is type string	
crossmark_domain_exclusive	Publishers can set this optional **crossmark_domain_exclusive** flag to *true* to indicate that legitimate updates to CrossMark content will occur only at the CrossMark domain. Alternatively, they can set it to *false* to indicate that they ae fine with third-party sites also providing updates. This flag enables a wide range of policies. Publishers who encourage third-party hosting of their content can indicate so by setting this flag to *false* on all of their submissions, while publishers who consider only their own updates to be legitimate can set this flag to *true* for all of their publications. Finally, publishers whose policies depend on whether and item was published under Open Access (OA) rules can use this flag on a case-by-case basis.	is type boolean	
updates	Optional. A document might provide updates (e.g. corrections, clarifications, retractions) to several other documents. When this is the case, the DOIs of the documents that are being *updated* should be listed here.	SEQUENCE OF **update** **REQUIRED** at least 1 as many as needed	
update	Gives the DOI of the updated items. The attributes describe the update. According to CrossMark Terms and Conditions, an *update* is an editorially significant modification that is likely to "change the reader's interpretation or crediting of the work." **update** should *not* be used for minor changes that do not impact on the meaning or intent of the work such as spelling, punctuation, or format fixes. Earlier versions of Crossref included a *label* attribute to provide a human-readable description of the update type, and used a generic character string for the machine-readable *type* attribute of the update. In the current version (4.2.2) these are consolidated into a single enumerated type that is both human and machine readable. Arbitrary string descriptions of updates are no longer permitted. The two permitted 4.2.2 **update** attributes are: *type*: Required. The permitted (enumerated) types are: addendum, clarification, correction, corrigendum, erratum, expression_of_concern, new_edition, new_version, partial_retraction, removal, retraction, withdrawal.	based on type **doi_t**	*type* required attribute is type **cm_update_type** *date* required attribute is type date

Element or Attribute	Description	Element Content Options	Attribute Content Options
	date: Required. This date is displayed in the CrossMark dialog to help researchers determine quickly if they have seen the update.		

custom_metadata	Optional. Publishers are encouraged to provide any non-bibliographical metadata that they feel might help the researcher evaluate and make better use of the content that the Crossmark record refers to. For example, publishers might want to provide funding information, clinical trial numbers, information about the peer-review process or a summary of the publication history of the document.	CHOICE OF
		    SEQUENCE OF **REQUIRED**
		        assertion at least 1 as many as needed
		        fr:program optional
		        ai:program optional
		        ct:program optional
		    SEQUENCE OF **REQUIRED**
		        fr:program
		        ai:program optional
		        ct:program optional
		    SEQUENCE OF **REQUIRED**
		        ai:program
		        ct:program optional
		    ct:program	

assertion	An assertion is a piece of custom, non-bibliographic metadata that the publisher is asserting about the content to which the CrossMark refers. Available attributes for this element are: *explanation*: Optional. If the publisher wants to provide a further explanation of what the particular assertion means, they can link to such an explanation by providing an appropriate web address (URL) in the *explanation* attribute. *group_label*: Optional. This is the human-readable form of the *group_name* attribute that is displayed in group headings on the CrossMark metadata record dialogs. *group_name*: Optional. Some assertions could be logically grouped together in the CrossMark dialog. For instance, if the publisher is recording several pieces of metadata related to funding sources (source name, percentage, grant number), they may want to make sure that these three assertions are grouped next to each-other in the CrossMark dialog. The *group_name* attribute is the machine-readable value that will be used for grouping such assertions. *label*: Optional. This is the human-readable version of the name attribute which will be displayed in the CrossMark dialog. If this attribute is missing, then the value of the assertion will *not* be displayed in the dialog. Publishers may want to hide assertions	CHOICE OF optional, or as many as needed **face_markup**	*explanation* optional attribute is type **anyURI** *group_label* optional attribute is type **cm_assertion_group_label** *group_name* optional attribute is type **cm_assertion_group_name** *label* optional attribute is type **cm_assertion_label** *name* required attribute is type **cm_assertion_name** *order* required attribute is type integer *href* optional attribute is type **anyURI**

Element or Attribute	Description	Element Content Options	Attribute Content Options
	this way in cases where the assertion value is too large or too complex to display in the dialog, but where the assertion is nonetheless valuable enough to include in API queries and metadata dumps (e.g. detailed licensing terms). *name*: Required. This is the machine-readable name of the assertion. To give the human-readable version use the *label* attribute instead. *order*: Optional integer. The publisher may want to control the order in which assertions are displayed to the user in the CrossMark dialog. If this attribute is present all assertions will be sorted. *href*: Optional. A web address (URL) linking to information relevant to the assertion.		

designators	A wrapper for **designators** or other primary identifiers for a **standard**.	SEQUENCE OF
		  CHOICE OF optional
		    SEQUENCE OF optional
		      CHOICE OF optional
		        std_family_designator optional
		        CHOICE OF
		          std_set_designator optional
		          std_undated_designator optional
		      SEQUENCE OF optional
		        std_as_published optional
		        std_alt_as_published optional, or as many as needed
		  std_supersedes optional, or as many as needed
		  std_adopted_from optional, or as many as needed
		  std_revision_of optional, or as many as needed	

std_as_published	Designator or another primary identifier for the **standard** being deposited. Required.	based on type **std_designator_t**	*family* attribute is type string *set* attribute is type string *undated* attribute is type string

std_alt_as_published		based on type **std_designator_t**	*reason* required attribute
			  permitted values are
			    editorial
			    revision
			    reapproval

Element or Attribute	Description	Element Content Options	Attribute Content Options
			correction amendment *approvedMonth* optional attribute is 2 digits from 01 to 12 *approvedYear* required attribute is type **gYear**
std_family_designator	Provides for defining a DOI for a broad grouping of standards.	is type **std_designator_t**	
std_set_designator	Provides for defining a DOI for a set of standards (sometimes known as truncated form).	based on type **std_designator_t**	*family* attribute is type string
std_undated_designator	Provides for defining a DOI for a group of closely related standard documents (undated form is a stem for any dated form)	based on type **std_designator_t**	*family* attribute is type string *set* attribute is type string
std_supersedes	Designator for **standard** being replaced by the **standard** being deposited.	is type **std_designatorvalue_t**	
std_adopted_from	Designator for **standard** from which the current deposit is adopted.	is type **std_designatorvalue_t**	
std_revision_of	Designator for the previous revision of the **standard** being deposited. Use **alt_as_published** for revisions within **designators** having common stem.	is type **std_designatorvalue_t**	

standards_body	A wrapper for standards body information.	SEQUENCE OF
		    standards_body_name REQUIRED
		    standards_body_acronym REQUIRED	

standards_body_name	Required. Name of the standards organization or publisher.		
standards_body_acronym	Required. This acronym is used for query matching.		
std_designatorvalue_t	The XML data type for **std_designator**, **std_alt_script**, and **std_variant_form**	type definition is string of 2 to 150 characters	

std_designator_t	This XML data type defines a triplet of character string values that must include at least one standard designator value and as many as needed optional 'alternative scripts' and 'variant forms' to document variations of that standard designator. Crossref documentation as of April 2021 does not specify what alternative scripts or variant forms are, or how they differ from each other. This type is used by **std_as_published**, **std_alt_as_published**, **std_family_designator**, **std_set_designator**, and **std_undated_designator**	type definition is
		  SEQUENCE OF
		    std_designator REQUIRED
		    std_alt_script optional, or as many as needed
		    std_variant_form optional, or as many as needed	

std_designator	This character string is the primary designator for the standard.	is type **std_designatorvalue_t**	

Element or Attribute	Description	Element Content Options	Attribute Content Options
std_alt_script		is type **std_designatorvalue_t**	
std_variant_form		is type **std_designatorvalue_t**	
scn_policies	A wrapper for Scholarly Sharing Network (SCN) policy information	SEQUENCE OF **scn_policy_set** optional, or as many as needed	
scn_policy_set	A group of related SCN policies	SEQUENCE OF **scn_policy_ref** optional, or as many as needed	*start_date* optional attribute is type **date**
scn_policy_ref	An individual SCN policy	based on type **resource_t**	

jats:abstract	**jats** stands for **Journal Articles Tag Suite**, which is a National Information Standards Organization (NISO) technical standard used to describe online scientific literature. The only element of JATS used by Crossref is its specification of abstracts. The jats: prefix is required since this NISO namespace is described separate XML file. Except for this namespace prefix, **jats:abstract** works like any other Crossref element. Documentation for all of JATS is available at: https://groups.niso.org/apps/group_public/download.php/21030/ANSI-NISO-Z39.96-2019.pdf
	
	A JATS abstract largely uses intuitive HTML-style tags. Including abstracts in Crossref submissions is encouraged but not required.
	
	The most common form of a **jats:abstract** is a simple single paragraph:
	
	<**jats:abstract**><**p**>The abstract goes here.</**p**>/</**jats:abstract**>
	
	More complex abstracts are possible, including specific types and even multiple abstracts. However, these are uncommon since most readers expect an abstract by definition to be a short, simple text description of the contents of an article. For the more complex formats see: https://jats.nlm.nih.gov/archiving/tag-library/1.1d1/n-ba20.html
		CHOICE OF:
		    p optional
		        text any number of characters
		SEQUENCE OF:
		    JATS elements (mostly HTML-like)	

fr:program	**fr** stands for **Funding References** (FundRef), meaning in particular any research funding used behind a published item. FundRef elements are defined in their own XML file, so the fr: prefix is required in cases where names in that file may collide with the main Crossref file. Each Funding References submission to Crossref must contain at least one and optionally more **award_number** elements. Each **award_number** contains at least one and optionally more **funder_name** elements. A	SEQUENCE OF: **assertion** optional, or as many as needed	*name* is an attribute with the value "fundref"

Element or Attribute	Description	Element Content Options	Attribute Content Options
	funder listed in **funder_name** can also have one or more optional **funder_identifier** elements. A FundRef deposit begins with a <**fr:program**> tag within the <**crossmark**> structure, and contains a sequence of nested <**assertion**> tags. The **fr:program** element is an implicit **funder_group** and will typically contain: a) one or more **funder_name** assertions and an **award_number** assertion, or b) one or more **funder_group** assertions where each **funder_group** should contain one or more **funder_name** assertions and at least one **award_number** assertion. A single program or fundgroup can include multiple **award_number** elements. Crossref accepts deposits that lack an **award_number**, but an **award_number** should be provided whenever possible. When an article is funded under more than one award number from a single organization, use the fundgroup **assertion** to enclose and group the corresponding **funder_name**, **funder_identifier**, and award numbers. As noted earlier, **fr:program** is defined in its own schema file: https://data.crossref.org/schemas/fundref.xsd/ Funding References documentation and examples are available at: http://help.crossref.org/#fundref. If a DOI is not participating in CrossMark, FundRef data can still be deposited by placing **fr:program** in the **journal_article** metadata container. Note: Some rules will be enforced by the deposit logic (e.g. not the schema).		
assertion (fr:)	Attributes included in an fr: **assertion** are: *fundgroup*: Used to group funding info for items with multiple funding sources. This attribute is required for items with multiple **award_number** assertions, optional for items with a single **award_number**	SEQUENCE OF: **assertion** (fr:) optional, or as many as needed	*provider* is an attribute with default value publisher permitted values are publisher crossref *name* is a required attribute permitted values are

Element or Attribute	Description	Element Content Options	Attribute Content Options
	funder_identifier: The funding agency identifier. It be nested within the **funder_name** assertion *funder_name*: Required. The name of the funding agency. *award_number*: The grant number, or another fund identifier		fundgroup, funder_identifier, funder_name, award_number

ai:program	**ai** stands for **Access Indicators**, meaning the important and nearly universal issue of how a publication can be legally accessed. Access Indicator elements are defined in their own XML file, so the ai: prefix is required in cases where names in that file may collide with the main Crossref file.
	
	Its **license_ref** element provides the web address (URL) where the relevant, comprehensive, and authoritative license description for the element resides. The *applies_to* attribute of **license_ref** allows specification of licensing for three distinct stages in manuscript publication: Accepted Manuscript (*am*), Version of Record (*vor*), and Text and Data Mining (*tdm*).
	
	An **Accepted Manuscript** (*am*) reference describes any legal constraints on an item after publisher acceptance but prior to publication.
	
	A **Version of Record** (*vor*) reference describes the legal constraints on the final-form or "typeset" publication format of the item. In the modern online era it may refer either to the traditional printed version of the article, or to an online version whose quality the publisher has deemed sufficient for release online. Note that with open licenses in particular, non-*vor* versions of an item may exist in parallel with the *vor* but under different licensing.
	
	A **Text and Data Mining** (*tdm*) reference specifies both the freedoms and limitation on third-party automated collection and summarization (mining) of data from the Internet as it relates to this particular item. Most publishers have *tdm* policies that defer to the licensing of the article itself. Open licenses in particular tend to specify such issues in considerable detail, and legally must take precedence over publisher policies.
	
	The schema for Access Indicators (licenses and access) is separate from the Crossref xsd files. See: https://data.crossref.org/schemas/AccessIndicators.xsd
		SEQUENCE OF:
		    free_to_read optional
		    license_ref optional, or as many as needed
			name is an attribute with the value "AccessIndicators"

license_ref		based on type **license_ref_t**	*start_date* is an optional attribute of type **date**

Element or Attribute	Description	Element Content Options	Attribute Content Options
			applies_to is an optional attribute permitted values are vor, am, tdm
license_ref_t (element type)		web address (URL) at least 10 characters using pattern ([hH][tT][tT][pP]|[hH][tT][tT][pP][sS]|[fF][tT][pP])://.*"	
free_to_read			*end_date* is an optional attribute of type date *start_date* is an optional attribute of type **date**
ct:program	**ct** stands for **Clinical Trials**. Clinical Trial elements are defined in their own XML file, so the ct: prefix is required in cases where names in that file may collide with the main Crossref file. This element is relevant only for publications whose content is connected to clinical trials. It uses one or more **clinical-trial-number** strings to match a pattern assigned to that clinical trial in a clinical trial registry. Within each clinical-trial-number listed, a required *registry* attributed specifies the DOI of a recognized registry. The schema for the **ct:program** element is located at https://data.crossref.org/schemas/clinicaltrials.xsd Linked Clinical Trials is a CrossRef initiative helping to connect the published literature to registered clinical trials associated with the research. See http://dx.doi.org/10.18810/registries for more information.	SEQUENCE OF: **clinical-trial-number** optional, or as many as needed	
clinical-trial-number	The required *registry* attribute identifies the clinical trial associated with the article. The optional *type* attribute tells whether the article was published before (*preResults*), during (*results*), or after (*postResults*) issuance of results by the clinical trial.		*registry* is a required attribute from 12 to 200 characters using pattern "10.18810/[a-z-]+" *type* is an optional attribute permitted text values are preResults results postResults
rel:program	**rel** stands for **Relationship**, more specifically a two-way relationship between two otherwise independent DOI identified publications. Use this wrapper element to create metadata relationships between Crossref DOI identifiers, non-Crossref DOI identifiers, and other identifiers. Its schema is at https://data.crossref.org/schemas/relations.xsd. See also https://support.crossref.org/hc/en-us/articles/214357426	SEQUENCE OF: **related_item** optional, or as many as needed	*name* is an attribute with the value "relations"

Element or Attribute	Description	Element Content Options	Attribute Content Options

related_item	**related_item** is a description of a relationship to the target item, or of the target item itself.	SEQUENCE OF:
		    description (rel:) optional at most one
		    CHOICE OF:
		        inter_work_relation
		        intra_work_relation	

inter_work_relation	This element describes relationships between items that are not the same work with its required *relationship-type* attribute. The relationship values are in pairs in that describe the relationship in a complementary fashion (e.g. hasComment, isCommentOn).		*relationship-type* is a required attribute
			permitted text values are
			    isDerivedFrom,
			    hasDerivation,
			    isReviewOf,
			    hasReview,
			    isCommentOn,
			    hasComment,
			    isReplyTo, hasReply,
			    basedOnData,
			    isDataBasisFor,
			    hasRelatedMaterial,
			    isRelatedMaterial,
			    isCompiledBy,
			    compiles,
			    isDocumentedBy,
			    documents,
			    isSupplementTo,
			    isSupplementedBy,
			    isContinuedBy,
			    continues, isPartOf,
			    hasPart, references,
			    isReferencedBy,
			    isBasedOn, isBasisFor,
			    requires, isRequiredBy
			uses attribute group
			    relations_type.atts

intra_work_relation	Used to define relations between items that are essentially the same work but may differ in some way that impacts citation, for example a difference in format, language, or revision. Assigning different identifiers to exactly the same item available in one place or as copies in multiple places can be problematic and should be avoided.		*relationship-type* is a required attribute
			permitted text values are
			    isTranslationOf,
			    hasTranslation,
			    isPreprintOf,
			    hasPreprint,
			    isManuscriptOf,
			    hasManuscript,

Element or Attribute	Description	Element Content Options	Attribute Content Options
			isExpressionOf, hasExpression, isManifestationOf, hasManifestation, isReplacedBy, replaces, isSameAs, isIdenticalTo, isVariantFormOf, isOriginalFormOf, isVersionOf, hasVersion, isFormatOf, hasFormat uses attribute group *relations_type.atts*
relations_type.atts (attributes group)	The required *identifier-type* attribute may optionally need a *namespace* attribute to ensure uniqueness.		*identifier-type* is a required attribute permitted text values are doi, issn, isbn, uri, pmid, pmcid, purl, arxiv, ark, handle, uuid, ecli, accession, other *namespace* is an attribute from 4 to 1024 characters
description (rel:)	A narrative description of the relationship target item	CHOICE OF: optional, or as many as needed items from group **face_markup** (rel:)	uses attribute group *language.atts*
xrefFaces (rel:) (element type)		CHOICE OF: optional, or as many as needed items from group **face_markup** (rel:)	
face_markup (rel:) (group)	Basic data types for face markup in the target related item	CHOICE OF: **b**, **i**, **em**, **strong**, **u**, **ovl**, **sup**, **sub**, **scp**, **tt**, **font**	
b, **i**, **em**, **strong**, **u**, **ovl**, **sup**, **sub**, **scp**, **tt**, **font**		type **xrefFaces** (rel:)	
language.atts (attributes group)	Language attributes are based on ISO 639		*language* is an optional attribute permitted values are aa, ab, ae, af, ak, am, an, ar, as, av, ay, az, ba, be, bg, bh, bi, bm, bn, bo, br, bs, ca, ce, ch, co, cr, cs, cu, cv, cy, da, de, dv, dz, ee,

Element or Attribute	Description	Element Content Options	Attribute Content Options
			el, en, eo, es, et, eu, fa, ff, fi, fj, fo, fr, fy, ga, gd, gl, gn, gu, gv, ha, he, hi, ho, hr, ht, hu, hy, hz, ia, id, ie, ig, ii, ik, io, is, it, iu, ja, jw, ka, kg, ki, kj, kk, kl, km, kn, ko, kr, ks, ku, kv, kw, ky, la, lb, lg, li, ln, lo, lt, lu, lv, mg, mu, mi, mk, ml, mn, mr, ms, mt, my, na, nb, nd, ne, ng, nl, nn, no, nr, nv, ny, oc, oj, om, or, os, pa, pi, pl, ps, pt, qu, rm, rn, ro, ru, rw, sa, sc, sd, se, sg, si, sk, sl, sm, sn, so, sq, sr, ss, st, su, sv, sw, ta, te, tg, th, ti, tk, tl, tn, to, tr, ts, tt, tw, ty, ug, uk, ur, uz, ve, vi, vo, wa, wo, xh, yi, yo, za, zh

[1] Crossref, "Choosing a content registration method" [NOTE: For small publishers this is the best Crossref page for deciding how to create and submit valid DOI numbers for their publications.] Online: https://www.crossref.org/education/member-setup/choose-content-registration-method/. [Accessed 29 April 2021].

[2] Crossref, "Metadata deposit schema 4.4.2" [NOTE: For small publishers this may be the most authoritative page for finding relevant XML code. However, since many of these files have bad links in them and have not changed since 2019, their exact status is not clear.] Online: https://www.crossref.org/education/content-registration/crossrefs-metadata-deposit-schema/metadata-deposit-schema-4-4-2/. [Accessed 29 April 2021].

[3] Crossref, "Crossref XSD schema quick reference" [NOTE: This page has the best links to code and 'documentation' (diagrammed code) for defining valid DOI descriptions. Only the version 4.4.2 links are relevant to first-time users. Some links may be obsolete.] Online: https://www.crossref.org/education/content-registration/crossrefs-metadata-deposit-schema/crossref-xsd-schema-quick-reference/. [Accessed 29 April 2021].

[4] Crossref, "Example XML metadata" [NOTE: Small publishers can find a wide range of examples of valid descriptions submissions here. Unfortunately, the examples provide no guidance on what can be changed and what cannot. Only the XML code provides that.] Online: https://www.crossref.org/xml-samples/. [Accessed 29 April 2021].

[5] Crossref, "XML Schema Definition crossref4.4.2.xsd" [NOTE: This is the code that defines exactly what information can be associated with a DOI number. It looks complicated, but amounts mostly to labeling sequences and choices of short text descriptions.] Online: https://www.crossref.org/schemas/crossref4.4.2.xsd. [Accessed 29 April 2021].

[6] Crossref, "XML Schema Definition common4.4.2.xsd" [NOTE: Many of the types of short text description used for DOI numbers are common across many document types (e.g. books, articles). This code file describes these widely-used description types.] Online: https://www.crossref.org/schemas/common4.4.2.xsd. [Accessed 29 April 2021].