

# The hyperxmp package\*

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November 1, 2020

## Abstract

`hyperxmp` makes it easy for an author to include XMP metadata in a PDF document produced by  $\text{\LaTeX}$ . `hyperxmp` integrates seamlessly with `hyperref` and requires virtually no modifications to a document that already specifies document metadata through `hyperref`'s mechanisms.

## 1 Introduction

Adobe Systems, Inc. has been promoting XMP [5]—eXtensible Metadata Platform—as a standard way to include metadata within a document. The idea behind XMP is that it is an XML-based description of various document attributes and is embedded as uncompressed, unencoded text within the document it describes. By storing the metadata this way it is independent of the document's file format. That is, regardless of whether a document is in PDF, JPEG, HTML, or any other format, it is trivial for a program (or human) to locate, extract, and—using any standard XML parser—process the embedded XMP metadata.

As of this writing there are few tools that actually do process XMP. However, it is easy to imagine future support existing in file browsers for displaying not only a document's filename but also its title, list of authors, description, and other metadata.

**This is too abstract! Give me an example.** Consider a  $\text{\LaTeX}$  document with three authors—Jack Napier, Edward Nigma, and Harvey Dent—named in the  $\text{\LaTeX}$  source in the usual way: “`\author{Jack Napier \and Edward Nigma \and Harvey Dent}`”. With `hyperxmp`, the generated PDF file will contain, among other information, the following stanza of XMP code embedded within it:

```
<dc:creator>
  <rdf:Seq>
    <rdf:li>Jack Napier</rdf:li>
    <rdf:li>Edward Nigma</rdf:li>
```

---

\*This document corresponds to `hyperxmp` v5.7, dated 2020/11/01.

```

    <rdf:li>Harvey Dent</rdf:li>
  </rdf:Seq>
</dc:creator>

```

In the preceding code, the `dc` namespace refers to the Dublin Core schema, a collection of metadata properties. The `dc:creator` property surrounds the list of authors. The `rdf` namespace is the Resource Description Framework, which defines `rdf:Seq` as an ordered list of values. Each author is represented by an individual list item (`rdf:li`), making it easy for an XML parser to separate the authors' names.

Remember that XMP code is stored as *metadata*. It does not appear when viewing or printing the PDF file. Rather, it is intended to make it easy for computer applications to identify and categorize the document.

## 1.1 Supported metadata

hyperxmp knows how to embed all of the following types of metadata within a document:

- address of primary author (`lptc4xmpCore:CreatorContactInfo.CiAdrExtadr`, `lptc4xmpCore:CreatorContactInfo.CiAdrCity`, `lptc4xmpCore:CreatorContactInfo.CiAdrRegion`, `lptc4xmpCore:CreatorContactInfo.CiAdrPcode`, and `lptc4xmpCore:CreatorContactInfo.CiAdrCtry`)
- author(s) (`dc:creator`)
- base URL for relative references (`xmp:BaseURL`)
- book edition (`prism:bookEdition`)
- copyright (`dc:rights` and `xmpRights:Marked`)
- date (`dc:date`, `xmp:CreateDate`, `xmp:ModifyDate`, and `xmp:MetadataDate`)
- DOI (`prism:doi`)
- email address(es) of primary author (`lptc4xmpCore:CreatorContactInfo.CiEmailWork`)
- file format (`dc:format`)
- file name of main  $\text{\LaTeX}$  source file (`dc:source`)
- file size in bytes (`prism:byteCount`)
- ISBN (`prism:isbn`)
- ISSN—both print (`prism:issn`) and electronic (`prism:elssn`)
- issue number of parent publication (`prism:number`)

- journal article version (jav:journal\_article\_version)
- keywords (pdf:Keywords and dc:subject)
- language used (dc:language)
- license URL (xmpRights:WebStatement)
- metadata writer (photoshop:CaptionWriter)
- page count (prism:pageCount)
- page range(s) (prism:pageRange)
- PDF version (pdf:PDFVersion)
- PDF-generating tool (pdf:Producer and xmp:CreatorTool)
- PDF/A version and conformance level (pdfaid:part and pdfaid:conformance)
- PDF/UA version (pdfuaid:part)
- PDF/X standard compliance (pdfxid:GTS\_PDFXVersion)
- position/title of primary author (photoshop:AuthorsPosition)
- publication name of parent publication (prism:publicationName)
- publisher of the document (dc:publisher)
- rendition variation of the document (xmpMM:RenditionClass)
- summary (dc:description)
- subtitle (prism:subtitle)
- telephone number(s) of primary author  
(Iptc4xmpCore:CreatorContactInfo.CiTelWork)
- title (dc:title)
- trapping of colors (pdf:trapped)
- type of document (dc:type)
- type of parent publication (prism:aggregationType)
- unique identifier for the document (dc:identifier)
- URL of the document (prism:url)
- URL(s) of the primary author (Iptc4xmpCore:CreatorContactInfo.CiUrlWork)
- UUID for the document (xmpMM:DocumentID)

|  |  |
|--|--|
| <pre> \Title{Baking through the ages} \Author{A. Baker\sep C. Kneader} \Language{en-GB} \Keywords{cookies\sep muffins\sep cakes} \Publisher{Baking International} </pre> | <pre> \hypersetup{% pdftitle={Baking through the ages}, pdfauthor={A. Baker, C. Kneader}, pdflang={en-GB}, pdfkeywords={cookies, muffins, cakes}, pdfpublisher={Baking International} } </pre> |
| (a) pdfx (separate .xmpdata file)  | (b) hyperxmp (main document)   |

Figure 1: Comparison of pdfx and hyperxmp

- UUID for the document instance (`xmpMM:InstanceID`)
- version identifier for the document (`xmpMM:VersionID`)
- volume number of parent publication (`prism:volume`)

More types of metadata may be added in a future release.

## 1.2 Comparisons with similar packages

**xmpincl** In short, `xmpincl` is more flexible but `hyperxmp` is easier to use. With `xmpincl`, the author manually constructs a file of arbitrary XMP data and the package merely embeds it within the generated PDF file. With `hyperxmp`, the author specifies values for various predefined metadata types and the package formats those values as XMP and embeds the result within the generated PDF file.

`xmpincl` can embed XMP only when running under `pdfLATEX` and only when in PDF-generating mode. `hyperxmp` additionally works with a few other PDF-producing `LATEX` backends.

`hyperxmp` and `xmpincl` can complement each other. An author may want to use `hyperxmp` to produce a basic set of XMP code, then extract the XMP code from the PDF file with a text editor, augment the XMP code with any metadata not supported by `hyperxmp`, and use `xmpincl` to include the modified XMP code in the PDF file.

**pdfx** The main difference between `hyperxmp` and `pdfx` is that `hyperxmp` tries to integrate as seamlessly as possible into an existing document. It leverages `hyperref`’s `\hypersetup` command and many of `\hypersetup`’s options and defines its own options in a compatible manner. In contrast, `pdfx` requires the user to create a separate `\jobname.xmpdata` file containing `pdfx`-defined commands for each metadata element.

Figure 1 adapts an example appearing in the `pdfx` manual to `hyperxmp`. The two are comparable line-by-line in terms of how one specifies the title, author, document language, keywords, and publisher. However, `hyperxmp` implicitly writes a wealth of additional metadata into the XMP packet such as the document date, creation date, creator tool, file format, PDF version, and unique document and

instance IDs. In fact, if a document omits all of the code shown in Figure 1(b), it will still store the `\title` and `\author` data in the XMP packet.

One can therefore summarize the difference between `hyperxmp` and `pdfx` as follows: `pdfx` requires the author to be fully explicit about the document’s metadata while `hyperxmp` allows some metadata to be specified implicitly, automatically inferring it when possible. In general, `hyperxmp` tries to simplify the author’s task as much as possible.

## 2 Usage

`hyperxmp` works by postprocessing some of the package options honored by `hyperref`. To use `hyperxmp`, merely put a `\usepackage{hyperxmp}` in your document’s preamble. That line can appear anywhere before the `hyperref` PDF options are specified (i.e., with either `\usepackage[...]{hyperref}` or `\hypersetup{...}`). `hyperxmp` will construct its XMP data using the following `hyperref` options:

- `baseurl`
- `pdfauthor`
- `pdfcreationdate`
- `pdfkeywords`
- `pdflang`
- `pdfmoddate`
- `pdfproducer`
- `pdfsubject`
- `pdftitle`
- `pdftrapped`

`hyperxmp` instructs `hyperref` also to accept the following options, which have meaning only to `hyperxmp`:

- `pdfaconformance`
- `pdfapart`
- `pdfauthortitle`
- `pdfbookedition`
- `pdfbytes`
- `pdfcaptionwriter`
- `pdfcontactaddress`
- `pdfcontactcity`
- `pdfcontactcountry`
- `pdfcontactemail`
- `pdfcontactphone`
- `pdfcontactpostcode`
- `pdfcontactregion`
- `pdfcontacturl`
- `pdfcopyright`
- `pdfdate`
- `pdfdocumentid`
- `pdfdoi`
- `pdfeissn`
- `pdfidentifier`
- `pdfinstanceid`
- `pdfisbn`
- `pdfissn`
- `pdfissuenum`
- `pdflicenseurl`
- `pdfmetadate`
- `pdfmetalang`
- `pdfnumpages`
- `pdfpagerange`
- `pdfpublication`
- `pdfpublisher`
- `pdfpubstatus`
- `pdfpubtype`
- `pdfrendition`
- `pdfsource`
- `pdfsubtitle`

- `pdftype`
- `pdfurl`
- `pdfvolumenum`
- `pdfuapart`
- `pdfversionid`
- `pdfxstandard`

## 2.1 Option descriptions

`pdftitle` The document title is specified as normal for `hyperref` with `pdftitle`, but see Note 7 on page 16 for instructions on how to specify a title in multiple languages. If `pdftitle` is not specified it will inherit its value from the document’s `\title`. `hyperxmp` introduces a complementary `pdfsubtitle` option:

```
pdftitle={Frankenstein},
pdfsubtitle={The Modern Prometheus},
```

Unfortunately, the subtitle can appear in only one language. It assumed to be the same language as the document language (`pdflang`) but can be overridden by preceding the text with a bracketed ISO 639-1 two-letter language code and an optional ISO 3166-1 two-letter region code. See the example below for `pdfpublication`.

`pdfauthor` `hyperref`’s `pdfauthor` option specifies the document’s author(s). See Note 4 on page 15 for a discussion of the correct syntax. If `pdfauthor` is not specified it will inherit its value from the document’s `\author`. `pdfauthortitle` indicates the primary author’s position or title. `pdfcaptionwriter` specifies the name of the person who added the metadata to the document.

The next eight items describe how to contact the person or institution responsible for the document (the “contact”). `pdfcontactaddress` is the contact’s street address and can include the institution name if the contact is an institution; `pdfcontactcity` is the contact’s city; `pdfcontactcountry` is the contact’s country; `pdfcontactemail` is the contact’s email address (or multiple, comma-separated email addresses); `pdfcontactphone` is the contact’s telephone number (or multiple, comma-separated telephone numbers); `pdfcontactpostcode` is the contact’s postal code; `pdfcontactregion` is the contact’s state or province; and `pdfcontacturl` is the contact’s URL (or multiple, comma-separated URLs).

`pdfcopyright` defines the copyright text, and `pdflicenseurl` identifies a URL that points to the document’s license agreement.

`pdfmetalang` indicates the natural language in which certain metadata—specifically, the document’s title, subject, and copyright statement—are written. The language should be specified using an IETF language tag [11], for example, “en” for English, “en-US” for specifically United States English, “de” for German, and so forth. If `pdfmetalang` is not specified, `hyperxmp` assumes the metadata language is the same as the document language (`hyperref`’s `pdflang` option). If neither `pdfmetalang` nor `pdflang` is specified, `hyperxmp` uses only “x-default” as the metadata language.

`pdfdocumentid` XMP can include a universally unique identifier (UUID) for each document and for each instance of a given document. By default, `hyperxmp` assigns a version 4 (i.e., pseudorandom) UUID [12] for each of these. However, a document can

|                |   |
|----------------|---|
| pdfinstanceid  | alternatively specify a particular document identifier using <code>pdfdocumentid</code> and (not normally recommended) a particular instance identifier using <code>pdfinstanceid</code> . These should be of the form <code>uuid:xxxxxx-xxx-xxx-xxx-xxxxxxxxxx</code> , where “ <i>x</i> ” is a lowercase hexadecimal number. For example, <code>uuid:53ab7f19-a48c-5177-8bb2-403ad907f632</code> is a valid argument to <code>pdfdocumentid</code> (or <code>pdfinstanceid</code> ). See Leach, Mealling, and Salz’s UUID specification document for details on how to produce the various forms of UUIDs [12]. A more freeform mechanism than <code>pdfinstanceid</code>   |
| pdfversionid   | for versioning documents is available via <code>pdfversionid</code> . The version specified by <code>pdfversionid</code> can be incremented as 1, 2, 3, ...; identified with a hierarchical numbering scheme (e.g., this document is versioned 5.7 to match the package version); or labeled using any other approach. One possibility is to use a revision number or commit hash from the version-control software maintaining the document. For example, the <code>\gitVer</code> macro from the <code>gitver</code> package is an expandable (see Note 8 on page 17) version of the current Git hash that can suitably be passed to <code>pdfversionid</code> . If not specified, <code>pdfversionid</code> defaults to 1.   |
| pdfisbn        | Already-published documents can be identified in a number of ways. <code>pdfisbn</code> specifies the ISBN. <code>pdfissn</code> refers to the ISSN of the <i>print</i> version of the document while <code>pdfeissn</code> refers to the ISSN of the <i>electronic</i> version of the document. <code>pdfdoi</code> specifies the DOI and should include only the DOI name without any URL prefix. For example, specify <code>pdfdoi={10.1145/3149526.3149532}</code> , <i>not</i> <code>pdfdoi={https://doi.org/10.1145/3149526.3149532}</code> . <code>pdfurl</code> points to the complete URL for the document. In contrast, <code>baseurl</code> points one level up and is used to resolve relative URLs.  |
| pdfissn        |   |
| pdfeissn       |   |
| pdfdoi         |   |
| pdfurl         |   |
| baseurl        |   |
| pdfidentifier  | <code>pdfidentifier</code> provides an alternative mechanism to uniquely identify a document. Its advantage relative to <code>pdfisbn</code> , <code>pdfissn</code> , <code>pdfdoi</code> , etc. is its flexibility; any of a wide variety of identification types can be used. <sup>1</sup> <code>pdfidentifier</code> ’s disadvantage is that it allows only a single identifier per document. For example, a document could use <code>pdfidentifier=urn:iso:std:32000:ed-1:v1:en</code> to identify itself as version 1 of English-language ISO standard 32000-1, but then this same document could not also use <code>pdfidentifier</code> to identify itself by DOI ( <code>info:doi/...</code> ), ISBN ( <code>urn:ISSN:...</code> ), etc. (It can still use the options described in the previous paragraph, though.) If <code>pdfidentifier</code> is not specified explicitly, <code>hyperxmp</code> will use the first non-empty value out of the DOI, electronic ISSN, print ISSN, and ISBN or skip the identifier entirely if all of those are empty. |
| pdfpublication | Already-published documents can further be identified by the publication in which they appear. <code>pdfpublication</code> specifies the title of the journal, magazine, or other parent document. The title language is assumed to be the same as the document language ( <code>pdflang</code> ) but can be overridden by preceding the text with a bracketed ISO 639-1 two-letter language code and an optional ISO 3166-1 two-letter region code. For example, <code>pdfpublication={[fr]Charlie Hedbo}</code> indicates a French-language title. Were the language or pronunciation differences significant, <code>fr-FR</code> would indicate specifically the French spoken in France, as opposed to that spoken in, say, Canada ( <code>fr-CA</code> ) or Belgium ( <code>fr-BE</code> ). The publisher itself can be  |

<sup>1</sup>See, for example, <https://www.iana.org/assignments/urn-namespaces/urn-namespaces.xhtml> for the `urn:` URI scheme and <http://info-uri.info/registry/> for the `info:` URI scheme.

Table 1: Valid arguments for `pdfpubstatus`

| Value | Meaning                           |
|-------|-----------------------------------|
| AO    | Author’s Original                 |
| SMUR  | Submitted Manuscript Under Review |
| AM    | Accepted Manuscript               |
| P     | Proof                             |
| VoR   | Version of Record                 |
| CVoR  | Corrected Version of Record       |
| EVOR  | Enhanced Version of Record        |

`pdfpublisher` named using `pdfpublisher`.

`pdfpubtype` `pdfpubtype` indicates the type of publication in which the document was published. This should be one of the PRISM aggregation types [9] such as `book`, `journal`, `magazine`, `manual`, `report`, or `whitepaper`.

`pdfvolumenum` For publications in journals, magazines, and similar periodicals, a document can specify the volume number with `pdfvolumenum` and the issue number within the volume with `pdfissuenum`. `pdfpagerange` indicates the page numbers at which the document appears within the publication. The intention is that this be a comma-separated list of dash-separated ranges, as in `pdfpagerange={1,4-5}`. See Note 9 on page 17 for advice on how to assign `pdfpagerange` semi-automatically. A journal article’s publication status can be indicated with `pdfpubstatus`. This option expects to take one of the values listed in Table 1. See the NISO/ALPSP Journal Article Versions recommendation [1] for an explanation of each of those values and when to use them.

`pdfpubstatus`

`pdfbookedition` For books, `pdfbookedition` names the edition of the book. This is specified as text, not a number. As with `pdfpublication` (above), `pdfbookedition` accepts a bracketed language code, as in `pdfbookedition={ [en] Second edition }`.

`pdfdate` XMP metadata can include a number of dates (in fact, timestamps, as they include both date and time components). `pdfdate` specifies the document date. It is analogous to the  $\text{\LaTeX}$  `\date` command, and, like `\date`, defaults to the date the document was built. It must be specified in either XMP format [5] or PDF format [4]. XMP dates are written in the form `YYYY-MM-DDThh:mm:ss+TT:tt`.<sup>2</sup> A W3C recommendation [15] discusses this format in more detail, but as an example, 14 hours, 15 minutes, 9 seconds past midnight U.S. Mountain Daylight Time (UTC-6) on the 23rd day of September in the year 2014 should be written as `2014-09-23T14:15:09-06:00`. This can be truncated (with loss of information) to `2014-09-23T14:15:09`, `2014-09-23T14:15`, `2014-09-23`, `2014-09`, or `2014` but no other subsets. PDF dates are written in the form `D:YYYYMMDDhhmmss+TT’tt’`. The same date in the preceding example would be written as `D:20140923141509-06’00’` in PDF format.

The document’s creation date, modification date, and metadata date are

<sup>2</sup>Although allowed by XMP, `hyperxmp` does not currently accept fractions of a second in timestamps.



|                 |  |
|-----------------|--|
| pdfcreationdate | normally set automatically, but pdfcreationdate, pdfmoddate, and pdfmetadate can                           |
| pdfmoddate      | be used to override the defaults. Like pdfdate, pdfmetadate can be specified in                            |
| pdfmetadate     | either XMP or PDF format. However, because hyperref defines pdfcreationdate and                            |
|                 | pdfmoddate and expects these to be written as PDF dates, hyperxmp concomitantly                            |
|                 | accepts these two dates only in PDF format as well. Note that it's rare that a                             |
|                 | document would need to specify any of pdfcreationdate, pdfmoddate, or pdfmetadate.                         |
| pdftype         | pdftype describes the type of document being produced. This refers to “the                                 |
|                 | nature or genre of the resource” [5] such as poem, novel or working paper, as                              |
|                 | opposed to the file format (always application/pdf when generated by hyperxmp).                            |
|                 | Although pdftype can be assigned an arbitrary piece of text, the XMP specification                         |
|                 | recommends selecting types from a “controlled vocabulary” such as the DCMI Type                            |
|                 | Vocabulary [6]. The DCMI Type Vocabulary currently consists of only Collection,                            |
|                 | Dataset, Event, Image, InteractiveResource, MovingImage, PhysicalObject,                                   |
|                 | Service, Software, Sound, StillImage, and Text. pdftype defaults to Text,                                  |
|                 | which refers to “books, letters, dissertations, poems, newspapers, articles, archives                      |
|                 | of mailing lists,” [6] and other forms of text—all things L <sup>A</sup> T <sub>E</sub> X is commonly used |
|                 | to typeset.  |
| pdfrendition    | Sometimes a base document is rendered in different forms. pdfrendition indicates                           |
|                 | the particular rendition the current document instance represents. The value                               |
|                 | should come from the following controlled vocabulary [5]: default, draft, low-                             |
|                 | res, proof, screen, and thumbnail. hyperxmp's default value is default, which                              |
|                 | indicates the master document, unless the draft option is passed to \documentclass,                        |
|                 | in which case hyperxmp defaults to draft.  |
| pdftrapped      | hyperxmp honors hyperref's pdftrapped option. A document can indicate whether                              |
|                 | it employs color trapping by specifying pdftrapped=True or pdftrapped=False.                               |
|                 | (pdftrapped=Unknown is also allowed.)  |
| pdfapart        | pdfapart and pdfaconformance, are used in conjunction with hyperref's pdfa                                 |
| pdfaconformance | option to claim a particular PDF/A standard by which the document abides. They                             |
|                 | default to pdfapart=1 and pdfaconformance=B, indicating the PDF/A-1b standard.                             |
|                 | These can be changed (with caution) to assert that the document abides by a                                |
|                 | different standard (e.g., PDF/A-2u). A document that conforms to the PDF/UA                                |
| pdfuapart       | standard can use pdfuapart to indicate the PDF/UA conformance level. For example,                          |
| pdfxstandard    | pdfuapart=1 asserts that the document respects PDF/UA-1. pdfxstandard indicates                            |
|                 | the particular PDF/X standard by which the document abides. Unlike pdfapart and                            |
|                 | pdfaconformance, which accept a number and a letter, respectively, pdfxstandard                            |
|                 | expects a textual identification of a standard name. The following are the acceptable                      |
|                 | PDF/X standard names as of at the time of this writing.  |

- |                 |                |             |
|-----------------|----------------|-------------|
| • PDF/X-1a:2001 | • PDF/X-3:2003 | • PDF/X-5g  |
| • PDF/X-1a:2003 | • PDF/X-4      | • PDF/X-5n  |
| • PDF/X-3:2002  | • PDF/X-4p     | • PDF/X-5pg |

For example, one can specify pdfxstandard={PDF/X-4} or pdfxstandard={PDF/X-3:2003}, but specifying pdfxstandard={PDF/X-3} will not pass PDF/X validation. Note that at the time of this writing the use of the PDF/X-4p, PDF/X-5n, and PDF/X-5pg standards has not been tested.

### Rarely needed options

|             |  |
|-------------|--|
| pdfsource   | pdfsource overrides the name of the L <sup>A</sup> T <sub>E</sub> X source file. It defaults to <code>\jobname.tex</code> but can be replaced by any other string. If pdfsource is given an empty argument, no document source will be specified at all.   |
| pdfnumpages | The number of pages in the published, print version of the document can be expressed with pdfnumpages. This is computed automatically when the document is built using either pdfL <sup>A</sup> T <sub>E</sub> X or LuaL <sup>A</sup> T <sub>E</sub> X.  |
| pdfbytes    | The pdfbytes option expresses the document's file size in bytes. The intention is for this to be used to display an estimate of download time to a user or to serve as a quick check on whether a file was transmitted correctly between systems. pdfbytes is computed automatically by both pdfL <sup>A</sup> T <sub>E</sub> X and LuaL <sup>A</sup> T <sub>E</sub> X, using the file size from the previous build of the document. |

It is usually more convenient to provide values for all of the options presented in this section using hyperref's `\hypersetup` command than on the `\usepackage` command line. See the hyperref manual for more information.

## 2.2 A complete example

The following is a sample L<sup>A</sup>T<sub>E</sub>X document that provides values for most of the metadata options that hyperxmp recognizes:

```
\documentclass{article}
\usepackage[utf8]{inputenc}
\usepackage{hyperxmp}
\usepackage[unicode]{hyperref}

\title{%
  On a heuristic viewpoint concerning the production and
  transformation of light}
\author{Albert Einstein}
\date{March 17, 1905}

\hypersetup{%
  pdftitle={%
    On a heuristic viewpoint concerning the production and
    transformation of light},
  pdfsubtitle={[en-US]Putting that bum Maxwell in his place},
  pdfauthor={Albert Einstein},
  pdfauthortitle={\xmpquote{Technical Assistant\xmpcomma\ Level III}},
  pdfdate={1905-03-17},
  pdfcopyright={Copyright (C) 1905, Albert Einstein},
  pdfsubject={photoelectric effect},
  pdfkeywords={energy quanta, Hertz effect, quantum physics},
  pdflicenseurl={http://creativecommons.org/licenses/by-nc-nd/3.0/},
  pdfcaptionwriter={Scott Pakin},
  pdfcontactaddress={Kramgasse 49},
  pdfcontactcity={Bern},
```

```

pdfcontactpostcode={3011},
pdfcontactcountry={Switzerland},
pdfcontactphone={031 312 00 91},
pdfcontactemail={aeinstein@ipi.ch},
pdfcontacturl={%
  http://einstein.biz/,
  https://www.facebook.com/AlbertEinstein
},
pdfdocumentid={uuid:6d1ac9ec-4ff2-515a-954b-648eeb4853b0},
pdfversionid={2.998e8},
pdfpublication=[{de}Annalen der Physik},
pdfpublisher={Wiley-VCH},
pdfpubtype={journal},
pdfvolumenum={322},
pdfissuenum={6},
pdfpagerange={132-148},
pdfissn={0003-3804},
pdfeissn={1521-3889},
pdfpubstatus={VoR},
pdflang={en},
pdfmetalang={en},
pdfurl={http://www.physik.uni-augsburg.de/annalen/history/einstein-
papers/1905_17_132-148.pdf},
pdfdoi={10.1002/andp.19053220607},
pdfidentifier={info:lcnn/50013519}
}
\XMLLangAlt{de}{pdftitle={Über einen die Erzeugung und Verwandlung des
  Lichtes betreffenden heuristischen Gesichtspunkt}}

\begin{document}
\maketitle
A profound formal difference exists between the theoretical
concepts that physicists have formed about gases and other
ponderable bodies, and Maxwell's theory of electromagnetic
processes in so-called empty space\dots
\end{document}

```

Compile the document to PDF using any of the following approaches:

- pdf $\LaTeX$
- Lua $\LaTeX$
- Xe $\LaTeX$
- $\LaTeX$  + Dvipdfm
- $\LaTeX$  + Dvips + Adobe Acrobat Distiller

Unfortunately, the  $\text{\LaTeX}$  + Dvips + Ghostscript path doesn't work. Ghostscript bug report #690066, closed with "WONTFIX" status on 2012-05-28, explains that Ghostscript doesn't honor the `Metadata` tag needed to inject a custom XMP packet. Instead, Ghostscript fabricates an XMP packet of its own based on the metadata it finds in the PDF file's `Info` dictionary (`Author`, `Title`, `Subject`, and `Keywords`).

Once the document is compiled, the resulting PDF file will contain an XMP packet that looks something like that shown in Appendix A. Figure 2 is a screenshot of the XMP metadata as it appears in Adobe Acrobat's "Advanced" metadata dialog box. Further clicking on the "Advanced" item within that dialog box displays all of the document's metadata sorted by schema as shown in Figure 3.

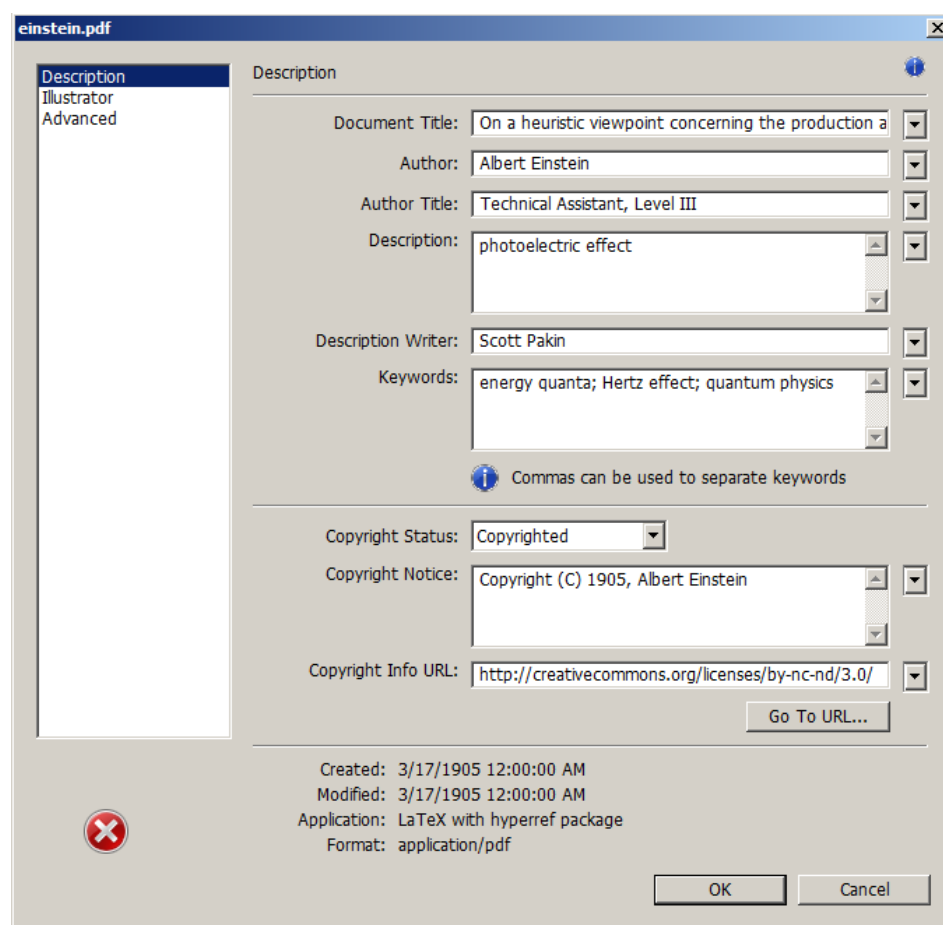


Figure 2: XMP metadata as it appears in Adobe Acrobat

## 2.3 Usage notes

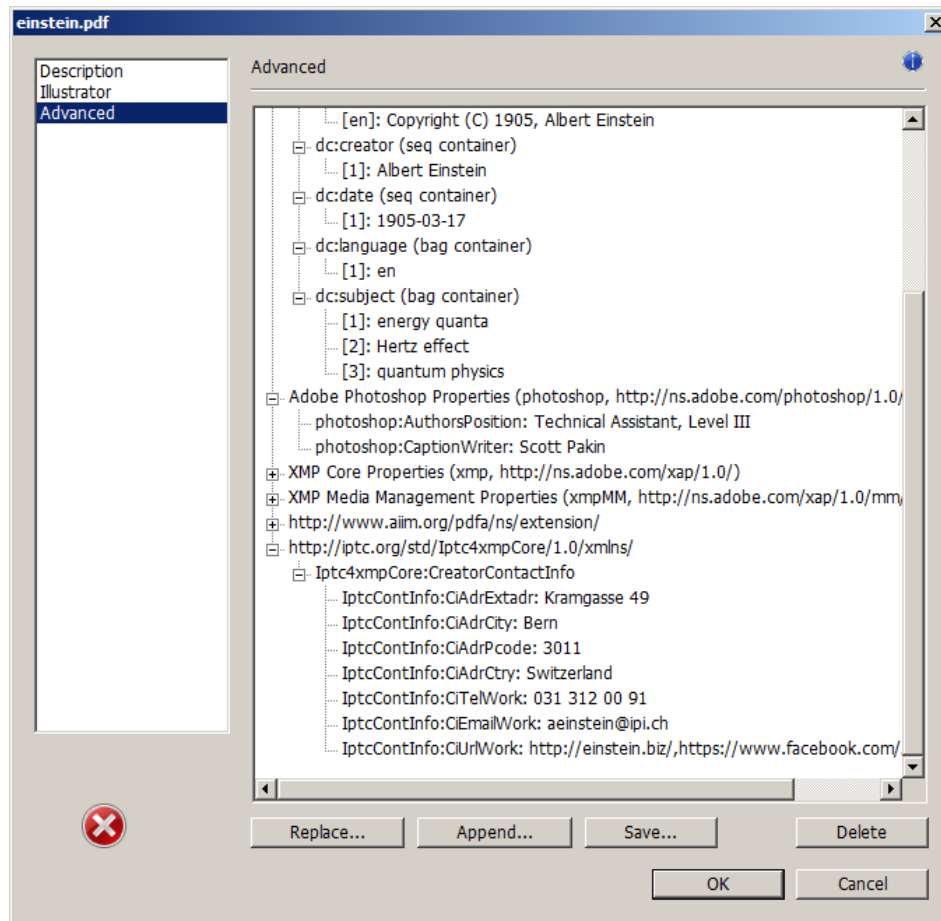


Figure 3: Additional XMP metadata as it appears in Adobe Acrobat

**Note 1: Conflicting metadata in PDF/A documents** A PDF file includes an Info dictionary containing Author, Title, Subject, and Keywords keys. The hyperref package’s pdfauthor, pdftitle, pdfsubject, and pdfkeywords options assign values to those keys. The hyperxmp package additionally uses those options to assign values to various XMP metadata: dc:creator, dc:title, dc:description, and pdf:Keywords. The PDF/A specification indicates that values that appear in both the PDF Info dictionary and XMP packet must match. The problem is that in XMP, the author and keywords can be proper lists, as in

```

<dc:creator>
  <rdf:Seq>
    <rdf:li>Curly Howard</rdf:li>
    <rdf:li>Larry Fine</rdf:li>
    <rdf:li>Moe Howard</rdf:li>
  </rdf:Seq>
</dc:creator>

```

while in PDF, the author and keywords are specified as flat strings. Alas, there is no definition of how a list should be collapsed to a flat string: “Curly Howard, Larry Fine, Moe Howard” or “Curly Howard; Larry Fine; Moe Howard” or something else. I have not yet found a form of flat string that passes all PDF/A validators. Furthermore, when Adobe Acrobat—at least Adobe Acrobat DC (2019) and earlier versions—converts a PDF file to PDF/A format, it does so by discarding all but the first author, which is an unsatisfying solution.

Starting with version 4.0, `hyperxmp`’s solution is to suppress writing metadata to the PDF Info dictionary and write it only to the XMP packet. (`hyperxmp` v5.0+ is more sophisticated. It suppresses only the author and keyword lists.) This appears to pacify PDF/A validators yet retains the author and keyword lists in their non-truncated form. If desired, the Info dictionary can be retained by passing the `keeppdfinfo` option to `\hyperxmpsetup`.

**Note 2: Acrobat multiline-field bug** The IPTC Photo Metadata schema states that “the [contact] address is a multiline field” [10]. `hyperxmp` converts commas in `pdfcontactaddress`’s argument to line breaks in the generated XML. Unfortunately, a bug in Adobe Acrobat—at least in Adobe Acrobat DC (2019) and earlier versions—causes that PDF reader to discard line breaks in the contact address. Interestingly, Adobe Illustrator CS5 correctly displays the contact address. If you find Adobe Acrobat’s behavior bothersome, you can redefine the `\xmplinesep` macro as a string to use as an address-line separator. For example, the following replaces all commas appearing in `pdfcontactaddress`’s argument with semicolons:

```
\renewcommand*{\xmplinesep}{;}
```

**Note 3: Object compression** One intention of XMP is that metadata embedded in a file be readable even without knowledge of the file’s format. That is, the metadata are expected to appear as plain text. Although `hyperxmp` does its best to honor that intention, it faces a few challenges:

1. When run with versions of `LuaLTeX` earlier than 0.85, `hyperxmp` leaves all PDF objects uncompressed. This is due to `LuaLTeX` treating object compression as a global parameter, unlike `pdfLTeX`, which treats it as a local parameter. Hence, when `hyperxmp` requests that the XMP packet be left uncompressed, `LuaLTeX` in fact leaves *all* PDF streams uncompressed. Beginning with

version 3.0, hyperxmp includes a workaround that correctly leaves only the XMP metadata uncompressed, but this workaround is implemented only for Lua<sup>A</sup>T<sub>E</sub>X v0.85 onwards.

2. X<sub>Y</sub>L<sup>A</sup>T<sub>E</sub>X (or, more precisely, the xdvipdfmx back end) exhibits the opposite problem. It compresses *all* PDF objects, including the ones containing XMP metadata. While Adobe Acrobat can still detect and utilize the XMP metadata, non-PDF-aware applications are unlikely to see the metadata. Three options to consider are to (1) use a different program (e.g., Lua<sup>A</sup>T<sub>E</sub>X), (2) pass the `--output-driver="xdvipdfmx -z0"` option to X<sub>Y</sub>L<sup>A</sup>T<sub>E</sub>X to instruct xdvipdfmx to turn off all compression (which will of course make the PDF file substantially larger), or (3) postprocess the generated PDF file by loading it into the commercial version of Adobe Acrobat and re-saving it with the Save As... menu option.

**Note 4: Literal commas** hyperxmp splits the pdfauthor and pdfkeywords lists at commas. Therefore, when specifying pdfauthor and pdfkeywords, you should separate items with commas. Also, omit “and” and other text that does not belong to any list item. The following examples should serve as clarification:

**Wrong:** pdfauthor={Jack Napier, Edward Nigma, and Harvey Dent}

**Wrong:** pdfauthor={Jack Napier; Edward Nigma; Harvey Dent}

**Right:** pdfauthor={Jack Napier, Edward Nigma, Harvey Dent}

If you need to include a literal comma within an author or keyword list (where commas normally separate list items) or a street address (where commas normally separate lines), use the \xmpcomma macro to represent it, and wrap the entire entry containing the comma within \xmpquote{...} as shown below:

```
pdfauthor={\xmpquote{Jack Napier\xmpcomma\ Jr.},
           \xmpquote{Edward Nigma\xmpcomma\ PhD},
           \xmpquote{Harvey Dent\xmpcomma\ Esq.}}

pdfcontactaddress={Office of the President,
                   \xmpquote{Wayne Enterprises\xmpcomma\ Inc.},
                   One Wayne Blvd}
```

As of version 2.2 of hyperxmp, it is acceptable to use \xmpcomma and \xmpquote within any hyperxmp option, not just in those in which a comma normally serves as a separator (i.e., lists and multiline fields). Outside of cases in which a comma serves as a separator, \xmpcomma is treated as an ordinary comma, and \xmpquote returns its argument unmodified. Hence, it is legitimate to use \xmpcomma and \xmpquote in cases like the following

```
pdfauthortitle={\xmpquote{Psychiatrist\xmpcomma\ Arkham Asylum}}
```

(Like most `hyperxmp` options, `pdfauthortitle` inserts its argument unmodified in an XMP tag.) When in doubt, use `\xmpcomma` and `\xmpquote`; it should always be safe to do so.

`\xmptilde` Version 2.4 of `hyperxmp` introduces a convenience macro called `\xmptilde`. `\xmptilde` expands to a literal tilde character instead of the nonbreaking space that “~” normally represents. Use it to represent URLs such as `http://www.pakin.org/~scott/` (“`http://www.pakin.org/\xmptilde scott/`”) in options such as `baseurl`, `pdfcontacturl` and `pdflicenseurl`.

**Note 5: Unicode support** Unicode support is provided via the `hyperref` package. If you specify `unicode=true` either as a `hyperref` option or as an argument to the `\hypersetup` command, the document can include Unicode characters in its XMP fields.

**Note 6: Automatically specified metadata** `hyperxmp` attempts to identify certain metadata automatically. The hope is that in many cases, an author can simply include `\usepackage{hyperxmp}` in a document’s preamble and benefit from a modicum of XMP metadata with no additional effort.

Currently, `pdftitle` defaults to the document’s title as specified by `\title{...}`. `pdfauthor` defaults to the document’s author(s) as specified by `\author{...}`. `pdfdate` defaults to the current date and time. `pdfmetalang` defaults to the same value as `pdflang` if non-empty, “x-default” otherwise. `hyperxmp` recognizes some class-specific metadata as well, such as that provided via the Koma letter classes (e.g., `scrlettr2`) and the ACM article class (`acmart`).

If a document uses either the `babel` or `polyglossia` packages it is recommended that it *not* explicitly set `pdflang`. `pdflang` accepts only a single language name while `hyperxmp` can automatically query `babel` and `polyglossia` for a list of all languages used in the document and include this list in an XMP `dc:language` element.

`\XMPLangAlt` **Note 7: Multilingual metadata** The `pdfmetalang` option specifies the language in which the document’s metadata is written. It defaults to the value of `pdflang`, which specifies the document language. As of version 3.3 of `hyperxmp`, it is possible to include certain metadata—specifically, the document’s title, subject, and copyright statement—in more than one language. The `\XMPLangAlt` macro provides this functionality. Usage is as follows:

```
\XMPLangAlt {<language>} { <option>=<text>, ... }
```

where `<language>` is an ISO 639-1 two-letter country code with an optional ISO 3166-1 two-letter region code (e.g., “en” for English or “en-US” for specifically US English); `<option>` is one of “`pdftitle`”, “`pdfsubject`”, or “`pdfcopyright`”; and `<text>` is the text as expressed in the specified language. By way, of example, the following code provides the document title in English then specifies an alternative title to use in four other languages:

```
\hypersetup{%
```



```

    pdfmetalang={en},
    pdftitle={English title}
}
\XMPLangAlt{de}{pdftitle={Deutscher Titel}}
\XMPLangAlt{fr}{pdftitle={Titre fran\c{c}ais}}
\XMPLangAlt{it}{pdftitle={Titolo italiano}}
\XMPLangAlt{rm}{pdftitle={Titel rumantsch}}

```

**Note 8: Expandable arguments** All arguments passed to `hyperxmp` options must be expandable, in  $\text{\TeX}$  terminology. This implies that any macros that are used in arguments are limited to a relatively small set of operations (such as conditionals and macro expansion) and must produce a string of text. Code (such as macro definitions and arithmetic operations) will be written to XMP as code, not as the result of executing the code.

By way of example, the macros provided by the `texdate` package for typesetting dates are not expandable (at least at the time of this writing). Hence, the `\printfddate{Y}` in the following code snippet is not replaced by the current year, as one might expect:

```

\usepackage{texdate}
\initcurrdate
\hypersetup{%
  pdfcopyright={Copyright \textcopyright \ \printfddate{Y}, Scott Pakin}
}

```

Rather, it generates a `dc:rights` tag of the form “Copyright © =2=0=by-1by=02020, Scott Pakin”. The garbage in that line corresponds to the remnants of the `\printfddate` code after expanding all of the  $\text{\TeX}$  primitives and certain other control sequences it uses to the empty string. For example, “`\global\advance\texd@yr by-1`” expands to “by-1”.

It is not possible to determine a priori whether or not a macro is expandable. The best advice is to carefully inspect the XMP package in the output file to ensure that any macros used in arguments to `hyperxmp` options produced the expected output.

**Note 9: Semi-automatic page ranges** Although `pdfpagerange` is intended to refer to pages in the final, published version of a document, it would be convenient for them to be generated automatically when producing a standalone PDF file that is not intended to be incorporated into a book, journal, or other publication (or if it is known that the pages will not be renumbered for publication). One approach is to use the `totpages` package help generate `pdfpagerange`. For documents numbered from 1 to  $n$ , a simple

```

\hypersetup{%
  pdfpagerange={1-\ref*{TotPages}}
}

```

should suffice. A bit more effort is needed for documents that change numbering schemes, such as using lowercase Roman numerals for the front matter and Arabic numerals for the main matter and back matter. One approach is to use `\label` to mark the first and last page of each numbering scheme and specify `pdfpagerange` as in the following:

```

\hypersetup{%
  pdfpagerange={%
    \pageref*{page:begin-front}-\pageref*{page:end-front},%
    1-\pageref*{TotPages}}%
}

```

I don't know how unnumbered pages (e.g., blank pages and the title page) are supposed to be handled. I suppose blank pages can be omitted from `pdfpagerange`, and the title page can be either omitted or listed as `title`, for example.

It appears that at least with version 2.00 of `totpages`, the `TotPages` label is not defined until after the `\begin{document}`. Consequently, using `TotPages` within a `\hypersetup` invocation in the document's preamble will produce “??” as the page count in the XMP packet. The solution is either to assign `pdfpagerange` after the `\begin{document}` or to ask L<sup>A</sup>T<sub>E</sub>X to do that on your behalf:

```

\AtBeginDocument{%
  \hypersetup{%
    pdfpagerange={1-\ref*{TotPages}}
  }%
}

```

**Note 10: Automatic computation of the PDF byte count** The PRISM Basic Metadata schema [8] defines a `prism:byteCount` property that indicates the PDF file size in bytes. `hyperxmp` computes this value automatically when the document is built using LuaL<sup>A</sup>T<sub>E</sub>X but not when using any other T<sub>E</sub>X engine. (Note that `hyperxmp` uses the file size from the *previous* run of LuaL<sup>A</sup>T<sub>E</sub>X because the new PDF file is not yet complete.)

The `latexmk` build tool can be configured to automatically append a line of the form “`\hypersetup{pdfbytes=<number>}`” to the generated `.aux` file. The subsequent build of the document will read the `.aux` file at the end of the preamble and set `pdfbytes` accordingly. The Perl code shown in Figure 4, derived from code posted by Nelson Posse Lago and John Collins on <https://github.com/borisveytsman/acmart/issues/413>, can be included in a

```

$pdflatex = 'internal mylatex %O %S';

sub mylatex {
    my @args = @_;
    $retval = system 'pdflatex', @args;
    get_pdf_size();
    return $retval;
}

sub get_pdf_size {
    my $size = (stat($out_dir1 . $root_filename . ".pdf"))[7];
    open(AUX, '>>', $aux_dir1 . $root_filename . ".aux")
        || die "Can't open file " . $aux_dir1 . $root_filename . ".aux: $!";
    if (defined($size)) {
        print AUX "\\@ifpackageloaded{hyperxmp}{\\hypersetup{pdfbytes=$size}}{\\n";
    }
    close(AUX);
}

```

Figure 4: Code to include in a `latexmk` configuration file to automate the assignment of `hyperxmp`'s `pdfbytes` option when building with `pdfLATEX`

`latexmk` configuration file to set `pdfbytes` automatically whenever `latexmk` builds a `hyperxmp`-based document using `pdfLATEX` (`latexmk`'s `--pdf` option). The code can be adapted, *mutatis mutandis*, to work with `XYLATEX` builds (`latexmk`'s `--pdfxe` or `--xelatex` option).

See the `latexmk` manual for information on configuration-file naming on different operating systems and explanations of the hooks used in the Figure 4 code.

### 3 Implementation

This section presents the commented `LATEX` source code for `hyperxmp`. Read this section only if you want to learn how `hyperxmp` is implemented.

One thing to bear in mind when reading the `hyperxmp` source code is that different actions occur at different times throughout document processing:

1. `\usepackage{hyperxmp}`: `hyperxmp` parses package options, defines a number of commands, loads various helper packages, and assigns default values to most XMP fields.
2. `\begin{document}`: `hyperxmp` loads certain packages such as `hyperref` and `ifdraft` and queries natural-language information from `babel` and `polyglossia` that becomes available only at the end of the preamble.
3. `\end{document}`: `hyperxmp` finalizes certain data that are known only at the end of the document, such as the page count, and writes the XMP packet to the PDF file.

### 3.1 Initial preparation

`\hyxmp@dq@code` The `ngerman` package redefines “ ” as an active character, which causes problems for `hyperxmp` when it tries to use that character. We therefore save the double-quote character’s current category code in `\hyxmp@dq@code` and mark the character as category code 12 (“other”). The original category code is restored at the end of the package code (Section 3.8).

```
1 \edef\hyxmp@dq@code{\the\catcode'\"}
2 \catcode'\ "=12
```

`\hyxmp@at@end` The `\hyxmp@at@end` macro includes code at the end of the document. When available (as is the case in most modern `TeX` backends), `\AtEndDocument` works well enough. Otherwise, we invoke `\AtEndDvi` from the `atenddvi` package, which is robust but requires an additional `LaTeX` run.

```
3 \@ifundefined{AtEndDocument}{%
4   \RequirePackage{atenddvi}
5   \let\hyxmp@at@end=\AtEndDvi
6 }{%
7   \let\hyxmp@at@end=\AtEndDocument
8 }
```

`\hyxmp@set@jobname` Given an expanded `\jobname` followed by `\relax`, invoke the `\hyxmp@set@jobname@dbl` macro if the job name is surrounded by double quotes and the `\hyxmp@set@jobname@plain` macro otherwise.

```
9 \def\hyxmp@set@jobname#1\relax{%
10   \ifnextchar"\hyxmp@set@jobname@dbl}{\hyxmp@set@jobname@plain}#1\relax
11 }
```

`\hyxmp@set@jobname@dbl` Set `\hyxmp@jobname` to to #1, discarding the surrounding double quotes.

```
\hyxmp@jobname 12 \def\hyxmp@set@jobname@dbl"#1"\relax{\xdef\hyxmp@jobname{#1}}
```

`\hyxmp@set@jobname@plain` Set `\hyxmp@jobname` to to #1.

```
\hyxmp@jobname 13 \def\hyxmp@set@jobname@plain#1\relax{\xdef\hyxmp@jobname{#1}}
```

Define `\hyxmp@jobname` as a sanitized version of `\jobname`. The problem with using `\jobname` directly is that it surrounds the filename with double quotes if it contains a space character. For example, a source file named `my-file.tex` results in a `\jobname` of “my-file”, but a source file named `my file.tex` results in a `\jobname` of “my file”. Trying to access “my file”.log (as is done on page 49) will fail because the filename does not in fact contain literal double quotes.

```
14 \expandafter\hyxmp@set@jobname\jobname\relax
```

`\hyxmp@aep@toks` In order for `hyperxmp` to be loaded safely during `\AtEndPreamble` we need to ensure that we perform no `\AtEndPreamble` actions until all top-level macro definitions have been made. The most straightforward approach would be to move all of `hyperxmp`’s `\AtEndPreamble` stanzas to the end of the package. However, this degrades readability of the source code. For instance, an `\AtEndPreamble` stanza

related to integration with `hyperref` could no longer appear in the “Integration with `hyperref`” section (Section 3.2). Hence, we instead store in a token list, `\hyxmp@aep@toks`, each `\AtEndPreamble` stanza as we encounter it. This token list is evaluated as one of the package’s final actions (Section 3.8).

```
15 \newtoks{\hyxmp@aep@toks}
```

## 3.2 Integration with `hyperref`

An important design decision underlying `hyperxmp` is that the package should integrate seamlessly with `hyperref`. To that end, `hyperxmp` takes XMP metadata from `hyperref`’s `baseurl`, `pdfauthor`, `pdfkeywords`, `pdflang`, `pdfproducer`, `pdfsubject`, `pdftrapped`, and `pdftitle` options. It also introduces a number of new options, which are listed on pages 5–6. For consistency with `hyperref`’s document-metadata naming conventions (which are in turn based on L<sup>A</sup>T<sub>E</sub>X’s document-metadata naming conventions), we do not prefix metadata-related macro names with our package-specific `\hyxmp@` prefix. That is, we use names like `\pdfcopyright` instead of `\hyxmp@pdfcopyright`.

We load a bunch of helper packages: `kvoptions` for package-option processing, `pdfescape` and `stringenc` for re-encoding Unicode strings, `intcalc` for performing integer calculations (division and modulo), `iftex` for determining which T<sub>E</sub>X engine is being used, `ifmtarg` for testing if a macro argument is empty or all spaces, `etoolbox` for dynamically patching existing commands (specifically, `hyperref`’s `\PDF@FinishDoc`), and `ifthen` for convenient string comparisons.

```
16 \RequirePackage{kvoptions}
17 \RequirePackage{pdfescape}
18 \RequirePackage{stringenc}
19 \RequirePackage{intcalc}
20 \RequirePackage{iftex}
21 \RequirePackage{ifmtarg}
22 \RequirePackage{etoolbox}
23 \RequirePackage{ifthen}
```

There are a few places where `hyperxmp` can take advantage of LuaT<sub>E</sub>X features. To simplify the use of LuaT<sub>E</sub>X we load the `luacode` package.

```
24 \ifLuaTeX
25   \RequirePackage{luacode}
26 \fi
```

```
\@ifmtargexp \@ifnotmtargexp
```

`\@ifmtargexp` and `\@ifnotmtargexp` do not expand their first argument. Define `\@ifmtargexp` and `\@ifnotmtargexp` as expanding versions of those macros.

```
27 \def\@ifmtargexp#1{\expandafter\@ifmtarg\expandafter{#1}}
28 \def\@ifnotmtargexp#1{\expandafter\@ifnotmtarg\expandafter{#1}}
```

```
\@if@def@and@nonempty
```

This macro combines `\@ifundefined` and `\@ifmtargexp`. If the macro named `#1` is both defined and non-empty, evaluate `#2`. Otherwise, evaluate `#3`.

```
29 \newcommand*{\@if@def@and@nonempty}[3]{%
```

```

30 \@ifundefined{#1}{#3}{%
31   \expandafter\ifmtargexp\expandafter{\csname#1\endcsname}{#3}{#2}%
32 }%
33 }

```

`\hyxmp@pdfstringdef` Because `hyperxmp` uses underscores to represent hard spaces, we need “\\_” to map initially to something other than an underscore, in particular the ASCII NAK (`^^U`) character. To accomplish this, we wrap `hyperref`’s `\pdfstringdef` macro with our own version that temporarily does the proper substitution. Later in the execution, after underscores have been replaced with spaces, we replace NAK characters with underscores.

```

34 \newcommand{\hyxmp@pdfstringdef}[2]{%
35   \let\hyxmp@textunderscore=\textunderscore
36   \let\textunderscore=\hyxmp@uscore
37   \pdfstringdef{#1}{#2}%
38   \let\textunderscore=\hyxmp@textunderscore
39 }

```

`\@pdfdatetime` Prepare to store the document’s date and (optionally) time. Whether specified by the author in XMP format or PDF format (see Section 3.4.2) we always store `\@pdfdatetime` as an XMP-format string.

```

40 \def\@pdfdatetime{}
41 \define@key{Hyp}{pdfdate}{%
42   \begingroup
43     \Hy@unicodetofalse

```

`\next` Expand `pdfdate`’s argument and convert it to XMP format.

```

44   \edef\next{%
45     \noexpand\hyxmp@pdfstringdef\noexpand\@pdfdatetime{%
46       \noexpand\hyxmp@as@xmp@date{#1}}}%
47   }%
48   \next
49   \endgroup
50 }

```

`\@pdfmetadatettime` Prepare to store the document’s metadata date and (optionally) time. Whether specified by the author in XMP format or PDF format (see Section 3.4.2) we always store `\@pdfmetadatettime` as an XMP-format string.

```

51 \def\@pdfmetadatettime{}
52 \define@key{Hyp}{pdfmetadate}{%
53   \begingroup
54     \Hy@unicodetofalse

```

`\next` Expand `pdfmetadate`’s argument and convert it to XMP format.

```

55   \edef\next{%
56     \noexpand\hyxmp@pdfstringdef\noexpand\@pdfmetadatettime{%
57       \noexpand\hyxmp@as@xmp@date{#1}}}%
58   }%

```

```

59     \next
60   \endgroup
61 }

\@pdfcopyright Prepare to store the document's copyright statement.
62 \def\@pdfcopyright{}
63 \define@key{Hyp}{pdfcopyright}{\hyxmp@pdfstringdef\@pdfcopyright{#1}}

\@pdftype Prepare to store the document's logical type, which defaults to "Text".
64 \def\@pdftype{Text}
65 \define@key{Hyp}{pdftype}{\hyxmp@pdfstringdef\@pdftype{#1}}

\@pdflicenseurl Prepare to store the URL containing the document's license agreement.
66 \def\@pdflicenseurl{}
67 \define@key{Hyp}{pdflicenseurl}{\hyxmp@pdfstringdef\@pdflicenseurl{#1}}

\@pdfauthortitle Prepare to store the author's position/title (e.g., Staff Writer).
68 \def\@pdfauthortitle{}
69 \define@key{Hyp}{pdfauthortitle}{\hyxmp@pdfstringdef\@pdfauthortitle{#1}}

\@pdfcaptionwriter Prepare to store the name of the person who inserted the hyperxmp metadata.
70 \def\@pdfcaptionwriter{}
71 \define@key{Hyp}{pdfcaptionwriter}{\hyxmp@pdfstringdef\@pdfcaptionwriter{#1}}

\@pdfmetalang Prepare to store the natural language of the document's metadata, typically as an
ISO 639-1 two-letter abbreviation.
72 \def\@pdfmetalang{}
73 \define@key{Hyp}{pdfmetalang}{\hyxmp@pdfstringdef\@pdfmetalang{#1}}

\hyxmp@no@bad@parts Complain about a bad pdfapart or pdfuapart if given trailing non-digits after a part
number.
74 \def\hyxmp@no@bad@parts#1\relax{%
75   \ifnotmtarg{#1}{%
76     \PackageWarning{hyperxmp}{pdfapart and pdfuapart must be numeric}%
77   }%
78 }

\@pdfapart Prepare to store the PDF/A part ID, which defaults to "1" if pdfa is passed to
hyperref.
79 \def\@pdfapart{}
80 \define@key{Hyp}{pdfapart}{%
81   \afterassignment\hyxmp@no@bad@parts\@tempcnta=0#1\relax
82   \hyxmp@pdfstringdef\@pdfapart{\the\@tempcnta}%
83 }

\@pdfaconformance Prepare to store the PDF/A conformance ID, which defaults to "b" if pdfa is passed
to hyperref and \@pdfapart is empty.
84 \def\@pdfaconformance{}

```

```

85 \define@key{Hyp}{pdfaconformance}{%
86   \uppercase{\hyxmp@pdfstringdef\@pdfaconformance{#1}}%
87 }

\@pdfuapart Prepare to store the PDF/UA part ID.
88 \def\@pdfuapart{}
89 \define@key{Hyp}{pdfuapart}{%
90   \afterassignment\hyxmp@no@bad@parts\@tempcnta=0#1\relax
91   \hyxmp@pdfstringdef\@pdfuapart{\the\@tempcnta}%
92 }

\hyxmp@set@pdfx@major Parse pdfxstandard as “PDF/X-⟨major⟩⟨other⟩”, setting \hyxmp@pdfx@major to
⟨major⟩.
93 \newcommand*{\hyxmp@set@pdfx@major}[1]{\hyxmp@set@pdfx@major@i#1!}

\hyxmp@set@pdfx@major@i This is the first helper macro for \hyxmp@set@pdfx@major. It stores the PDF/X
major version in \@tempcnta.
94 \def\hyxmp@set@pdfx@major@i PDF/X-{%
95   \afterassignment\hyxmp@set@pdfx@major@ii
96   \@tempcnta=%
97 }

\hyxmp@set@pdfx@major@ii This is the second helper macro for \hyxmp@set@pdfx@major. It copies the PDF/X
\hyxmp@pdfx@major major version from \@tempcnta to \@hyxmp@pdfx@major and discards the rest of
the PDF/X standard string.
98 \def\hyxmp@set@pdfx@major@ii#1!{%
99   \edef\hyxmp@pdfx@major{\the\@tempcnta}%
100 }

\hyxmp@check@std Compare a user-provided string to a fixed string. (Assumption: Both are names of
PDF/X standard versions.) If they match, undefine \next, which we assume was
previously defined to issue an “unrecognized standard” warning message.
101 \newcommand*{\hyxmp@check@std}[2]{%
102   \ifthenelse{\equal{#1}{#2}}{%
103     {\global\let\next=\relax}%
104     {}%
105 }%

\@pdfxstandard Prepare to store the PDF/X standard.
106 \def\@pdfxstandard{}
107 \def\hyxmp@pdfx@major{}
108 \define@key{Hyp}{pdfxstandard}{%
109   \hyxmp@pdfstringdef\@pdfxstandard{#1}%

\next Issue a warning message if the PDF/X standard named by the user does not appear
in a list of known PDF/X standards. This is to caution the user that hyperxmp
generates standard-specific XMP metadata and it can only guess at the correct

```



format for new standard versions. (See the comments on page 73 above the definition of `\hyxmp@pdfx@id@schema`, for example.)

```

110 \gdef\next{%
111   \PackageWarning{hyperxmp}{Unrecognized PDF/X standard ‘#1’}%
112 }%
113 \hyxmp@check@std{#1}{PDF/X-1a:2001}%
114 \hyxmp@check@std{#1}{PDF/X-1a:2003}%
115 \hyxmp@check@std{#1}{PDF/X-3:2002}%
116 \hyxmp@check@std{#1}{PDF/X-3:2003}%
117 \hyxmp@check@std{#1}{PDF/X-4}%
118 \hyxmp@check@std{#1}{PDF/X-4p}%
119 \hyxmp@check@std{#1}{PDF/X-5g}%
120 \hyxmp@check@std{#1}{PDF/X-5n}%
121 \hyxmp@check@std{#1}{PDF/X-5pg}%
122 \next

\hyxmp@pdfx@major Parse the PDF/X major version number from pdfxstandard and assign it to
\hyxmp@pdfx@major.
123 \hyxmp@set@pdfx@major{#1}%
124 }

\@pdfsource Prepare to store the document’s source, which defaults to the value of \jobname.
125 \edef\@pdfsource{\hyxmp@jobname.tex}
126 \define@key{Hyp}{pdfsource}{\hyxmp@pdfstringdef\@pdfsource{#1}}

\hyxmp@DocumentID Prepare to store a UUID that represents the document.
127 \def\hyxmp@DocumentID{}
128 \define@key{Hyp}{pdfdocumentid}{\hyxmp@pdfstringdef\hyxmp@DocumentID{#1}}

\hyxmp@InstanceID Prepare to store a UUID that represents the current instance of the document.
129 \def\hyxmp@InstanceID{}
130 \define@key{Hyp}{pdfinstanceid}{\hyxmp@pdfstringdef\hyxmp@InstanceID{#1}}

\@pdfversionid Prepare to store a string that represents the current version of the document. It
defaults to “1”.
131 \def\@pdfversionid{1}
132 \define@key{Hyp}{pdfversionid}{\hyxmp@pdfstringdef\@pdfversionid{#1}}

\ifdraft Use the ifdraft package to determine if this is a draft or final document. The
\next challenge here is that we want to use ifdraft if it’s already loaded, load it if not, and
not break any incompatible, author-defined \ifdraft macros that may occur either
before or after the \usepackage{hyperxmp}. Our solution begins by defining a new
group. Then, if ifdraft is not yet loaded, we locally undefine \ifdraft and load the
package. In this case, we later “unload” the package by setting \ver@ifdraft.sty
to \relax.
133 \begingroup
134 \@ifpackageloaded{ifdraft}{%
135   \let\next=\relax

```

```

136 }{%
137   \let\ifdraft=\relax
138   \RequirePackage{ifdraft}%
139   \def\next{%
140     \expandafter\global\expandafter\let\csname ver@ifdraft.sty\endcsname=\relax
141   }%
142 }%

\@pdfrendition Prepare to store a tag describing how this rendition of the document differs from
the master. The default value is default, which indicates the master document,
except in the case of \documentclass[draft], for which \@pdfrendition defaults
to draft.

143 \ifdraft{%
144   \gdef\@pdfrendition{draft}%
145 }{%
146   \gdef\@pdfrendition{default}%
147 }
148 \next
149 \endgroup
150 \define@key{Hyp}{pdfrendition}{\hyxmp@pdfstringdef\@pdfrendition{#1}}

\@pdfpublication Prepare to store the name of the publication in which the document was published.

151 \def\@pdfpublication{}
152 \define@key{Hyp}{pdfpublication}{\hyxmp@pdfstringdef\@pdfpublication{#1}}

\@pdfpubtype Prepare to store the type of the publication in which the document was published.

153 \def\@pdfpubtype{}
154 \define@key{Hyp}{pdfpubtype}{\hyxmp@pdfstringdef\@pdfpubtype{#1}}

\@pdfbytes Prepare to store the size of the file in bytes.

155 \def\@pdfbytes{}
156 \define@key{Hyp}{pdfbytes}{\hyxmp@pdfstringdef\@pdfbytes{#1}}

\@pdfnumpages Prepare to store the number of pages in the file.

157 \def\@pdfnumpages{}
158 \define@key{Hyp}{pdfnumpages}{\hyxmp@pdfstringdef\@pdfnumpages{#1}}

\@pdfissn Prepare to store the ISSN of the publication in which the document was published.

159 \def\@pdfissn{}
160 \define@key{Hyp}{pdfissn}{\hyxmp@pdfstringdef\@pdfissn{#1}}

\@pdfeissn Prepare to store the ISSN of the electronic version of the publication in which the
document was published.

161 \def\@pdfeissn{}
162 \define@key{Hyp}{pdfeissn}{\hyxmp@pdfstringdef\@pdfeissn{#1}}

\@pdfisbn Prepare to store the ISBN of the publication in which the document was published.

163 \def\@pdfisbn{}
164 \define@key{Hyp}{pdfisbn}{\hyxmp@pdfstringdef\@pdfisbn{#1}}

```

`\@pdfbookedition` Prepare to store the edition of the book in which the document was published.

```

165 \def\@pdfbookedition{}
166 \define@key{Hyp}{pdfbookedition}{\hyxmp@pdfstringdef\@pdfbookedition{#1}}

```

`\@pdfpublisher` Prepare to store the name of the document’s publisher.

```

167 \def\@pdfpublisher{}
168 \define@key{Hyp}{pdfpublisher}{\hyxmp@pdfstringdef\@pdfpublisher{#1}}

```

`\@pdfvolumenum` Prepare to store the volume identifier of the publication in which the document was published.

```

169 \def\@pdfvolumenum{}
170 \define@key{Hyp}{pdfvolumenum}{\hyxmp@pdfstringdef\@pdfvolumenum{#1}}

```

`\@pdfissuenum` Prepare to store the identifier of the issue within a volume of the publication in which the document was published.

```

171 \def\@pdfissuenum{}
172 \define@key{Hyp}{pdfissuenum}{\hyxmp@pdfstringdef\@pdfissuenum{#1}}

```

`\@pdfpagerange` Prepare to store the document’s range of pages within the publication in which the document was published.

```

173 \def\@pdfpagerange{}
174 \define@key{Hyp}{pdfpagerange}{\hyxmp@pdfstringdef\@pdfpagerange{#1}}

```

`\@pdfdoi` Prepare to store a DOI that represents the current instance of the document.

```

175 \def\@pdfdoi{}
176 \define@key{Hyp}{pdfdoi}{\hyxmp@pdfstringdef\@pdfdoi{#1}}

```

`\@pdfurl` Prepare to store a URL that represents where the document can be found. Note that we do not prepend `baseurl` to the value provided.

```

177 \def\@pdfurl{}
178 \define@key{Hyp}{pdfurl}{\hyxmp@pdfstringdef\@pdfurl{#1}}

```

`\@pdfidentifier` Prepare to store an identifier that uniquely represents the document.

```

179 \def\@pdfidentifier{}
180 \define@key{Hyp}{pdfidentifier}{\hyxmp@pdfstringdef\@pdfidentifier{#1}}

```

`\@pdfsubtitle` Prepare to store the document’s subtitle.

```

181 \def\@pdfsubtitle{}
182 \define@key{Hyp}{pdfsubtitle}{\hyxmp@pdfstringdef\@pdfsubtitle{#1}}

```

`\@pdfpubstatus` Prepare to store the document’s journal article version.

```

183 \def\@pdfpubstatus{}
184 \define@key{Hyp}{pdfpubstatus}{\hyxmp@pdfstringdef\@pdfpubstatus{#1}}

```

The following eight macros—`\@pdfcontactaddress`, `\@pdfcontactcity`, `\@pdfcontactregion`, `\@pdfcontactpostcode`, `\@pdfcontactcountry`, `\@pdfcontactphone`, `\@pdfcontactemail`, and `\@pdfcontacturl`—together specify how to contact the person or institution responsible for the document.

`\@pdfcontactaddress` Prepare to store a street address for the document's contact person/institution. The IPTC standard defines this as follows:

The contact information address part. Comprises an optional company name and all required information to locate the building or postbox to which mail should be sent. To that end, the address is a multiline field.

For consistency with the rest of `hyperxmp`, we use commas to separate terms, in this case, lines of the address. The author can use `\xmpquote` and `\xmpcomma` to include literal commas.

```
185 \def\@pdfcontactaddress{}
186 \define@key{Hyp}{pdfcontactaddress}{%
187   \let\xmpcomma=\hyxmp@comma
188   \def\xmpquote##1{##1}%
189   \hyxmp@pdfstringdef\@pdfcontactaddress{#1}%
190   \def\xmpcomma{,}%
191   \let\xmpquote=\relax
192 }
```

`\@pdfcontactcity` Prepare to store the city of the document's contact person/institution.

```
193 \def\@pdfcontactcity{}
194 \define@key{Hyp}{pdfcontactcity}{\hyxmp@pdfstringdef\@pdfcontactcity{#1}}
```

`\@pdfcontactregion` Prepare to store the state or province of the document's contact person/institution.

```
195 \def\@pdfcontactregion{}
196 \define@key{Hyp}{pdfcontactregion}{\hyxmp@pdfstringdef\@pdfcontactregion{#1}}
```

`\@pdfcontactpostcode` Prepare to store the postal code of the document's contact person/institution.

```
197 \def\@pdfcontactpostcode{}
198 \define@key{Hyp}{pdfcontactpostcode}{\hyxmp@pdfstringdef\@pdfcontactpostcode{#1}}
```

`\@pdfcontactcountry` Prepare to store the country of the document's contact person/institution.

```
199 \def\@pdfcontactcountry{}
200 \define@key{Hyp}{pdfcontactcountry}{\hyxmp@pdfstringdef\@pdfcontactcountry{#1}}
```

`\@pdfcontactphone` Prepare to store the telephone number of the document's contact person/institution.

```
201 \def\@pdfcontactphone{}
202 \define@key{Hyp}{pdfcontactphone}{\hyxmp@pdfstringdef\@pdfcontactphone{#1}}
```

`\@pdfcontactemail` Prepare to store the email address of the document's contact person/institution.

```
203 \def\@pdfcontactemail{}
204 \define@key{Hyp}{pdfcontactemail}{\hyxmp@pdfstringdef\@pdfcontactemail{#1}}
```

`\@pdfcontacturl` Prepare to store the URL of the document's contact person/institution.

```
205 \def\@pdfcontacturl{}
206 \define@key{Hyp}{pdfcontacturl}{\hyxmp@pdfstringdef\@pdfcontacturl{#1}}
```

```

\hyxmp@no@info@lists Suppress hyperref from writing Author and Keywords into the Info dictionary. This
                        prevents conflicts between the PDF metadata and the XMP metadata that cause
                        PDF/A validation to fail. The PDF metadata can be restored by passing the
                        keeppdfinfo option to \hypersetup.
207 \def\hyxmp@no@info@lists{%

\hyxmp@suppress@pdf@info If \patchcmd fails for any reason—most likely, a modification to the hyperref
\next package—our fallback is to prevent hyperref from writing any data to the PDF Info
                        dictionary.
208 \def\hyxmp@suppress@pdf@info{%
209   \global\let\PDF@FinishDoc=\@empty
210   \PackageWarningNoLine{hyperxmp}{%
211     Suppressing the _entire_ PDF Info dictionary.\MessageBreak
212     Please notify the hyperxmp maintainer%
213   }%
214 }%
215 \let\next=\relax
216 \patchcmd
217   {\PDF@FinishDoc}%
218   {/Author(\@pdfauthor)}%
219   {}%
220   {}%
221   {\let\next=\hyxmp@suppress@pdf@info}%
222 \patchcmd
223   {\PDF@FinishDoc}%
224   {/Keywords(\@pdfkeywords)}%
225   {}%
226   {}%
227   {\let\next=\hyxmp@suppress@pdf@info}%
228 \next
229 }

230 \define@key{Hyp}{keeppdfinfo}[true]{%
231   \gdef\hyxmp@no@info@lists{%
232 }

```

We need to capture list arguments (viz. `pdfauthor` and `pdfkeywords`) before `hyperref` converts them to `PDFDocEncoding`. Otherwise, `\xmpcomma` is permanently replaced with a comma, and we lose our ability to change it to a `\hyxmp@comma`. We therefore need to augment `hyperref`'s option processing with our own. Because `hyperref` has not yet been loaded we need to ensure that our augmentation gets loaded in the future: after the `\usepackage{hyperref}` but before options are passed to that package.

For lack of a better approach, `hyperxmp` redefines `\ProcessKeyvalOptions` to alter the way `hyperref` processes `pdfauthor` and `pdfkeywords`. This is somewhat heavy-handed as it gets executed for *every* subsequently loaded package that uses `\ProcessKeyvalOptions`, but at least it does what we need. `hyperxmp` also redefines `\hypersetup` to do the same thing. This is required in case `hyperref` is loaded before `hyperxmp`.

|   |  |
|---|--|
| <code>\hyxmp@pdfauthor</code><br><code>\hyxmp@pdfkeywords</code>  | Prepare to store the name of the author and a list of keywords.<br>233 <code>\def\hyxmp@pdfauthor{}</code><br>234 <code>\def\hyxmp@pdfkeywords{}</code>  |
| <code>\hyxmp@redefine@Hyp</code>  | If not already redefined, redefine <code>hyperref</code> 's <code>pdfauthor</code> and <code>pdfkeywords</code> options to properly handle <code>\xmpcomma</code> and <code>\xmpquote</code> .<br>235 <code>\newcommand*{\hyxmp@redefine@Hyp}{%</code>   |
| <code>\hyxmp@Hyp@pdfauthor</code>   | Store the old definition of <code>\KV@Hyp@pdfauthor</code> in <code>\hyxmp@Hyp@pdfauthor</code> , but only if we see that <code>\KV@Hyp@pdfauthor</code> is defined and <code>\hyxmp@Hyp@pdfauthor</code> isn't. Otherwise, we'd be defining <code>\hyxmp@Hyp@pdfauthor</code> in terms of itself and creating an infinite loop.<br>236 <code>\@ifundefined{KV@Hyp@pdfauthor}{}{%</code><br>237 <code>\@ifundefined{hyxmp@Hyp@pdfauthor}{%</code><br>238 <code>\expandafter\let\expandafter\hyxmp@Hyp@pdfauthor</code><br>239 <code>\csname KV@Hyp@pdfauthor\endcsname</code><br>240 <code>}{}}%</code><br>241 <code>}%</code>   |
| <code>\KV@Hyp@pdfauthor</code><br><code>\xmpcomma</code><br><code>\xmpquote</code><br><code>\hyxmp@and</code><br><code>\and</code><br><code>\hyxmp@pdfauthor</code><br><code>\@pdfauthor</code> | Redefine <code>\KV@Hyp@pdfauthor</code> to process its argument twice. The first time, <code>\xmpcomma</code> is defined as a placeholder character ( <code>\hyxmp@comma</code> ) and <code>\xmpquote</code> as the identity function. The result is stored in <code>\hyxmp@pdfauthor</code> for use in structured lists (those surrounding each entry with <code>&lt;rdf:li&gt;</code> ). The second time, <code>\xmpcomma</code> is defined as an ordinary comma, and <code>\xmpquote</code> is defined as a macro that puts its argument within double quotes. The result is stored in <code>\@pdfauthor</code> for use in unstructured lists (those in which the entire list appears within a single pair of tags). In case <code>pdfauthor</code> is left unspecified and we copy <code>\author</code> 's argument to <code>pdfauthor</code> , we temporarily redefine <code>\and</code> as the list separator when producing a structured list and as "and" when producing an unstructured list.<br>242 <code>\define@key{Hyp}{pdfauthor}{%</code><br>243 <code>\let\xmpcomma=\hyxmp@comma</code><br>244 <code>\def\xmpquote####1{####1}%</code><br>245 <code>\let\hyxmp@and=\and</code><br>246 <code>\def\and{,}%</code><br>247 <code>\hyxmp@Hyp@pdfauthor{##1}%</code><br>248 <code>\global\let\hyxmp@pdfauthor=\@pdfauthor</code><br>249 <code>\def\and{and\space}%</code><br>250 <code>\def\xmpcomma{,}%</code><br>251 <code>\def\xmpquote####1{"####1"%</code><br>252 <code>\hyxmp@Hyp@pdfauthor{##1}%</code><br>253 <code>\def\xmpcomma{,}%</code><br>254 <code>\let\xmpquote=\relax</code><br>255 <code>\let\and=\hyxmp@and</code><br>256 <code>}%</code> |
| <code>\hyxmp@Hyp@pdfkeywords</code>   | The previous block of code now repeats for the keyword list, starting by storing the old definition of <code>\KV@Hyp@pdfkeywords</code> in <code>\hyxmp@Hyp@pdfkeywords</code> .   |

```

257 \ifundefined{KV@Hyp@pdfkeywords}{}{%
258   \ifundefined{hyxmp@Hyp@pdfkeywords}{%
259     \expandafter\let\expandafter\hyxmp@Hyp@pdfkeywords
260     \csname KV@Hyp@pdfkeywords\endcsname
261   }{}%
262 }%

```

`\KV@Hyp@pdfkeywords` Redefine `\KV@Hyp@pdfkeywords` to process its argument twice. The first time, `\xmpcomma` is defined as a placeholder character (`\hyxmp@comma`) and `\xmpquote` as the identity function. The result is stored in `\hyxmp@pdfkeywords` for use in structured lists (those surrounding each entry with `<rdf:li>`). The second time, `\xmpcomma` is defined as an ordinary comma, and `\xmpquote` is defined as a macro that puts its argument within double quotes. The result is stored in `\@pdfkeywords` for use in unstructured lists (those in which the entire list appears within a single pair of tags).

```

263 \define@key{Hyp}{pdfkeywords}{%
264   \let\xmpcomma=\hyxmp@comma
265   \def\xmpquote####1{####1}%
266   \hyxmp@Hyp@pdfkeywords{##1}%
267   \global\let\hyxmp@pdfkeywords=\@pdfkeywords
268   \def\xmpcomma{,%}
269   \def\xmpquote####1{"####1"%
270   \hyxmp@Hyp@pdfkeywords{##1}%
271   \def\xmpcomma{,%}
272   \let\xmpquote=\relax
273 }%
274 }

```

`\hyxmp@ProcessKeyvalOptions` Redefine `kvoptions`'s `\ProcessOptions` command to invoke `\hyxmp@redefine@Hyp` before performing its normal option processing.

```

275 \let\hyxmp@ProcessKeyvalOptions=\ProcessKeyvalOptions
276 \renewcommand*\ProcessKeyvalOptions{%
277   \hyxmp@redefine@Hyp
278   \hyxmp@ProcessKeyvalOptions
279 }

```

`\hyxmp@hypersetup` Redefine `hyperref`'s `\hypersetup` command to invoke `\hyxmp@redefine@Hyp` before performing its normal option processing.

```

280 \let\hyxmp@hypersetup=\hypersetup
281 \def\hypersetup{%
282   \hyxmp@redefine@Hyp
283   \hyxmp@hypersetup
284 }

```

`\hyxmp@concat@metadata` Assume that if the document loaded either `babel` or `polyglossia` it will eventually define one or more languages that `hyperxmp` can list within a `dc:language` element. As explained in Section 3.1, we defer the invocation of `\AtEndPreamble` to the end of the file.

```

285 \edef\hyxmp@concat@metadata{}
286 \expandafter\hyxmp@aep@toks\expandafter=\expandafter{%
287   \the\hyxmp@aep@toks
288   \AtEndPreamble{%
289     \ifpackageloaded{babel}{%
290       \edef\hyxmp@concat@metadata{babel}%
291     }{%
292       \ifpackageloaded{polyglossia}{%
293         \edef\hyxmp@concat@metadata{polyglossia}%
294       }{%
295       }%
296     }%
297   }%
298 }

```

\hyxmp@warn@if@no@metadata Issue a warning message if the author failed to specify any metadata at all. This excludes metadata that is included automatically such as the current timestamp. Note that we don't consider \@pdfmetlang as metadata as that value is meaningful only when used in conjunction with other information. We also don't examine \@pdfapart or \@pdfaconformance because those have nonempty default values.

```

299 \newcommand*{\hyxmp@warn@if@no@metadata}{%
300   \edef\hyxmp@concat@metadata{%
301     \hyxmp@concat@metadata
302     \@baseurl
303     \@pdfauthor
304     \@pdfauthortitle
305     \@pdfbookedition
306     \@pdfbytes
307     \@pdfcaptionwriter
308     \@pdfcontactaddress
309     \@pdfcontactcity
310     \@pdfcontactcountry
311     \@pdfcontactemail
312     \@pdfcontactphone
313     \@pdfcontactpostcode
314     \@pdfcontactregion
315     \@pdfcontacturl
316     \@pdfcopyright
317     \@pdfcreationdate
318     \@pdfdatetime
319     \@pdfdoi
320     \@pdfeissn
321     \@pdfidentifier
322     \@pdfisbn
323     \@pdfissn
324     \@pdfissuenum
325     \@pdfkeywords
326     \@pdflang
327     \@pdflicenseurl

```



```

328 \pdfmetadatetime
329 \pdfmoddate
330 \pdfnumpages
331 \pdfpagerange
332 \pdfpublication
333 \pdfpubtype
334 \pdfsubject
335 \pdfsubtitle
336 \pdftitle
337 \pdfuapart
338 \pdfurl
339 \pdfvolumenum
340 \pdfxstandard
341 }%
342 \ifx\hyxmp@concat@metadata\@empty
343 \PackageWarningNoLine{hyperxmp}{%
344 \hyxmp@jobname.tex did not specify any metadata to\MessageBreak
345 include in the XMP packet.\space\space Please see the\MessageBreak
346 hyperxmp documentation for instructions on how to\MessageBreak
347 provide metadata values to hyperxmp}%
348 \fi
349 }

```

`\hyxmp@check@standards` Most PDF standards require that certain metadata be present. If compliance with a PDF standard is claimed but any of the metadata it requires are absent, issue a warning message.

```

350 \newcommand*{\hyxmp@check@standards}{%
    If the pdfa option was passed to hyperref but \pdfapart is not set, set it to 1 and
    \pdfaconformance to B.
351 \ifHy@pdfa
352 \ifmtargexp{\pdfapart}{%
353 \PackageWarningNoLine{hyperxmp}{%
354 'pdfa' was passed to hyperref, but 'pdfapart' was\MessageBreak
355 not specified.\space\space Setting pdfapart to '1' and\MessageBreak
356 pdfaconformance to 'B'%
357 }%
358 \gdef\pdfapart{1}%
359 \gdef\pdfaconformance{B}%
360 }%
361 {}%
362 \fi

```

`\hyxmp@standards` We define `\hyxmp@standards` to be non-empty if *any* PDF standard is claimed (currently, PDF/A, PDF/X, or PDF/UA).

```

363 \edef\hyxmp@standards{%
364 \pdfapart
365 \pdfxstandard
366 \pdfuapart
367 }%

```

Check that a document title was provided and is non-empty.

```

368 \ifnotmtargexp{\hyxmp@standards}{%
369   \ifmtargexp{\@pdftitle}{%
370     \PackageWarningNoLine{hyperxmp}{%
371       Missing pdftitle (required for PDF standards\MessageBreak
372         compliance)%
373     }%
374   }%
375 }%
376 }%
377 }
```

`\hyxmp@aep@toks` Right before we reach the `\begin{document}` we check if `hyperref` was loaded. In normal usage, the document will already have done a `\usepackage{hyperref}` because otherwise, `\hypersetup` will not have been defined, and only a limited amount of metadata will be included. However, in case the author is relying exclusively on `hyperxmp`'s automatically detected metadata, we'll need to load `hyperref` now. As explained in Section 3.1, we defer the invocation of `\AtEndPreamble` to the end of the file.

```

378 \expandafter\hyxmp@aep@toks\expandafter=\expandafter{%
379   \the\hyxmp@aep@toks
380   \AtEndPreamble{%
381     \RequirePackage{hyperref}%

```

Older versions of `hyperref` write the `Info` dictionary to the PDF file at the end of the document. Newer versions of `hyperref` write the `Info` dictionary to the PDF file at the *beginning* of the document. For compatibility with both old and new `hyperref` implementations we suppress writing the `Info` dictionary here, at the beginning of the document.

```

382   \hyxmp@no@info@lists

```

If `pdftitle` is undefined but the author invoked `\title`, we copy the latter to the former. This addresses two problems: (1) handling `LATEX` classes in which `\maketitle` clears `\title` and (2) ensuring that `hyperref` writes the same title to the PDF `Info` dictionary that `hyperxmp` writes to the XMP packet. We do likewise for `\author`  $\rightarrow$  `pdfauthor`.

One tricky bit is that the standard `LATEX` classes do not define `\@title` and `\@author` as empty strings but rather as calls to `\@latex@warning@no@line` that complain about a missing title/author. Hence, we can't simply test if the title and author are empty because they're not. Instead, we first locally redefine `\@latex@warning@no@line` to discard its argument then test if any text remains.

```

383   \begingroup
384     \let\@latex@warning@no@line=\@gobble
385     \hyxmp@use@first@valid{pdftitle}{\@pdftitle}{%
386       \scr@subject@var,%
387       \@title
388     }%
389     \hyxmp@use@first@valid{pdfauthor}{\@pdfauthor}{%

```

```

390         \scr@fromname@var,%
391         \@author
392     }%
393 \endgroup
394 }%
395 }

```

When we reach the `\end{document}` we need to gather up the metadata specified explicitly by the user, infer additional metadata where possible, and write the XMP packet to the PDF file.

```
396 \hyxmp@at@end{%
```

Fill in any missing metadata we can using values provided by the author via mechanisms other than the `\hypersetup` command.

```
397 \hyxmp@auto@assign@data
```

If the document claims to comply with one or more PDF standards, check that all of the requisite metadata are present.

```
398 \hyxmp@check@standards
```

We can finally construct the XMP packet and write it to the PDF document catalog.

```

399 \hyxmp@warn@if@no@metadata
400 \hyxmp@embed@packet
401 }

```

### 3.3 Advanced metadata detection

`hyperxmp` strives to be as convenient and user-friendly as possible. To that end, we try to automatically detect as much metadata as possible. The author can of course augment or override autodetected metadata by explicitly providing values to `\hypersetup`, but the hope is that we can save the author some effort in many cases.

In this section, we identify additional metadata we can use. Most of the functionality is class- or package-specific. For example, we check for phone numbers provided to the Koma letter classes via `\setkomavar{fromphone}{...}` and/or `\setkomavar{frommobilephone}{...}`, street addresses provided to the ACM article class via `\affiliation`, and languages the `polyglossia` package is instructed to load via `\setdefaultlanguage` and `\setotherlanguage`.

```

\hyxmp@set@koma@phones Define \hyxmp@koma@phones as a comma-separated list of the phone numbers
\hyxmp@koma@phones provided to a Koma letter class (mobile and landline).
402 \newcommand*{\hyxmp@set@koma@phones}{%
403 \begingroup
404 \Hy@unicodedefalse
405 \@if@def@and@nonempty{\scr@frommobilephone@var}{%
406 \@if@def@and@nonempty{\scr@fromphone@var}{%
407 \hyxmp@pdfstringdef\hyxmp@koma@phones{\scr@frommobilephone@var,\scr@fromphone@var}%
408 }{%
409 \hyxmp@pdfstringdef\hyxmp@koma@phones{\scr@frommobilephone@var}%

```

```

410     }%
411   }{%
412     \if@def@and@nonempty{scr@fromphone@var}{%
413       \hyxmp@pdfstringdef\hyxmp@koma@phones{\scr@fromphone@var}%
414     }{%
415     }%
416   }%
417 \endgroup
418 }

```

`\hyxmp@use@first@valid` Given a hyperxmp option (#1), its current value (#2), and a comma-separated list of option names (#3), if the current value is empty, invoke `\hypersetup` to set the option to the first non-empty item in the list. If all items in the list are empty, do nothing.

```

419 \newcommand*{\hyxmp@use@first@valid}[3]{%
420   \ifmtargexp{#2}{%
421     \hyxmp@use@first@valid@i{#1}#3,!,%
422   }%
423   {}%
424 }

```

`\hyxmp@use@first@valid@i` This macro performs all the work for `\hyxmp@use@first@valid`. It loops over a comma-separated list of macros (#2), stopping when it encounters an end-of-list marker (“!”). The first list element that is neither undefined nor empty is assigned to a given option name (#1) using `\hypersetup`.

```

425 \def\hyxmp@use@first@valid@i#1#2,{%
426   \def\next{\hyxmp@use@first@valid@i{#1}}%
427   \ifx#2!%
428     \let\next=\relax
429   \else
430     \ifx#2\undefined
431     \else
432       \@ifnotmtargexp{#2}{%
433         \hypersetup{#1={#2}}%
434         \def\next##1!,{%
435           }%
436       \fi
437     \fi
438     \next
439 }

```

`\hyxmp@auto@assign@data` If certain metadata are unspecified, try to specify meaningful values using data provided by author via other means (e.g., `\title` for the document’s title).

```

440 \newcommand*{\hyxmp@auto@assign@data}{%

```

If `\@pdflang` is not set, see if we can detect the document language via either the `babel` or `polyglossia` packages.

```

441   \if@def@and@nonempty{@pdflang}{%
442     \let\hyxmp@dc@lang=\@pdflang

```

```

443 }{%
444   \hyxmp@detect@langs
445 }%

```

Replace an empty `\@pdfmetalang`. If `\@pdflang` is defined, use that as the metadata language. Otherwise, use x-default.

```

446 \ifx\@pdfmetalang\@empty
447   \ifx\@pdflang\@empty
448     \let\@pdfmetalang=\hyxmp@x@default
449   \else
450     \edef\@pdfmetalang{\@pdflang}%
451   \fi
452 \fi

```

Identify various author-provided information that can be co-opted for use as XMP metadata.

```

453 \hyxmp@use@first@valid{pdfcontactemail}{\@pdfcontactemail}{%
454   \scr@fromemail@var
455 }%
456 \hyxmp@set@koma@phones
457 \hyxmp@use@first@valid{pdfcontactphone}{\@pdfcontactphone}{%
458   \hyxmp@koma@phones
459 }%
460 \hyxmp@use@first@valid{pdfcontacturl}{\@pdfcontacturl}{%
461   \scr@fromurl@var
462 }%
463 \hyxmp@use@first@valid{pdfsubtitle}{\@pdfsubtitle}{%
464   \@subtitle
465 }%
466 \hyxmp@use@first@valid{pdfpublisher}{\@pdfpublisher}{%
467   \@publishers
468 }%

```

We handle the `acmart` class specially. `acmart` stores author-provided contact information in a structured format that we can process fairly easily. Note that if the author is not using the `acmart` class, `\hyxmp@parse@acmart` will have been redefined to do nothing.

```

469 \hyxmp@parse@acmart

```

Most PDF standards dictate that if the same metadata appear in both the XMP packet and the PDF Info dictionary, the metadata must match. This requirement poses a problem for a user-unspecified `pdfcreationdate` in the context of  $\text{\LaTeX}$ . In this case we explicitly define `\@pdfcreationdate` as `\hyxmp@today@pdf` to prevent the `xdvipdfmx` back-end processor from detecting a missing `CreationDate` in the Info dictionary and adding its own—typically a few seconds after `hyperxmp` has constructed an `xmp:CreateDate` for the XMP metadata and leading to a metadata mismatch.

```

470 \@ifundefined{XeTeXversion}{}{%
471   \ifmtargexp{\@pdfcreationdate}{%
472     \let\@pdfcreationdate=\hyxmp@today@pdf

```

```

473    }%
474    {}%
475    }%

```

Query the document currently being built for page and byte counts.

```

476 \hyxmp@query@self
477 }

```

`hyperxmp` can directly query the page count using `LuaTeX` features. When any other `TeX` engine is used, `hyperxmp` employs the `totpages` package to help tally the total number of pages.

```

478 \ifLuaTeX
479 \else
480 \RequirePackage{totpages}
481 \fi

```

Determine the size of the output file from the *previous* run of `LuaLaTeX`. This action has to be performed before the `\begin{document}` because at that point the size of the output file is reset to zero. We use `\jobname.pdf` as the name of the output file because `status.output_file_name` is not defined at this point.

It's possible to use `pdfLaTeX`'s `\pdffilesize` primitive to query the size of `\jobname.pdf` under `pdfLaTeX`. Unfortunately, doing so has a side effect of making `latexmk` view the PDF file as an input file, which puts `latexmk` in an infinite build loop. (This was the case for `hyperxmp` v5.5 and v5.6.) See the discussion at <https://github.com/borisveytsman/acmart/issues/413> for more information.

```

482 \ifLuaTeX
483 \edef\hyxmp@prev@pdf@size{%
484 \luadirect{%
485 local nbytes = lfs.attributes("\hyxmp@jobname.pdf", "size")
486 if nbytes then
487 tex.write(nbytes)
488 end
489 }%
490 }%
491 \fi

```

`\hyxmp@query@self` Query the document currently being built to acquire page and byte counts.

```

492 \newcommand*{\hyxmp@query@self}{%

```

`LuaTeX` exposes via `status.total_pages` the number of pages written. We use this mechanism when available to assign `\@pdfnumpages`. To finalize the page count we first issue a `\clearpage`.

```

493 \ifLuaTeX
494 \if@def@and@nonempty{@pdfnumpages}{%
495 }{%
496 \clearpage
497 \xdef{@pdfnumpages{\luadirect{tex.print(status.total_pages)}}%
498 }%
499 \else

```

Without Lua<sub>T</sub><sub>E</sub>X we rely on the `totpages` package to help count the number of pages. This may require an additional run of L<sup>A</sup>T<sub>E</sub>X, but the user will be notified in that case.

```
500 \pdfstringdef\@pdfnumpages{\ref*{TotPages}}%
501 \fi
```

If `pdfbytes` hasn't been set, set it to the output file's size from the previous run.

```
502 \hyxmp@use@first@valid{pdfbytes}{\@pdfbytes}{%
503 \hyxmp@prev@pdf@size
504 }%
505 }
```

`\hyxmp@parse@acmart` The `acmart` class stores a rich set of author metadata in its `\addresses` macro. `\hyxmp@parse@acmart` extracts the contact information for the first author and converts that to XMP metadata.

```
506 \newcommand*{\hyxmp@parse@acmart}{%
507 \begingroup
```

`\@author` `acmart` has already invoked `\hypersetup{pdfauthor=...}` to specify the complete list of authors. At this point, `\@author` is defined to produce a warning message. We locally redefine it to do nothing.

```
508 \let\@author=\@gobble
```

`\email` Within `\addresses`, `\email` is defined to accept two arguments, the second of which is the author's email address.

```
509 \def\email##1##2{%
510 \def\hyxmp@address@val{##2}%
511 \hyxmp@use@first@valid{pdfcontactemail}{\@pdfcontactemail}{%
512 \hyxmp@address@val
513 }%
514 }%
```

`\streetaddress` `\streetaddress` wraps the author's street address.

```
515 \def\streetaddress##1{%
516 \def\hyxmp@address@val{##1}%
517 \hyxmp@use@first@valid{pdfcontactaddress}{\@pdfcontactaddress}{%
518 \hyxmp@address@val
519 }%
520 }%
```

`\city` `\city` wraps the author's city name.

```
521 \def\city##1{%
522 \def\hyxmp@address@val{##1}%
523 \hyxmp@use@first@valid{pdfcontactcity}{\@pdfcontactcity}{%
524 \hyxmp@address@val
525 }%
526 }%
```

`\state` `\state` wraps the author's state or region name.

```

\hyxmp@address@val 527    \def\state##1{%
                    528        \def\hyxmp@address@val{##1}%
                    529        \hyxmp@use@first@valid{pdfcontactregion}{\@pdfcontactregion}{%
                    530            \hyxmp@address@val
                    531        }%
                    532    }%

```

`\country` `\country` wraps the author's country name.

```

\hyxmp@address@val 533    \def\country##1{%
                    534        \def\hyxmp@address@val{##1}%
                    535        \hyxmp@use@first@valid{pdfcontactcountry}{\@pdfcontactcountry}{%
                    536            \hyxmp@address@val
                    537        }%
                    538    }%

```

`\postcode` `\postcode` wraps the author's postal code.

```

\hyxmp@address@val 539    \def\postcode##1{%
                    540        \def\hyxmp@address@val{##1}%
                    541        \hyxmp@use@first@valid{pdfcontactpostcode}{\@pdfcontactpostcode}{%
                    542            \hyxmp@address@val
                    543        }%
                    544    }%

```

`\affiliation` We want to produce XMP metadata for only a single affiliation. Although `\hyxmp@use@first@valid` will ensure that only the first email, city, country, etc. encountered is considered, we run the first of one affiliation defining, say, a city and state but no country and a subsequent affiliation defining a country. In that case, the XMP would include the first author's city and state and the subsequent author's country. Hence, we define `\affiliation` to “self destruct” after its first use, discarding all further affiliations.

```

545    \def\affiliation##1##2{%
546        ##2%
547        \let\affiliation=\@gobbletwo
548    }%

```

We want to evaluate `\addresses` with the preceding local definitions in effect, but we don't want to typeset any text appearing in the string. Hence, we “typeset” `\addresses` within a box that is subsequently discarded.

```

549    \setbox0=\hbox{\addresses}%
550    \endgroup

```

`acmart` supports other relevant metadata in addition to the authors' mailing addresses. For instance, papers accepted for publication indicate their DOI number. However, papers under review will contain either a placeholder DOI, “10.1145/nnnnnnn.nnnnnnn”, or the example DOI specified in the `acmart` example document, “10.1145/1122445.1122456”. We ignore both of those DOIs.

```

551    \@if@def@and@nonempty{@acmDOI}{%

```



```

552 \IfSubStr{\@acmDOI}{10.1145/1122445.1122456}{-}{%
553 \IfSubStr{\@acmDOI}{10.1145/nnnnnnn.nnnnnnn}{-}{%
554 \hyxmp@use@first@valid{pdfdoi}{\@pdfdoi}{%
555 \@acmDOI
556 }%
557 }%
558 }%
559 }%
560 {}%

```

`\hyxmp@strip@isbn@date` Papers appearing in conference proceedings specify the proceedings' ISBN. As  
`\hyxmp@acm@isbn` with `\@acmDOI` above, we ignore both the placeholder ISBN, "978-x-xxxx-xxxx-x/YY/MM", and the example ISBN, "978-1-4503-XXXX-X/18/06". We also strip off the "*/year/month*" suffix so as to include a true ISBN in the XMP metadata.

```

561 \@if@def@and@nonempty{\@acmISBN}{%
562 \IfSubStr{\@acmISBN}{XXXX}{-}{%
563 \IfSubStr{\@acmISBN}{xxxx}{-}{%
564 \def\hyxmp@strip@isbn@date##1/##2!{##1}%
565 \edef\hyxmp@acm@isbn{%
566 \expandafter\hyxmp@strip@isbn@date\@acmISBN/!%
567 }%
568 \hyxmp@use@first@valid{pdfisbn}{\@pdfisbn}{%
569 \hyxmp@acm@isbn
570 }%
571 }%
572 }%
573 }%
574 {}%

```

`\hyxmp@acm@publisher` The publisher is of course ACM.

```

575 \def\hyxmp@acm@publisher{Association for Computing Machinery}%
576 \hyxmp@use@first@valid{pdfpublisher}{\@pdfpublisher}{%
577 \hyxmp@acm@publisher
578 }%

```

Use the journal name if defined, otherwise the book name (for conference proceedings).

```

579 \hyxmp@use@first@valid{pdfpublication}{\@pdfpublication}{%
580 \@journalName,%
581 \@acmBooktitle,%
582 \@acmConference
583 }%

```

`\hyxmp@acm@pubtype` `acmart` makes clear whether it's typesetting a journal article. If it's not a journal, we assume it's a book (conference proceedings).

```

584 \if@ACM@journal
585 \def\hyxmp@acm@pubtype{journal}%
586 \else
587 \def\hyxmp@acm@pubtype{book}%

```

```

588 \fi
589 \hyxmp@use@first@valid{pdfpubtype}{\@pdfpubtype}{%
590 \hyxmp@acm@pubtype
591 }%

```

Journal articles have a volume and issue number.

```

592 \hyxmp@use@first@valid{pdfvolumenum}{\@pdfvolumenum}{%
593 \acmVolume
594 }%
595 \hyxmp@use@first@valid{pdfissuenum}{\@pdfissuenum}{%
596 \acmNumber
597 }%
598 }

```

Nullify `\hyxmp@parse@acmart` if the author is not using the `acmart` class.

```

599 \ifclassloaded{acmart}{\let\hyxmp@parse@acmart=\relax}

```

`\hyxmp@dc@lang` `\hyxmp@dc@lang` is a comma-separated list of all languages used in the document.

```

600 \let\hyxmp@dc@lang=\@empty

```

`\hyxmp@detect@langs` If `pdflang` was not specified, try to determine the document language(s) using either `babel`'s or `polyglossia`'s definitions.

```

601 \newcommand*{\hyxmp@detect@langs}{%
602 \ifundefined{mainbcp47id}{%
603 \ifundefined{LocaleForEach}{%

```

The document doesn't appear to have loaded either `babel` or `polyglossia`. In this case we have one small task to do. In older versions of `hyperref`, `\@pdflang` is set to `\@empty` if `pdflang` is not specified. In newer versions of `hyperref`, `\@pdflang` is set to `\relax` if `pdflang` is not specified. The latter is a bit problematic for `hyperxmp` because it makes `\@pdflang` non-expandable, which causes a literal "`\@pdflang`" to be written as XMP metadata. To avoid that situation we explicitly set `\@pdflang` to `\@empty` to avoid problems with non-expandable symbols.

```

604 \let\@pdflang=\@empty
605 }%

```

`\hyxmp@dc@lang` Use `babel`'s `\LocaleForEach` and `\getlocaleproperty` to set `\@pdflang` to the document's main language and `\hyxmp@dc@lang` to a comma-separated list of all languages used.

```

\hyxmp@lang@tag
\hyxmp@lang@name
\@pdflang
606 \BabelEnsureInfo
607 \LocaleForEach{%
608 \getlocaleproperty\hyxmp@lang@tag{##1}{identification/tag.bcp47}%
609 \ifx\hyxmp@dc@lang\@empty
610 \xdef\hyxmp@dc@lang{\hyxmp@lang@tag}%
611 \else
612 \xdef\hyxmp@dc@lang{\hyxmp@dc@lang,\hyxmp@lang@tag}%
613 \fi
614 \def\hyxmp@lang@name{##1}%

```

```

615         \ifx\hyxmp@lang@name\bbl@main@language
616             \edef\@pdflang{\hyxmp@lang@tag}%
617         \fi
618     }%
619 }%
620 }{%
```

Use `polyglossia's \mainbcp47id` as the document's main language and its `\xpg@bcp@loaded` as a comma-separated list of all document languages.

```

621     \xdef\@pdflang{\csname mainbcp47id\endcsname}%
622     \edef\hyxmp@dc@lang{\xpg@bcp@loaded}%
623 }%
624 }
```

### 3.4 Manipulating author-supplied data

The author provides metadata information to `hyperxmp` via package options to `hyperref` or via `hyperref's \hypersetup` command. The functions in this section convert author-supplied lists (e.g., `pdfkeywords={foo, bar, baz}`) into L<sup>A</sup>T<sub>E</sub>X lists (e.g., `\@elt {foo} \@elt {bar} \@elt {baz}`) that can be more easily manipulated (Section 3.4.1); parse dates in both PDF and XMP formats (Section 3.4.2; trim spaces off the ends of strings (Section 3.4.3); convert text to XML (e.g., from `<scott+hyxmp@pakin.org>` to `&lt;scott+hyxmp@pakin.org&gt;`) (Section 3.4.4); simplify the pretty-printing of a begin tag, XML text, and end tag (Section 3.4.5; and provide metadata in multiple languages (Section 3.4.6).

#### 3.4.1 List manipulation

We define a macro for converting a list of comma-separated elements (e.g., the list of PDF keywords) to a list of L<sup>A</sup>T<sub>E</sub>X `\@elt`-separated elements.

```

\hyxmp@commas@to@list Given a macro name (#1) and a comma-separated list (#2), define the macro name
                        as the elements of the list, each preceded by \@elt. (Executing the macro therefore
                        applies \@elt to each element in turn.)

625 \newcommand*{\hyxmp@commas@to@list}[2]{%
626     \gdef#1{%
627         \expandafter\hyxmp@commas@to@list@i\expandafter#1#2,,%
628     }

\hyxmp@commas@to@list@i Recursively construct macro #1 from comma-separated list #2. Stop if #2 is empty.
\next
629 \def\hyxmp@commas@to@list@i#1#2,{%
630     \gdef\hyxmp@sublist{#2}%
631     \ifx\hyxmp@sublist@empty
632         \let\next=\relax
633     \else
634         \hyxmp@trimspaces\hyxmp@sublist
635         \@cons{#1}{\hyxmp@sublist}%
636     \def\next{\hyxmp@commas@to@list@i{#1}}%
```

```

637 \fi
638 \next
639 }

```

**\xmpcomma** Because `hyperxmp` splits lists at commas, a comma cannot normally be used within a list. We there provide an `\xmpcomma` macro that can expand to either a true comma or a placeholder character depending on the situation. Here, we bind it to a comma so it can be used in *any* `hyperxmp` option, not just those that treat commas specially.

```

640 \def\xmpcomma{,}%

```

**\hyxmp@comma** This is what `\xmpcomma` maps to during list construction. We assume that documents will never otherwise use an ETX (`^^C`) character in their XMP metadata.

```

641 \bgroup
642 \catcode'\^^C=11
643 \gdef\hyxmp@comma{^^C}
644 \egroup

```

**\hyxmp@uscore** This is what `\_` temporarily maps to during packet construction. Because underscores are replaced by spaces, we need a mechanism to preserve user-specified underscores (e.g., in email addresses). We assume that documents will never otherwise use an NAK (`^^U`) character in their XMP metadata.

```

645 \bgroup
646 \catcode'\^^U=11
647 \gdef\hyxmp@uscore{^^U}
648 \egroup

```

**\xmpquote** Adobe Acrobat likes to see double quotes around list elements that contain commas when the entire list appears within a single XMP tag (e.g., `<pdf:Keywords>`). However, it doesn't like to see double quotes around list elements that contain commas when the list is broken up into individual components (i.e., using `<rdf:li>` tags). We therefore introduce an `\xmpquote` macro that quotes or doesn't quote its argument based on context. Here, we bind `\xmpquote` to `\relax` to prevent it from prematurely quoting or not quoting.

```

649 \let\xmpquote=\relax

```

**\xmptilde** As a convenience for the user, we define `\xmptilde` as a category 12 (other) “~” character.

```

650 \bgroup
651 \catcode'\~=12%
652 \gdef\xmptilde{~}%
653 \egroup

```

**\XMPTruncateList** As a workaround for the inability of older Adobe Acrobat versions to display author lists correctly we introduce a hack that replaces a list with its first element.

**\hyxmp@temp@str** One can then write “`\XMPTruncateList{pdfauthor}`” and have Adobe Acrobat display the author list correctly.

**\hyxmp@temp@list**

**\@elt**

```

654 \newcommand{\XMPTruncateList}[1]{%
655   \PackageWarning{hyperxmp}{%
656     \noexpand\XMPTruncateList has been deprecated since\MessageBreak
657     hyperxmp 4.0 and may be removed in future\MessageBreak
658     versions of the package. \noexpand\XMPTruncateList\MessageBreak
659     was found}%
660   \edef\hyxmp@temp@str{\csname hyxmp@#1\endcsname}%
661   \hyxmp@commas@to@list{\hyxmp@temp@list}{\hyxmp@temp@str}%
662   \def\@elt##1{%
663     \expandafter\gdef\csname @#1\endcsname{##1}%
664     \let\@elt=\@gobble
665   }
666   \hyxmp@temp@list
667 }

```

### 3.4.2 Date manipulation

hyperxmp needs to manipulate two types of date (really, timestamp) formats: PDF format and XMP format. PDF timestamps are of the form “D:YYYYMMDDhhmmss+TT’tt’” (e.g., D:20201101231126-07’00’) [4], while XMP timestamps are of the form “YYYY-MM-DDThh:mm:ss+TT:tt” (e.g., 2020-11-01T23:11:26-07:00) [5]. The `\hyxmp@as@pdf@date` and `\hyxmp@as@xmp@date` macros defined in this section facilitate timestamp conversions to PDF and XMP formats, respectively.

`\hyxmp@first@char` Return the first character of a string. This macro is fully expandable.

```

\hyxmp@first@char@i 668 \def\hyxmp@first@char#1{\hyxmp@first@char@i#1\relax}
669 \def\hyxmp@first@char@i#1#2\relax{#1}

```

`\hyxmp@as@xmp@date` If necessary, convert a timestamp to XMP format. That is, if the timestamp is in PDF format, convert it; otherwise, leave it unmodified. This macro is fully expandable.

```

670 \def\hyxmp@as@xmp@date#1{%
671   \expandafter\ifnum\expandafter'\hyxmp@first@char@i#1\relax='D
672     \hyxmp@pdf@to@xmp@date{#1}%
673   \else
674     #1%
675   \fi
676 }

```

`\hyxmp@pdf@to@xmp@date` Convert a timestamp from PDF format to XMP format. This macro is fully expandable.

```

677 \def\hyxmp@pdf@to@xmp@date#1:#2#3#4#5#6#7#8#9{%
678   #2#3#4#5-#6#7-#8#9%
679   \hyxmp@parse@time
680 }

```

`\hyxmp@parse@time` This is a helper function for `\hyxmp@pdf@to@xmp@date`. `\hyxmp@pdf@to@xmp@date` proper parses only the year, month, and day

then calls `\hyxmp@parse@time`. `\hyxmp@parse@time` parses the hours, minutes, and seconds then calls `\hyxmp@parse@tz@char`.

```
681 \def\hyxmp@parse@time#1#2#3#4#5#6{%
682   T#1#2:#3#4:#5#6%
683   \hyxmp@parse@tz@char
684 }
```

`\hyxmp@parse@tz@char` This is another helper function for `\hyxmp@pdf@to@xmp@date`. So far, the date and time have been parsed. `\hyxmp@parse@tz@char` parses the first character of the timezone descriptor. This can be one of “+” for eastern timezones (UTC+ $x$ , including Asia, Oceania, and most of Europe), “-” for western timezones (UTC- $x$ , primarily the Americas), or “Z” for Zulu time (UTC+0). Timezones beginning with “+” or “-” are followed by an offset in hours and minutes (parsed by `\hyxmp@parse@tz`; timezones beginning with “Z” are not.

```
685 \def\hyxmp@parse@tz@char#1{%
686   #1%
687   \ifx#1-%
688     \expandafter\hyxmp@parse@tz
689   \else
690     \ifx#1+%
691       \expandafter\hyxmp@parse@tz
692     \fi
693   \fi
694 }
```

`\hyxmp@parse@tz` This is the final helper function for `\hyxmp@pdf@to@xmp@date`. It parses the piece of the timezone comprising the offset from Coordinated Universal Time, measured in hours and minutes.

```
695 \def\hyxmp@parse@tz#1'#2'{%
696   #1:#2%
697 }
```

`\hyxmp@as@pdf@date` If necessary, convert a timestamp to PDF format. That is, if the timestamp is in XMP format, convert it; otherwise, leave it unmodified. This macro is fully expandable.

```
698 \def\hyxmp@as@pdf@date#1{%
699   \expandafter\ifx\hyxmp@first@char@i#1\relax D%
700   #1%
701   \else
702     \hyxmp@xmp@to@pdf@date{#1}%
703   \fi
704 }
```

`\hyxmp@xmp@to@pdf@date` Convert a timestamp from XMP format to PDF format. This macro is fully expandable.

```
705 \def\hyxmp@xmp@to@pdf@date#1{%
706   D:\hyxmp@xmp@to@pdf@date@i#1\relax\relax
707 }
```

```

\hyxmp@xmp@to@pdf@date@i Parse the year for \hyxmp@xmp@to@pdf@date.
708 \def\hyxmp@xmp@to@pdf@date@i#1#2#3#4#5#6{%
709   #1#2#3#4%
710   \ifx#5-%
711     \expandafter\hyxmp@xmp@to@pdf@date@ii\expandafter#6%
712   \fi
713 }

\hyxmp@xmp@to@pdf@date@ii Parse the month for \hyxmp@xmp@to@pdf@date.
714 \def\hyxmp@xmp@to@pdf@date@ii#1#2#3#4{%
715   #1#2%
716   \ifx#3-%
717     \expandafter\hyxmp@xmp@to@pdf@date@iii\expandafter#4%
718   \fi
719 }

\hyxmp@xmp@to@pdf@date@iii Parse the day for \hyxmp@xmp@to@pdf@date.
720 \def\hyxmp@xmp@to@pdf@date@iii#1#2#3#4{%
721   #1#2%
722   \ifx#3T%
723     \expandafter\hyxmp@xmp@to@pdf@date@iv\expandafter#4%
724   \fi
725 }

\hyxmp@xmp@to@pdf@date@iv Parse the hour for \hyxmp@xmp@to@pdf@date.
726 \def\hyxmp@xmp@to@pdf@date@iv#1#2#3#4{%
727   #1#2%
728   \ifx#3:%
729     \expandafter\hyxmp@xmp@to@pdf@date@v\expandafter#4%
730   \fi
731 }

\hyxmp@xmp@to@pdf@date@v Parse the minute for \hyxmp@xmp@to@pdf@date.
732 \def\hyxmp@xmp@to@pdf@date@v#1#2#3#4{%
733   #1#2%
734   \ifx#3:%
735     \expandafter\hyxmp@xmp@to@pdf@date@vi\expandafter#4%
736   \fi
737 }

\hyxmp@gobbletwo This is exactly the same as LATEX 2ε's \@gobbletwo but needs to be a different
literal for \hyxmp@xmp@to@pdf@date@vii's pattern-matching to work.
738 \let\hyxmp@gobbletwo=\@gobbletwo

\hyxmp@xmp@to@pdf@date@vi Parse the second for \hyxmp@xmp@to@pdf@date. The challenge here is that we
need to handle four cases for the character following the seconds—"+", "−", "Z",
and no character—without sacrificing expandability. Our tricky solution is to
insert a \@gobbletwo as a sentinel and let \hyxmp@xmp@to@pdf@date@vi discard
everything up to that sentinel (i.e., all the other conditionals).

```

```

739 \def\hyxmp@xmp@to@pdf@date@vi#1#2#3#4{%
740   #1#2%
741   \ifx#3+%
742     +\expandafter\hyxmp@xmp@to@pdf@date@vii
743   \fi
744   \ifx#3-%
745     -\expandafter\hyxmp@xmp@to@pdf@date@vii
746   \fi
747   \ifx#3Z%
748     Z%
749   \fi
750   \ifx#3\relax
751     \expandafter\hyxmp@gobbletwo
752   \fi
753   \@gobbletwo #4%
754 }

```

`\hyxmp@xmp@to@pdf@date@vii` Parse the time-zone hours for `\hyxmp@xmp@to@pdf@date`.

```

755 \def\hyxmp@xmp@to@pdf@date@vii#1\@gobbletwo#2#3#4#5{%
756   #2#3%
757   \ifx#4:%
758     \expandafter\hyxmp@xmp@to@pdf@date@viii\expandafter#5%
759   \fi
760 }

```

`\hyxmp@xmp@to@pdf@date@viii` Parse the time-zone minutes for `\hyxmp@xmp@to@pdf@date`.

```

761 \def\hyxmp@xmp@to@pdf@date@viii#1#2#3#4{%
762   '#1#2'%
763 }

```

`\hyxmp@today@xmp@define` Use  $\text{\TeX}$  primitives to define a given macro as today's date in YYYY-MM-DDThh:mmZ format.

```

764 \def\hyxmp@today@xmp@define#1{%

```

The date is a straightforward representation of  $\text{\TeX}$ 's `\year`, `\month`, and `\day` primitives, with the latter two zero-padded to two digits apiece.

```

765   \xdef#1{\the\year}%
766   \ifnum\month<10
767     \xdef#1{#1-0\the\month}%
768   \else
769     \xdef#1{#1-\the\month}%
770   \fi
771   \ifnum\day<10
772     \xdef#1{#1-0\the\day}%
773   \else
774     \xdef#1{#1-\the\day}%
775   \fi

```

$\text{\TeX}$  does not provide the time in terms of separate hours and minutes but rather as the total number of minutes since midnight (`\time`). There's no mechanism in



TeX to query the number of seconds since midnight or the timezone so we omit those fields when defining macro #1.

```

776 \@tempcnta=\time
777 \divide\@tempcnta by 60
778 \ifnum\@tempcnta<10
779   \xdef#1{#1T0\the\@tempcnta}%
780 \else
781   \xdef#1{#1T\the\@tempcnta}%
782 \fi
783 \multiply\@tempcnta by -60
784 \advance\@tempcnta by \time
785 \ifnum\@tempcnta<10
786   \xdef#1{#1:0\the\@tempcnta}%
787 \else
788   \xdef#1{#1:\the\@tempcnta}%
789 \fi
790 \xdef#1{#1Z}%
791 }

```

`\hyxmp@try@today` If `\hyxmp@today@xmp` is still empty and #1 is defined, evaluate #2. Otherwise, do nothing.

```

792 \def\hyxmp@try@today#1#2{%
793   \@ifmtargexp{\hyxmp@today@xmp}{%
794     \@ifundefined{#1}{#2}%
795   }%
796   {}%
797 }

```

`\hyxmp@today@xmp` Define `\hyxmp@today@xmp` as the current date and (if available) time and timezone in XMP Date format [5].

```

798 \def\hyxmp@today@xmp{}
    Case 1: \pdfcreationdate is defined (pdfLaTeX and pre-0.85 LuaLaTeX).
799 \hyxmp@try@today{\pdfcreationdate}{%
800   \edef\hyxmp@today@xmp{\expandafter\hyxmp@pdf@to@xmp@date\pdfcreationdate}%
801 }
    Case 2: \pdffeedback is defined (LuaLaTeX 0.85+).
802 \hyxmp@try@today{\pdffeedback}{%
803   \edef\hyxmp@today@xmp{\expandafter\hyxmp@pdf@to@xmp@date\pdffeedback creationdate}%
804 }

```

`\hyxmp@timestamp` Case 3: `\filemoddate` is defined (XeLaTeX). In this case, we treat the timestamp of the job's .log file as the current date/time.

```

805 \hyxmp@try@today{\filemoddate}{%
806   \edef\hyxmp@today@xmp{\filemoddate{\hyxmp@jobname.log}}%
807   \edef\next{%
808     \edef\noexpand\hyxmp@today@xmp{\noexpand\hyxmp@as@xmp@date{\hyxmp@today@xmp}}%
809   }%
810   \next

```

```

811 }%
      Case 4: None of the above. Do the best we can using the available TEX primitives
      (\year, \month, \day, and \time.
812 \hyxmp@try@today{year}{%
813   \hyxmp@today@xmp@define\hyxmp@today@xmp
814 }

```

```

\hyxmp@today@pdf Define \hyxmp@today@pdf as the current date and (if available) time and timezone
                  in PDF date format [4]. To do so we simply convert \hyxmp@today@xmp, defined
                  above, from XMP to PDF using \hyxmp@xmp@to@pdf@date.
815 \expandafter\edef\expandafter\hyxmp@today@pdf\expandafter{%
816   \expandafter\hyxmp@xmp@to@pdf@date\expandafter{\hyxmp@today@xmp}%
817 }

```

### 3.4.3 Trimming leading and trailing spaces

To make it easier for XMP processors to manipulate our output we define a `\hyxmp@trimspaces` macro to strip leading and trailing spaces from various data fields.

```

\hyxmp@trimspaces Redefine a macro as its previous value but without leading or trailing spaces. This
                  code—as well as that for its helper macros, \hyxmp@trimb and \hyxmp@trimc—was
                  taken almost verbatim from a solution to an Around the Bend puzzle [7]. Inline
                  comments are also taken from the solution text.

```

```

818 \catcode'\Q=3
      \hyxmp@trimspaces\x redefines \x to have the same replacement text sans leading
      and trailing space tokens.
819 \newcommand{\hyxmp@trimspaces}[1]{%
      Use grouping to emulate a multi-token afterassignment queue.
820   \begingroup
      Put “\toks 0 {” into the afterassignment queue.
821   \aftergroup\toks\aftergroup0\aftergroup{%
      Apply \hyxmp@trimb to the replacement text of #1, adding a leading \noexpand
      to prevent brace stripping and to serve another purpose later.
822   \expandafter\hyxmp@trimb\expandafter\noexpand#1Q Q}%
      Transfer the trimmed text back into #1.
823   \edef#1{\the\toks0}%
824 }

```

```

\hyxmp@trimb \hyxmp@trimb removes a trailing space if present, then calls \hyxmp@trimc to clean
              up any leftover bizarre Qs, and trim a leading space. In order for \hyxmp@trimc to
              work properly we need to put back a Q first.
825 \def\hyxmp@trimb#1 Q{\hyxmp@trimc#1Q}

```

`\hyxmp@trimc` Execute `\vfuzz` assignment to remove leading space; the `\noexpand` will now prevent unwanted expansion of a macro or other expandable token at the beginning of the trimmed text. The `\endgroup` will feed in the `\aftergroup` tokens after the `\vfuzz` assignment is completed.

```
826 \def\hyxmp@trimc#1Q#2{\afterassignment\endgroup \vfuzz\the\vfuzz#1}
827 \catcode'\Q=11
```

### 3.4.4 Converting text to XML

The “<”, “>”, and “&” characters are significant to XML. We therefore need to escape them in any author-supplied text.

`\ifhyxmp@unicodetex` X<sub>Y</sub>TeX and LuaTeX natively support Unicode. We define the conditional `\ifhyxmp@unicodetex` to check for these so we can properly handle encoding conversions. The trick here is that Unicode TeX implementations compare decimal 64 to hexadecimal 40 (decimal 64), specified with four carets, and take the TRUE branch; non-Unicode TeX implementations compare decimal 64 to character “^” (decimal 94), ignore the “^^0040” and the rest of the TRUE branch, and take the FALSE branch.

```
828 \newif\ifhyxmp@unicodetex
829 \ifnum64='^^^^0040\relax
830   \hyxmp@unicodetextrue
831 \else
832   \hyxmp@unicodetexfalse
833 \fi
```

`\SE->pdfdoc@03` Preserve ETX (^^C), which is normally an invalid character in PDFDocEncoding. We use it in hyperxmp (and specifically in `\hyxmp@xmlify` below) as a list-element separator.

```
834 \expandafter\def\csname SE->pdfdoc@03\endcsname{0003}
```

`\SE->pdfdoc@15` Preserve NAK (^^U), which is normally an invalid character in PDFDocEncoding. We use it in hyperxmp (and specifically in `\hyxmp@xmlify` below) as a placeholder for an underscore character.

```
835 \expandafter\def\csname SE->pdfdoc@15\endcsname{0015}
```

`\hyxmp@xmlify` Given a piece of text defined using `\pdfstringdef` (i.e., with many special characters redefined to have category code 11), set `\hyxmp@xmlified` to the same text but with all occurrences of “<” replaced with `&lt;`; all occurrences of “>” replaced with `&gt;`; and all occurrences of “&” replaced with `&amp;`.

```
836 \newcommand*{\hyxmp@xmlify}[1]{%
837   \gdef\hyxmp@xmlified{%
      Escaped PDF string → PDFDocEncoding/Unicode
838   \EdefUnescapeString\hyxmp@text{#1}%
839   \ifhyxmp@unicodetex
```

PDFDocEncoding/Unicode → UTF-32BE

```

840 \hyxmp@is@unicode\hyxmp@text{%
841 \StringEncodingConvert
842 \hyxmp@text\hyxmp@text{utf16be}{utf32be}%
843 }{%
844 \ifXeTeX
845 \hyxmp@xetex@crap
846 \else
847 \StringEncodingConvert
848 \hyxmp@text\hyxmp@text{pdfdoc}{utf32be}%
849 \fi
850 }%

```

UTF-32BE → UTF-32BE as hex string

```

851 \EdefEscapeHex\hyxmp@text{\hyxmp@text}%

```

UTF-32BE → XML in ASCII

```

852 \edef\hyxmp@text{%
853 \expandafter
854 }\expandafter\hyxmp@toxml@unicodetex\hyxmp@text
855 \relax\relax\relax\relax\relax\relax\relax\relax
856 \else

```

PDFDocEncoding/Unicode → UTF-8

```

857 \hyxmp@is@unicode\hyxmp@text{%
858 \StringEncodingConvert
859 \hyxmp@text\hyxmp@text{utf16be}{utf8}%
860 }{%
861 \StringEncodingConvert
862 \hyxmp@text\hyxmp@text{pdfdoc}{utf8}%
863 }%

```

UTF-8 → UTF-8 as hex string

```

864 \EdefEscapeHex\hyxmp@text{\hyxmp@text}%

```

UTF-8 as hex string → XML in UTF-8 as hex string

```

865 \edef\hyxmp@text{%
866 \expandafter\hyxmp@toxml\hyxmp@text\@empty\@empty
867 }%

```

XML in UTF-8 as hex string → XML in UTF-8

```

868 \EdefUnescapeHex\hyxmp@text{\hyxmp@text}%
869 \fi
870 \global\let\hyxmp@xmlified\hyxmp@text
871 }

```

\hyxmp@is@unicode Given a string and two expressions, evaluate the first expression if the string is  
\hyxmp@@is@unicode UTF-16BE-encoded and the second expression if not.

```

872 \begingroup
873 \lccode'\<=254 %
874 \lccode'\>=255 %
875 \catcode254=12 %

```

```

876 \catcode255=12 %
877 \lowercase{\endgroup
878 \def\hyxmp@is@unicode#1{%
879   \expandafter\hyxmp@@is@unicode#1<>\@nil
880 }%
881 \def\hyxmp@@is@unicode#1<>#2\@nil{%
882   \ifx\#1\%
883     \expandafter\@firstoftwo
884   \else
885     \expandafter\@secondoftwo
886   \fi
887 }%
888 }

```

`\hyxmp@toxml` Replace the characters “<”, “&”, and “>” with XML entities when using a non-native-Unicode T<sub>E</sub>X (T<sub>E</sub>X or pdfT<sub>E</sub>X).

```

889 \def\hyxmp@toxml#1#2{%
890   \ifx#1\@empty
891   \else
892     \ifnum"#1#2='\& %
893       26616D703B% &
894     \else\ifnum"#1#2='\< %
895       266C743B% <
896     \else\ifnum"#1#2='\> %
897       2667743B% >
898   \else

```

`dvips` wraps text when generating most PostScript code but preserves line breaks within strings. Unfortunately, `dvips` fails to observe the special case in the PostScript specification that “[b]alanced pairs of parentheses in the string require no special treatment” [3]. Consequently, XMP data containing parentheses (e.g., “Copyright (C) 1605 Miguel de Cervantes”) confuse `dvips` into thinking that the string has ended after the closing parenthesis and that line breaks can subsequently be injected safely into the document at arbitrary points for formatting purposes. This leads to erroneous display by PDF viewers, which honor line breaks within XMP tags. The solution is to insert a backslash before all parentheses when in `pdfmark`-generating mode to convince `dvips` that the entire XMP packet must be treated as a single, not-to-be-modified string.

```

899   \@ifundefined{pdfmark}{%
900     #1#2%
901   }{%
902     \ifnum"#1#2='\( %
903       5C28% \(
904     \else\ifnum"#1#2='\) %
905       5C29% \)
906     \else
907       #1#2%
908     \fi\fi
909   }%

```

```

910     \fi\fi\fi
911     \expandafter\hyxmp@toxml
912     \fi
913 }

\hyxmp@toxml@unicodetex Replace the characters “<”, “&”, and “>” with XML entities when using a native-
\hyxmp@text Unicode TEX (XYTEX or LuaTEX).
914 \def\hyxmp@toxml@unicodetex#1#2#3#4#5#6#7#8{%
915     \ifx#1\relax
916     \else
917         \ifnum"#1#2#3#4#5#6#7#8>127 %
918             \uccode'\*="#1#2#3#4#5#6#7#8\relax
919             \uppercase{%
920                 \edef\hyxmp@text{\hyxmp@text *}%
921             }%
922         \else\ifnum"#7#8='< %
923             \edef\hyxmp@text{\hyxmp@text &lt;}%
924         \else\ifnum"#7#8='& %
925             \edef\hyxmp@text{\hyxmp@text &amp;%
926         \else\ifnum"#7#8='> %
927             \edef\hyxmp@text{\hyxmp@text &gt;}%
928         \else\ifnum"#7#8='\ %
929             \edef\hyxmp@text{\hyxmp@text\space}%
930         \else
931             \uccode'\*="#7#8\relax
932             \uppercase{%
933                 \edef\hyxmp@text{\hyxmp@text *}%
934             }%
935         \fi\fi\fi\fi\fi
936         \expandafter\hyxmp@toxml@unicodetex
937     \fi
938 }

\hyxmp@skipzeros Skip over leading zeroes in the input argument.
939 \def\hyxmp@skipzeros#1{%
940     \ifx#10%
941         \expandafter\hyxmp@skipzeros
942     \fi
943 }

\hyxmp@xetex@crap \x In the case of XYTEX, the strings defined by \pdfstringdef can contain big
\hyxmp@text characters. In this case, the string is treated as Unicode.
\hyxmp@try 944 \begingroup
\hyxmp@crap@result 945 \def\x#1{\endgroup
\hyxmp@text 946 \def\hyxmp@xetex@crap{%
947     \edef\hyxmp@try{%
948         \expandafter\hyxmp@SpaceOther\hyxmp@text#1\@nil
949     }%
950     \let\hyxmp@crap@result=N%

```

```

951 \expandafter\hyxmp@crap@test\hyxmp@try\relax
952 \ifx\hyxmp@crap@result Y%
953 \let\hyxmp@text\@empty
954 \expandafter\hyxmp@crap@convert\hyxmp@try\relax
955 \else
956 \StringEncodingConvert\hyxmp@text\hyxmp@text{pdfdoc}{utf32be}%
957 \fi
958 }%
959 }
960 \x{ }

```

`\hyxmp@SpaceOther` Re-encode all spaces in a string with category code 12 (“other”).

```

961 \begingroup
962 \catcode'\~=12 %
963 \lccode'\~=' %
964 \lowercase{\endgroup
965 \def\hyxmp@SpaceOther#1 #2\@nil{%
966 #1%
967 \ifx\relax#2\relax
968 \expandafter\@gobble
969 \else
970 ~%
971 \expandafter\@firstofone
972 \fi
973 {\hyxmp@SpaceOther#2\@nil}%
974 }%
975 }

```

`\hyxmp@crap@test` Determine if we need to treat a string as Unicode.

```

976 \def\hyxmp@crap@test#1{%
977 \ifx#1\relax
978 \else
979 \ifnum'#1>127 %
980 \let\hyxmp@crap@result=Y%
981 \expandafter\expandafter\expandafter\hyxmp@skiptorelax
982 \else
983 \expandafter\expandafter\expandafter\hyxmp@crap@test
984 \fi
985 \fi
986 }

```

`\hyxmp@skiptorelax` Discard all tokens up to and including the first `\relax`.

```

987 \def\hyxmp@skiptorelax#1\relax{}

```

`\hyxmp@crap@convert` Convert a hexadecimal string to a number.

```

\hyxmp@num 988 \def\hyxmp@crap@convert#1{%
\hyxmp@text 989 \ifx#1\relax
990 \else
991 \edef\hyxmp@num{\number'#1}%

```

```

992 \ifnum\hyxmp@num>"FFFFFF %
993 \lccode'\!=\intcalcDiv{\hyxmp@num}{\number"1000000}\relax
994 \lowercase{\edef\hyxmp@text{\hyxmp@text!}}}%
995 \edef\hyxmp@num{\intcalcMod{\hyxmp@num}{\number"1000000}}}%
996 \else
997 \edef\hyxmp@text{\hyxmp@text\hyxmp@zero}%
998 \fi
999 \ifnum\hyxmp@num>"FFFF %
1000 \lccode'\!=\intcalcDiv{\hyxmp@num}{\number"10000}\relax
1001 \lowercase{\edef\hyxmp@text{\hyxmp@text!}}}%
1002 \edef\hyxmp@num{\intcalcMod{\hyxmp@num}{\number"10000}}}%
1003 \else
1004 \edef\hyxmp@text{\hyxmp@text\hyxmp@zero}%
1005 \fi
1006 \ifnum\hyxmp@num>"FF %
1007 \lccode'\!=\intcalcDiv{\hyxmp@num}{\number"100}\relax
1008 \lowercase{\edef\hyxmp@text{\hyxmp@text!}}}%
1009 \edef\hyxmp@num{\intcalcMod{\hyxmp@num}{\number"100}}}%
1010 \else
1011 \edef\hyxmp@text{\hyxmp@text\hyxmp@zero}%
1012 \fi
1013 \ifnum\hyxmp@num>0 %
1014 \lccode'\!=\hyxmp@num\relax
1015 \lowercase{\edef\hyxmp@text{\hyxmp@text!}}}%
1016 \else
1017 \edef\hyxmp@text{\hyxmp@text\hyxmp@zero}%
1018 \fi
1019 \expandafter\hyxmp@crap@convert
1020 \fi
1021 }

```

`\hyxmp@zero` Define a null character with category code 12 (“other”).

```

1022 \begingroup
1023 \catcode0=12 %
1024 \gdef\hyxmp@zero{^^00}%
1025 \endgroup

```

### 3.4.5 Outputting structured XML

An XMP packet consists of structured XML data. We define some helper routines to handle the repetitive tasks of indenting a consistent number of spaces, inserting begin and end tags, and escaping arbitrary text as necessary for XML compatibility.

`\hyxmp@extra@indent` This macro is used internally to increase the amount of indentation when writing certain XML data. It is normally defined as empty but can temporarily be redefined to a sequence of `\space` characters.

```

1026 \newcommand*{\hyxmp@extra@indent}{}

```



`\hyxmp@add@simple` Given an XMP tag (#1) and a string (#2), if the string is nonempty, add a begin tag, the string, and an end tag to the packet. The “simple” in the macro name indicates that the string is output without variations for different languages.

```

1027 \newcommand*{\hyxmp@add@simple}[2]{%
1028   \ifnotmtargexp{#2}{%
1029     \hyxmp@xmllify{#2}%
1030     \hyxmp@add@to@xml{\hyxmp@extra@indent_____<}%
1031     \xdef\hyxmp@xml{\hyxmp@xml#1}%
1032     \hyxmp@add@to@xml{>\hyxmp@xmllified</>}%
1033     \xdef\hyxmp@xml{\hyxmp@xml#1>^^J}%
1034   }%
1035 }

```

`\hyxmp@add@simple@var` Given an XMP tag (#1) and a variable name (#2), if the string is defined, add a begin tag, the string, and an end tag to the packet. The “simple” in the macro name indicates that the string is output without variations for different languages. `\hyxmp@add@simple@var` differs from `\hyxmp@add@simple` in that the former includes defined but empty values in the XMP packet while the latter excludes both undefined and defined but empty values.

```

1036 \newcommand*{\hyxmp@add@simple@var}[2]{%
1037   \expandafter\ifx\csname#2\endcsname\relax
1038   \else
1039     \hyxmp@xmllify{\csname#2\endcsname}%
1040     \hyxmp@add@to@xml{%
1041       \hyxmp@extra@indent_____<#1>\hyxmp@xmllified</#1>^^J%
1042     }%
1043   \fi
1044 }

```

`\hyxmp@add@simple@lang` Given an XMP tag (#1) and a string (#2), if the string is nonempty, add a begin tag, the string, and an end tag to the packet. The “simple” in the macro name indicates that the string is output without variations for different languages. However, if the string begins with a language code in square brackets, specify that as the (sole) language for the tag.

```

1045 \newcommand*{\hyxmp@add@simple@lang}[2]{%
1046   \ifnotmtarg{#2}{%
1047     \hyxmp@xmllify{#2}%
1048     \expandafter\hyxmp@add@simple@lang@i\hyxmp@xmllified\relax{#1}%
1049   }%
1050 }

```

`\hyxmp@add@simple@lang@i` This is a helper macro for `\hyxmp@add@simple@lang`. It takes an optional language code (in brackets), text up to `\relax`, and a tag, and typesets the text within the XML tag.

```

1051 \newcommand*{\hyxmp@add@simple@lang@i}[1]{%
1052   \ifnextchar[\hyxmp@add@simple@lang@ii{\hyxmp@add@simple@lang@ii[\pdfmetalang]}%
1053 }

```

`\hyxmp@add@simple@lang@ii` This is another helper macro for `\hyxmp@add@simple@lang`. It takes an mandatory language code (in brackets; can be empty), text up to `\relax`, and a tag, and typesets the text within the XML tag.

```

1054 \def\hyxmp@add@simple@lang@ii[#1]#2\relax#3{%
1055   \ifnotmtarg{#2}{%
1056     \hyxmp@xmlify{#2}%
1057     \ifmtarg{#1}{%
1058       \hyxmp@add@to@xml{%
1059   -----<#3>\hyxmp@xmlified</#3>^^J%
1060       }%
1061     }%
1062     \hyxmp@add@to@xml{%
1063   -----<#3 xml:lang="#1">\hyxmp@xmlified</#3>^^J%
1064       }%
1065     }%
1066   }%
1067 }

```

`\hyxmp@add@simple@pfx` Given an XMP tag (`#1`), a—typically hard-wired—prefix string (`#2`), and a main string (`#2`), if the main string is nonempty, add a begin tag, both strings, and an end tag to the packet. The “simple” in the macro name indicates that the string is output without variations for different languages.

```

1068 \newcommand*{\hyxmp@add@simple@pfx}[3]{%
1069   \ifnotmtargexp{#3}{%
1070     \hyxmp@add@to@xml{\hyxmp@extra@indent-----<}%
1071     \xdef\hyxmp@xml{\hyxmp@xml#1}%
1072     \hyxmp@pdfstringdef\hyxmp@iprefix{#2}%
1073     \hyxmp@xmlify{\hyxmp@iprefix}%
1074     \hyxmp@add@to@xml{>\hyxmp@xmlified}%
1075     \hyxmp@xmlify{#3}%
1076     \hyxmp@add@to@xml{\hyxmp@xmlified</}%
1077     \xdef\hyxmp@xml{\hyxmp@xml#1>^^J}%
1078   }%
1079 }

```

### 3.4.6 Providing metadata in multiple languages

Certain XMP tags—`dc:title`, `dc:description`, and `dc:rights` (and others? Let me know.)—can be expressed in multiple languages. The same text is used for both language `pdfmetalang` (default: `pdflang`) and language “x-default”. To express the same metadata in multiple languages, we provide an `\XMPLangAlt` macro to construct a list of alternative forms for a piece of metadata.

`\hyxmp@alt@title` Each of these macros is a list in which each element is of the form “`\do <language>`  
`\hyxmp@alt@description` `<text>`” in which `<language>` is an ISO 639-1 two-letter country code with an optional  
`\hyxmp@alt@rights` ISO 3166-1 two-letter region code. For example, `\hyxmp@alt@title` may contain  
 an element, “`\do {es-MX} {Este es mi documento}`”.

```

1080 \def\hyxmp@alt@title{}

```

```

1081 \def\hyxmp@alt@description{}
1082 \def\hyxmp@alt@rights{}

\hyxmp@LA@accept This macro wraps \define@key to make the option “#1=⟨value⟩” append ⟨value⟩
to list #2.
1083 \newcommand{\hyxmp@LA@accept}[2]{%
1084   \define@key{hyxmp@LA}{#1}{%

\hyxmp@value As Niklas Beisert observed, if the option passed to the current key contains LATEX
code, this code will be included in the XMP packet, which is undesirable. Hence,
we first clean up the string using \hyxmp@pdfstringdef.
1085   \hyxmp@pdfstringdef\hyxmp@value{##1}%
1086   \xdef#2{#2\noexpand\do {\hyxmp@cur@lang} {\hyxmp@value}}%
1087 }
1088 }

Define ⟨key⟩=⟨value⟩ options for appending to each of the \hyxmp@alt⟨tag⟩
lists.
1089 \hyxmp@LA@accept{pdftitle}{\hyxmp@alt@title}
1090 \hyxmp@LA@accept{pdfsubject}{\hyxmp@alt@description}
1091 \hyxmp@LA@accept{pdfcopyright}{\hyxmp@alt@rights}

\XMPLangAlt Argument #1 is a language expressed as a two-letter country code and optional two-
letter region code. Argument #2 is a list of ⟨key⟩=⟨value⟩ pairs. Keys correspond
to \hypersetup options such as “pdftitle”, “pdfsubject”, and “pdfcopyright”.
Values are the alternative-language form of the text provided for the corresponding
option.
1092 \newcommand{\XMPLangAlt}[2]{%
1093   \let\do=\relax

\hyxmp@cur@lang Store the provided language, which will be used during option processing.
1094   \edef\hyxmp@cur@lang{#1}%
1095   \setkeys{hyxmp@LA}{#2}%
1096 }

```

### 3.5 UUID generation

We use a linear congruential generator to produce pseudorandom version 4 UUIDs [12]. True, this method has its flaws but it’s simple to implement in T<sub>E</sub>X and is good enough for producing the XMP xmpMM:DocumentID and xmpMM:InstanceID fields.

```

\hyxmp@modulo@a Replace the contents of \@tempcnta with the contents modulo #1. Note that
\@tempcntb is overwritten in the process.
1097 \def\hyxmp@modulo@a#1{%
1098   \@tempcntb=\@tempcnta
1099   \divide\@tempcntb by #1
1100   \multiply\@tempcntb by #1

```

```

1101 \advance\@tempcnta by -\@tempcntb
1102 }

\hyxmp@big@prime Define a couple of large prime numbers that can still be stored in a TEX counter.
\hyxmp@big@prime@ii 1103 \def\hyxmp@big@prime{536870923}
1104 \def\hyxmp@big@prime@ii{536870027}

\hyxmp@seed@rng Seed hyperxmp's random-number generator from a given piece of text.
\hyxmp@one@token 1105 \def\hyxmp@seed@rng#1{%
1106 \@tempcnta=\hyxmp@big@prime
1107 \futurelet\hyxmp@one@token\hyxmp@seed@rng@i#1\@empty
1108 }

\hyxmp@seed@rng@i Do all of the work for \hyxmp@seed@rng. For each character code  $c$  of the input
\hyxmp@one@token text, assign  $\@tempcnta \leftarrow 3 \cdot \@tempcnta + c \pmod{\hyxmp@big@prime}$ .
\next 1109 \def\hyxmp@seed@rng@i{%
1110 \ifx\hyxmp@one@token\@empty
1111 \let\next=\relax
1112 \else
1113 \def\next##1{%
1114 \multiply\@tempcnta by 3
1115 \advance\@tempcnta by '##1
1116 \hyxmp@modulo@a{\hyxmp@big@prime}%
1117 \futurelet\hyxmp@one@token\hyxmp@seed@rng@i
1118 }%
1119 \fi
1120 \next
1121 }

\hyxmp@set@rand@num Advance \hyxmp@rand@num to the next pseudorandom number in the se-
\hyxmp@rand@num quence. Specifically, we assign  $\hyxmp@rand@num \leftarrow 3 \cdot \hyxmp@rand@num + \hyxmp@big@prime@ii \pmod{\hyxmp@big@prime}$ . Note that both \@tempcnta
and \@tempcntb are overwritten in the process.
1122 \def\hyxmp@set@rand@num{%
1123 \@tempcnta=\hyxmp@rand@num
1124 \multiply\@tempcnta by 3
1125 \advance\@tempcnta by \hyxmp@big@prime@ii
1126 \hyxmp@modulo@a{\hyxmp@big@prime}%
1127 \xdef\hyxmp@rand@num{\the\@tempcnta}%
1128 }

\hyxmp@append@hex Append a randomly selected hexadecimal digit to macro #1. Note that both
\@tempcnta and \@tempcntb are overwritten in the process.
1129 \def\hyxmp@append@hex#1{%
1130 \hyxmp@set@rand@num
1131 \@tempcnta=\hyxmp@rand@num
1132 \hyxmp@modulo@a{16}%
1133 \ifnum\@tempcnta<10
1134 \xdef#1{#1\the\@tempcnta}%
1135 \else

```

There *must* be a better way to handle the numbers 10–15 than with `\ifcase`.

```

1136     \advance\@tempcnta by -10
1137     \ifcase\@tempcnta
1138         \xdef#1{#1a}%
1139         \or\xdef#1{#1b}%
1140         \or\xdef#1{#1c}%
1141         \or\xdef#1{#1d}%
1142         \or\xdef#1{#1e}%
1143         \or\xdef#1{#1f}%
1144     \fi
1145     \fi
1146 }
```

`\hyxmp@append@hex@iii` Invoke `\hyxmp@append@hex` three times.

```

1147 \def\hyxmp@append@hex@iii#1{%
1148     \hyxmp@append@hex#1%
1149     \hyxmp@append@hex#1%
1150     \hyxmp@append@hex#1%
1151 }
```

`\hyxmp@append@hex@iv` Invoke `\hyxmp@append@hex` four times.

```

1152 \def\hyxmp@append@hex@iv#1{%
1153     \hyxmp@append@hex@iii#1%
1154     \hyxmp@append@hex#1%
1155 }
```

`\hyxmp@create@uuid` As per the definition of a version 4 UUID [12], define macro `#1` as a UUID of the form “`uuid:xxxxxxxx-xxxx-4xxx-yxxx-xxxxxxxxxxxx`” in which each “*x*” is a lowercase hexadecimal digit and “*y*” is one of “8”, “9”, “a”, or “b”. We assume that the random-number generator is already seeded. Note that `\hyxmp@create@uuid` overwrites both `\@tempcnta` and `\@tempcntb`.

```

1156 \def\hyxmp@create@uuid#1{%
1157     \def#1{uuid:}%
1158     \hyxmp@append@hex@iv#1%
1159     \hyxmp@append@hex@iv#1%
1160     \g@addto@macro#1{-}%
1161     \hyxmp@append@hex@iv#1%
1162     \g@addto@macro#1{-4}%
1163     \hyxmp@append@hex@iii#1%
1164     \g@addto@macro#1{-}%

```

Randomly select one of “8”, “9”, “a”, or “b”.

```

1165     \hyxmp@set@rand@num
1166     \@tempcnta=\hyxmp@rand@num
1167     \hyxmp@modulo@a{4}%
1168     \ifcase\@tempcnta
1169         \g@addto@macro#1{8}%
1170         \or\g@addto@macro#1{9}%
1171         \or\g@addto@macro#1{a}%

```

```

1172     \or\g@addto@macro#1{b}%
1173     \fi
1174     \hyxmp@append@hex@iii#1%
1175     \g@addto@macro#1{-}%
1176     \hyxmp@append@hex@iv#1%
1177     \hyxmp@append@hex@iv#1%
1178     \hyxmp@append@hex@iv#1%
1179 }

\hyxmp@def@DocumentID Seed the random-number generator with a function of the current filename, PDF
    \hyxmp@DocumentID document title, and PDF author, then invoke \hyxmp@create@uuid to define
    \hyxmp@seed@string \hyxmp@DocumentID as a random UUID.
1180 \newcommand*{\hyxmp@def@DocumentID}{%
1181     \edef\hyxmp@seed@string{\hyxmp@jobname:\@pdftitle:\@pdfauthor}%
1182     \expandafter\hyxmp@seed@rng\expandafter{\hyxmp@seed@string}%
1183     \edef\hyxmp@rand@num{\the\@tempcnta}%
1184     \hyxmp@create@uuid\hyxmp@DocumentID
1185 }

\hyxmp@def@InstanceID Seed the random-number generator with a function of the current filename,
    \hyxmp@InstanceID PDF document title, PDF author, and the current timestamp, then invoke
    \hyxmp@seed@string \hyxmp@create@uuid to define \hyxmp@InstanceID as a random UUID. For the
    current timestamp, we use both the document-specified timestamp from pdfdate
    and the TEX time. The former can be more precise (to sub-seconds) but may be
    less random (as it depends on manual document modifications) while the latter
    is typically less precise (to minutes) but may be more random (as it is updated
    automatically).
1186 \newcommand*{\hyxmp@def@InstanceID}{%
1187     \hyxmp@today@xmp@define{\hyxmp@seed@string}%
1188     \edef\hyxmp@seed@string{%
1189         \hyxmp@jobname:\@pdftitle:\@pdfauthor:\hyxmp@today@xmp:\hyxmp@seed@string
1190     }%
1191     \expandafter\hyxmp@seed@rng\expandafter{\hyxmp@seed@string}%
1192     \edef\hyxmp@rand@num{\the\@tempcnta}%
1193     \hyxmp@create@uuid\hyxmp@InstanceID
1194 }

```

### 3.6 Constructing the XMP packet

An XMP packet “shall consist of the following, in order: a header PI, the serialized XMP data model (the XMP packet) with optional white-space padding, and a trailer PI” [5]. (“PI” is an abbreviation for “processing instructions”). The serialized XMP includes blocks of XML for various XMP schemata: Adobe PDF (Section 3.6.2), Dublin Core (Section 3.6.3), XMP Rights Management (Section 3.6.4), XMP Media Management (Section 3.6.5), XMP Basic (Section 3.6.6), Photoshop (Section 3.6.7), PDF/\* Identification (Section 3.6.8), IPTC Photo Metadata (Section 3.6.9), PRISM Basic Metadata (Section 3.6.10), Journal Article Versions (Section 3.6.11), and XMP Paged-Text (Section 3.6.12). The `\hyxmp@construct@packet` macro

(Section 3.6.14) constructs the XMP packet into `\hyxmp@xml`. It first writes the appropriate XML header, then calls the various schema-writing macros, then injects `\hyxmp@padding` as padding, and finally writes the appropriate XML trailer.

### 3.6.1 XMP utility functions

`\hyxmp@add@to@xml` Given a piece of text, replace all underscores with category-code 11 (“other”) spaces and all `^C` characters with commas, then append the result to the `\hyxmp@xml` macro.

```

1195 \newcommand*{\hyxmp@add@to@xml}[1]{%
1196   \bgroup
1197     \@tempcnta=0
1198     \ifhyxmp@unicodetex
1199       \@tempcntb=65536%
1200     \else
1201       \@tempcntb=256%
1202     \fi
1203     \loop
1204       \lccode\@tempcnta=\@tempcnta
1205       \advance\@tempcnta by 1
1206       \ifnum\@tempcnta<\@tempcntb
1207         \repeat
1208         \lccode'\_='\ \relax
1209         \lccode'\^C='\,\relax
1210         \lccode'\^U='\_\relax
1211         \lowercase{\xdef\hyxmp@new@xml{#1}}%
1212         \xdef\hyxmp@xml{\hyxmp@xml\hyxmp@new@xml}%
1213     \egroup
1214 }
```

`\hyxmp@hash` Define a category-code 11 (“other”) version of the “#” character.

```

1215 \bgroup
1216 \catcode'\#=11
1217 \gdef\hyxmp@hash{#}
1218 \egroup
```

`\hyxmp@padding` The XMP specification recommends leaving approximately 2000 bytes of whitespace at the end of each XMP packet to facilitate editing the packet in place [5].  
`\hyxmp@xml` `\hyxmp@padding` is defined to contain 32 lines of 63 spaces and a newline apiece for a total of 2048 characters of whitespace.

```

1219 \bgroup
1220 \xdef\hyxmp@xml{%
1221   \hyxmp@add@to@xml{%
1222     -----^^J%
1223   }
1224   \xdef\hyxmp@padding{\hyxmp@xml}%
1225 \egroup
1226 \xdef\hyxmp@padding{\hyxmp@padding\hyxmp@padding}
1227 \xdef\hyxmp@padding{\hyxmp@padding\hyxmp@padding}
```

```

1228 \xdef\hyxmp@padding{\hyxmp@padding\hyxmp@padding}
1229 \xdef\hyxmp@padding{\hyxmp@padding\hyxmp@padding}
1230 \xdef\hyxmp@padding{\hyxmp@padding\hyxmp@padding}

```

`\hyxmp@x@default` Define an x-default string that we can use in comparisons with `\@pdfmetalang`.

```

1231 \newcommand*{\hyxmp@x@default}{x-default}

```

### 3.6.2 The Adobe PDF schema

Older versions of `hyperref` defined a default producer; newer versions do not. Instead, they let the `TeX` engine define the producer itself. This poses a problem for PDF/A compliance because `hyperxmp` sees an empty producer and therefore omits writing a `pdf:Producer` to the XMP packet, causing a mismatch between the data in the XMP packet and the data in the PDF Info dictionary. To ensure consistency between XMP and Info, we explicitly define our own default `\@pdfproducer` here.

```

\@pdfproducer Define \@pdfproducer using the banner string if available or the TeX engine's
\hyxmp@define@pdfproducer version number if not.

1232 \newcommand*{\hyxmp@define@pdfproducer}{%
1233   \gdef\@pdfproducer{TeX}
1234   \ifLuaTeX
1235     \expandafter\hyxmp@banner@to@producer\expandafter{\luatexbanner}%
1236   \else
1237     \ifPDFTeX
1238       \expandafter\hyxmp@banner@to@producer\expandafter{\pdftexbanner}%
1239     \else
1240       \ifXeTeX
1241         \edef\@pdfproducer{XeTeX version \the\XeTeXversion\XeTeXrevision}%
1242       \fi
1243     \fi
1244   \fi
1245 }

\@pdfproducer Define \@pdfproducer as the TeX engine's banner string (e.g., "This is
\hyxmp@banner@to@producer LuaHBTeX, Version 1.12.0 (TeX Live 2020)", removing the initial "This is"
if possible (specifically, when  $\varepsilon$ -TeX's \scantokens primitive is available).

1246 \def\hyxmp@banner@to@producer#1{%
1247   \ifx\scantokens\relax
1248     \gdef\@pdfproducer{#1}%
1249   \else
1250     {\scantokens{\makeatletter\hyxmp@remove@this#1\relax}}%
1251   \fi
1252 }

\@pdfproducer Define \@pdfproducer as a given banner string with the initial "This is" stripped
\hyxmp@remove@this off the beginning.

1253 \def\hyxmp@remove@this This is #1\relax{\gdef\@pdfproducer{#1}}

```



If `pdfproducer` wasn't specified and `hyperref` didn't already define `\pdfproducer`—old versions of `hyperref` did; newer ones don't—try to assign a meaningful producer string and use that.

```
1254 \AtBeginDocument{%
1255   \ifx\pdfproducer\relax
1256     \hyxmp@definepdfproducer
1257   \fi
1258 }
```

`\hyxmp@assign@major@minor` Assign `\hyxmp@major@minor` to be the PDF version targeted by the running `TEX` engine.

`\hyxmp@major@minor`

```
1259 \newcommand*{\hyxmp@assign@major@minor}{%
1260   \@ifundefined{pdfvariable}{%
1261     \@ifundefined{pdfminorversion}{%
```

Case 1: Neither `\pdfvariable` nor `\pdfminorversion` is defined (X<sub>Y</sub>L<sup>A</sup>T<sub>E</sub>X and regular L<sup>A</sup>T<sub>E</sub>X).

```
1262   }{%
```

Case 2: `\pdfminorversion` is defined (pdfL<sup>A</sup>T<sub>E</sub>X and pre-0.85 LuaL<sup>A</sup>T<sub>E</sub>X).

```
1263     \xdef\hyxmp@major@minor{\the\pdfminorversion}%
1264     \@ifundefined{pdfmajorversion}{%
```

Case 2(a): `\pdfmajorversion` is not defined (older versions of pdfL<sup>A</sup>T<sub>E</sub>X and LuaL<sup>A</sup>T<sub>E</sub>X).

```
1265       \xdef\hyxmp@major@minor{1.\hyxmp@major@minor}%
1266     }{%
```

Case 2(b): `\pdfmajorversion` is defined (pdfL<sup>A</sup>T<sub>E</sub>X 1.40.21+).

```
1267       \xdef\hyxmp@major@minor{\the\pdfmajorversion.\hyxmp@major@minor}%
1268     }%
1269   }%
1270 }
```

Case 3: `\pdfvariable` is defined (LuaL<sup>A</sup>T<sub>E</sub>X 0.85+).

```
1271   \xdef\hyxmp@major@minor{\the\pdfvariable majorversion.\the\pdfvariable minorversion}%
1272   }%
1273 }
```

`\hyxmp@pdf@schema` Add properties defined by the Adobe PDF schema to the `\hyxmp+xml` macro.

```
1274 \newcommand*{\hyxmp@pdf@schema}{%
```

Add a block of XML to `\hyxmp+xml` that lists the document's keywords (the `pdf:Keywords` property), the tools used to produce the PDF file (the `pdf:Producer` property), and the version of the PDF standard adhered to (the `pdf:PDFVersion` property). Unlike most of the other schemata that `hyperxmp` supports, the Adobe PDF schema is *always* included in the document, even if all of its keys are empty. This is because PDF/A-1b requires the keywords and producer to be the same in the XMP metadata and the PDF metadata. Because `hyperref` always specifies the

Keywords and Producer fields, even when they're empty, hyperxmp has to follow suit and define pdf:Keywords and pdf:Producer in the XMP packet.

```

1275 \hyxmp@add@simple@var{pdf:Producer}{@pdfproducer}%
1276 \hyxmp@add@simple@var{pdf:Keywords}{@pdfkeywords}%
1277 \hyxmp@add@simple{pdf:Trapped}{@pdftrapped}%
1278 \hyxmp@assign@major@minor
1279 \hyxmp@add@simple@var{pdf:PDFVersion}{hyxmp@major@minor}%
1280 }

```

### 3.6.3 The Dublin Core schema

`\ifhyxmp@multi@langs` These macros are used locally to `\hyxmp@rdf@dc`. If the property being processed has values in different languages, `\ifhyxmp@multi@langs` evaluates to TRUE. If it has a value in only a single language, `\ifhyxmp@multi@langs` evaluates to FALSE.

```

1281 \newif\ifhyxmp@multi@langs

```

`\hyxmp@rdf@dc` Given an optional `\if<something>` statement (#1), a Dublin Core property (#2) and a macro containing some `\pdfstringdef`-defined text (#3), append the appropriate block of XML to the `\hyxmp@xml` macro.

```

1282 \newcommand*{\hyxmp@rdf@dc}[3][\iffalse]{%

```

Set `\@tempswatrue` only if the given text is nonempty or the provided conditional evaluates to TRUE.

```

1283 \ifmtargexp{#3}{\@tempswafalse}{\@tempswatrue}%
1284 #1
1285 \@tempswatrue
1286 \fi

```

Append the corresponding XML only if `\@tempswatrue`.

```

1287 \if@tempswa
1288 \hyxmp@xmlify{#3}%

```

`\hyxmp@value` Store the XML-ified version of #3 in `\hyxmp@value` so we can reuse `\hyxmp@xmlified` if necessary.

```

1289 \let\hyxmp@value=\hyxmp@xmlified
1290 \hyxmp@add@to@xml{%
1291 -----<dc:#2>^^J%
1292 -----<rdf:Alt>^^J%
1293 }%

```

Record whether property #2 has definitions in multiple languages.

```

1294 \if@def@and@nonempty{hyxmp@alt@#2}{%
1295 \hyxmp@multi@langstrue
1296 }{%
1297 \hyxmp@multi@langsfalse
1298 }%

```

There are now four cases to consider: the cross product of  $\{\text{pdfmetalang} = \text{"x-default"}, \text{pdfmetalang} \neq \text{"x-default"}\}$  and  $\{\backslash\text{XMPLangAlt} \text{ was specified}, \backslash\text{XMPLangAlt} \text{ was not specified}\}$ . We handle each of these in turn.

```
1299 \ifx\@pdfmetalang\hyxmp@x@default
1300 \ifhyxmp@multi@langs
```

**Case 1:** No pdfmetalang but \XMPLangAlt. We consider this an error because the x-default language will not have a matching non-default language, in violation of the XMP specification’s guidance [5, p. 23]:

An **xml:lang** value of “x-default” may be used to explicitly denote a default item. If used, the “x-default” item shall be first in the array and its simple text value should be repeated in another item in which **xml:lang** specifies its actual language. However, an “x-default” item may be the only item, in which case there is only a default value in no defined language.

```
1301 \PackageError{hyperxmp}%
1302 {\string\XMPLangAlt\space was used without specifying
1303 pdfmetalang\MessageBreak
1304 or pdflang}%
1305 {Be sure to assign a language code to the pdfmetalang key and/or a
1306 document\MessageBreak
1307 language to the pdflang key (e.g., \string\hypersetup{pdfmetalang={en}}).}%
1308 \else
```

**Case 2:** No pdfmetalang and no \XMPLangAlt. Here we specify only x-default as the language, as per the guidance quoted above.

```
1309 \hyxmp@add@to@xml{%
1310 -----<rdf:li xml:lang="\hyxmp@x@default">\hyxmp@value</rdf:li>^^J%
1311 }%
1312 \fi
1313 \else
1314 \ifhyxmp@multi@langs
```

**Case 3:** Both pdfmetalang and \XMPLangAlt. In this case, we include an x-default followed by the pdfmetalang language, followed by all of the language alternatives.

```
1315 \hyxmp@xmlify{\@pdfmetalang}%
1316 \hyxmp@add@to@xml{%
1317 -----<rdf:li xml:lang="\hyxmp@x@default">\hyxmp@value</rdf:li>^^J%
1318 -----<rdf:li xml:lang="\hyxmp@xmlified">\hyxmp@value</rdf:li>^^J%
1319 }%
1320 \def\do##1##2{
1321 \hyxmp@xmlify{##2}%
1322 \hyxmp@add@to@xml{%
1323 -----<rdf:li xml:lang="##1">\hyxmp@xmlified</rdf:li>^^J%
1324 }%
1325 }%
1326 \csname hyxmp@alt@#2\endcsname
1327 \else
```

**Case 4:** pdfmetalang but no \XMPLangAlt. To reduce redundancy we omit the x-default and include the single language in which the text appears.

```

1328      \hyxmp@xmlify{\pdfmetalang}%
1329      \hyxmp@add@to@xml{%
1330  -----<rdf:li xml:lang="\hyxmp@xmlified">\hyxmp@value</rdf:li>^^J%
1331      }%
1332      \fi
1333  \fi

```

Complete this XMP element.

```

1334      \hyxmp@add@to@xml{%
1335  -----</rdf:Alt>^^J%
1336  -----</dc:#2>^^J%
1337      }%
1338  \fi
1339 }%

```

`\hyxmp@list@to@xml` Given an optional `\if<something>` statement (#1), a Dublin Core property (#2), an RDF array (#3), and a macro containing a comma-separated list (#4), append the appropriate block of XML to the `\hyxmp@xml` macro.

```

1340 \newcommand*{\hyxmp@list@to@xml}[4][\iffalse]{%

```

Set `\@tempswatrue` only if the given list is nonempty or the provided conditional evaluates to TRUE.

```

1341  \@ifmtargexp{#4}{\@tempswafalse}{\@tempswatrue}%
1342  #1
1343  \@tempswatrue
1344  \fi

```

Append the corresponding XML only if `\@tempswatrue`.

```

1345  \if@tempswa
1346      \hyxmp@add@to@xml{%
1347  -----<dc:#2>^^J%
1348  -----<rdf:#3>^^J%
1349      }%
1350      \bgroup

```

`\@elt` Re-encode the text from Unicode if necessary. Then redefine `\@elt` to XML-ify each element of the list and append it to `\hyxmp@xmlified`.

```

1351      \hyxmp@xmlify{#4}%
1352      \hyxmp@commas@to@list\hyxmp@list{\hyxmp@xmlified}%
1353      \def\@elt##1{%
1354          \hyxmp@add@to@xml{%
1355  -----<rdf:li>##1</rdf:li>^^J%
1356          }%
1357      }%
1358      \hyxmp@list
1359      \egroup
1360      \hyxmp@add@to@xml{%
1361  -----</rdf:#3>^^J%

```

```

1362 -----</dc:#2>^^J%
1363     }%
1364     \fi
1365 }

```

`\hyxmp@singleton@dc` Given an optional list type (Seq or Bag), a Dublin Core property, and a string, append a block of XML representing a one-element list consisting of the given string.

```

1366 \newcommand{\hyxmp@singleton@dc}[3][Bag]{%
1367   \@ifnotmtargexp{#3}{%
1368     \hyxmp@xmlify{#3}%
1369     \hyxmp@add@to@xml{%
1370       -----<dc:#2>^^J%
1371       -----<rdf:#1>^^J%
1372       -----<rdf:li>\hyxmp@xmlified</rdf:li>^^J%
1373       -----</rdf:#1>^^J%
1374       -----</dc:#2>^^J%
1375     }%
1376   }
1377 }

```

`\hyxmp@cond@dc@identifier` Conditionally add a `dc:identifier` tag. Given a prefix string (#1) and a main string (#2), wrap these in a `dc:identifier` if the main string is nonempty and `\hyxmp@xmlified` is empty (implying the `dc:identifier` has not yet been written).

```

1378 \newcommand*{\hyxmp@cond@dc@identifier}[2]{%
1379   \ifx\hyxmp@xmlified\@empty
1380     \@ifnotmtargexp{#2}{%
1381       \hyxmp@add@simple@pfx{dc:identifier}{#1}{#2}%
1382     }%
1383   \fi
1384 }

```

`\hyxmp@dc@schema` Add properties defined by the Dublin Core schema to the `\hyxmp@xml` macro. Specifically, we add entries for the `dc:title` property if the author specified a `pdftitle`, the `dc:description` property if the author specified a `pdfsubject`, the `dc:rights` property if the author specified a `pdfcopyright`, the `dc:creator` property if the author specified a `pdfauthor`, the `dc:subject` property if the author specified `pdfkeywords`, the `dc:language` property if the author specified `pdflang`, the `dc:type` property if the author specified `pdftype`, and the `dc:identifier` if the author specified `pdfidentifier` or if we can derive it from other options. We also specify the `dc:source` property using the base name of the source file with `.tex` appended and the `dc:date` property using the date the document was run through L<sup>A</sup>T<sub>E</sub>X—unless the author specified `pdfdate`, in which case we use that.

```

1385 \newcommand*{\hyxmp@dc@schema}{%
1386   \hyxmp@add@simple{dc:format}{application/pdf}%
1387   \hyxmp@rdf@dc[\ifHy@pdfa]{title}{\@pdftitle}%
1388   \hyxmp@rdf@dc[\ifHy@pdfa]{description}{\@pdfsubject}%
1389   \hyxmp@rdf@dc{rights}{\@pdfcopyright}%

```

```

1390 \hyxmp@singleton@dc{publisher}{\@pdfpublisher}%
1391 \@ifmtargexp{\@pdfdatetime}{%
1392   \hyxmp@singleton@dc[Seq]{date}{\hyxmp@today@xmp}%
1393 }{%
1394   \hyxmp@singleton@dc[Seq]{date}{\@pdfdatetime}%
1395 }%
1396 \hyxmp@singleton@dc{type}{\@pdftype}%
1397 \hyxmp@list@to@xml[\ifHy@pdfa]{creator}{Seq}{\hyxmp@pdfauthor}%
1398 \hyxmp@list@to@xml{subject}{Bag}{\hyxmp@pdfkeywords}%
1399 \ifx\@pdfsource\@empty
1400 \else
1401   \hyxmp@add@simple{dc:source}{\@pdfsource}%
1402 \fi
1403 \hyxmp@list@to@xml{language}{Bag}{\hyxmp@dc@lang}%
1404 % If \@pdfidentifier is empty, try setting it to each of \@pdfdoi,
1405 % \@pdfeissn, \@pdfissn, and \@pdfisbn, in turn, with proper
1406 % syntactic adjustments.
1407 %   \begin{macrocode}
1408 \@ifmtargexp{\@pdfidentifier}{%
1409   \let\hyxmp@xmlified=\@empty
1410   \hyxmp@cond@dc@identifier{info:doi/}{\@pdfdoi}%
1411   \hyxmp@cond@dc@identifier{urn:ISSN:}{\@pdfeissn}%
1412   \hyxmp@cond@dc@identifier{urn:ISSN:}{\@pdfissn}%
1413   \hyxmp@cond@dc@identifier{urn:ISBN:}{\@pdfisbn}%
1414 }{%
1415   \hyxmp@add@simple{dc:identifier}{\@pdfidentifier}%
1416 }%
1417 }

```

### 3.6.4 The XMP Rights Management schema

`\hyxmp@xmpRights@schema` Add properties defined by the XMP Rights Management schema to the `\hyxmp@xml` macro. Currently, these are only the `xmpRights:Marked` property and the `xmpRights:WebStatement` property. If the author specified a copyright statement we mark the document as copyrighted. If the author specified a license statement we include the URL in the metadata.

```

1418 \newcommand*{\hyxmp@xmpRights@schema}{%

```

`\hyxmp@legal` Set `\hyxmp@rights` to YES if either `pdfcopyright` or `pdflicenseurl` was specified.

```

1419 \let\hyxmp@rights=\@empty
1420 \ifx\@pdflicenseurl\@empty
1421 \else
1422   \def\hyxmp@rights{YES}%
1423 \fi
1424 \ifx\@pdfcopyright\@empty
1425 \else
1426   \def\hyxmp@rights{YES}%
1427 \fi

```

Include the license-statement URL and/or the copyright indication. The copyright statement itself is included by `\hyxmp@dc@schema` in Section 3.6.3.

```

1428 \ifx\hyxmp@rights\@empty
1429 \else
1430   \ifx\@pdfcopyright\@empty
1431   \else
1432     \hyxmp@add@simple{xmpRights:Marked}{True}%
1433   \fi
1434   \hyxmp@add@simple{xmpRights:WebStatement}{\@pdflicenseurl}%
1435 \fi
1436 }

```

### 3.6.5 The XMP Media Management schema

`\hyxmp@aep@toks` Once we reach the end of the preamble and know that `\@pdftitle` and `\@pdfauthor` are no longer expected to change we use those macros (and others) to define one UUID for the document (`\hyxmp@DocumentID`) and one for the document instance (`\hyxmp@InstanceID`). As explained in Section 3.1, we defer the invocation of `\AtEndPreamble` to the end of the file.

```

1437 \expandafter\hyxmp@aep@toks\expandafter=\expandafter{%
1438   \the\hyxmp@aep@toks
1439   \AtEndPreamble{%
1440     \@ifmtargexp{\hyxmp@DocumentID}{\hyxmp@def@DocumentID}{}%
1441     \@ifmtargexp{\hyxmp@InstanceID}{\hyxmp@def@InstanceID}{}%
1442   }%
1443 }

```

`\hyxmp@mm@schema` Add properties defined by the XMP Media Management schema to the `\hyxmp+xml` macro. According to the XMP specification, the `xmpMM:DocumentID` property is supposed to uniquely identify a document, and the `xmpMM:InstanceID` property is supposed to change with each save operation [5]. As seen in Section 3.5, we do what we can to honor this intention from within a T<sub>E</sub>X-based workflow. We additionally support the `xmpMM:VersionID` property, whose value is supplied by the author using `pdfversionid`.

```

1444 \gdef\hyxmp@mm@schema{%
1445   \hyxmp@add@simple{xmpMM:DocumentID}{\hyxmp@DocumentID}%
1446   \hyxmp@add@simple{xmpMM:InstanceID}{\hyxmp@InstanceID}%
1447   \hyxmp@add@simple{xmpMM:VersionID}{\@pdfversionid}%
1448   \hyxmp@add@simple{xmpMM:RenditionClass}{\@pdfrendition}%
1449 }

```

### 3.6.6 The XMP Basic schema

`\hyxmp@xmp@basic@schema` Add properties defined by the XMP Basic schema to the `\hyxmp+xml` macro. These include a bunch of dates (all set to the same value) and the base URL for the document if specified with `baseurl`.

```

1450 \newcommand*{\hyxmp@xmp@basic@schema}{%

```

For the document’s creation date, use the user-specified `\@pdfcreationdate` if defined and non-empty. Otherwise use our fabricated `\hyxmp@today@xmp`.

```

1451 \ifmtargexp{\@pdfcreationdate}{%
1452   \hyxmp@add@simple{xmp:CreateDate}{\hyxmp@today@xmp}%
1453 }{%
1454   \hyxmp@add@simple{xmp:CreateDate}{%
1455     \expandafter\hyxmp@as@xmp@date\expandafter{\@pdfcreationdate}}%
1456 }%
```

For the document’s modification date, use the user-specified `\@pdfmoddate` if defined and non-empty. Otherwise use our fabricated `\hyxmp@today@xmp`.

```

1457 \ifmtargexp{\@pdfmoddate}{%
1458   \hyxmp@add@simple{xmp:ModifyDate}{\hyxmp@today@xmp}%
1459 }{%
1460   \hyxmp@add@simple{xmp:ModifyDate}{%
1461     \expandafter\hyxmp@as@xmp@date\expandafter{\@pdfmoddate}}%
1462 }%
```

For the document’s metadata date, use the user-specified `\@pdfmetadatetime` if defined and non-empty. Otherwise use our fabricated `\hyxmp@today@xmp`.

```

1463 \ifmtargexp{\@pdfmetadatetime}{%
1464   \hyxmp@add@simple{xmp:MetadataDate}{\hyxmp@today@xmp}%
1465 }{%
1466   \hyxmp@add@simple{xmp:MetadataDate}{\@pdfmetadatetime}%
1467 }%
```

Define the creation tool and the base URL.

```

1468 \hyxmp@add@simple{xmp:CreatorTool}{\@pdfcreator}%
1469 \hyxmp@add@simple{xmp:BaseURL}{\@baseurl}%
1470 }
```

### 3.6.7 The Photoshop schema

`\hyxmp@photoshop@schema` Add properties defined by the Photoshop schema to the `\hyxmp+xml` macro. We  
`\hyxmp@photoshop@data` currently support only the `photoshop:AuthorsPosition` and `photoshop:CaptionWriter` properties.

```

1471 \gdef\hyxmp@photoshop@schema{%
1472   \edef\hyxmp@photoshop@data{\@pdfauthortitle\@pdfcaptionwriter}%
1473   \hyxmp@add@simple{photoshop:AuthorsPosition}{\@pdfauthortitle}%
1474   \hyxmp@add@simple{photoshop:CaptionWriter}{\@pdfcaptionwriter}%
1475 }
```

### 3.6.8 PDF/\* Identification schemata

`\hyxmp@pdfa@id@schema` Add properties defined by the PDF/A Identification schema [13] to the `\hyxmp+xml` macro. These properties identify a document as conforming to a particular PDF/A standard. We default to PDF/A-1b if any PDF/A compliance is detected but let the author override the “1” with `pdfapart` and the “b” with `pdfaconformance`.



```

1476 \newcommand*{\hyxmp@pdfa@id@schema}{%
1477   \ifHy@pdfa
1478     \hyxmp@add@simple{pdfaid:part}{\@pdfapart}%
1479     \hyxmp@add@simple{pdfaid:conformance}{\@pdfaconformance}%
1480   \fi
1481 }

```

`\hyxmp@pdfua@id@schema` If the document conforms to a PDF/UA standard, the author can indicate the standard version with `pdfuapart`.

```

1482 \newcommand*{\hyxmp@pdfua@id@schema}{%
1483   \hyxmp@add@simple{pdfuaid:part}{\@pdfuapart}%
1484 }

```

`\hyxmp@pdfx@id@schema` If the document conforms to a PDF/X standard, the author can indicate the standard version with `pdfxstandard`. We separately handle PDF/X-1, PDF/X-2 and PDF/X-3, and PDF/X-4 onwards.

```

1485 \newcommand*{\hyxmp@pdfx@id@schema}{%
1486   \@tempcnta=0\hyxmp@pdfx@major\relax
1487   \ifnum\@tempcnta=0
1488     \else
1489       \ifnum\@tempcnta=1
1490         \hyxmp@add@simple{pdfx:GTS_PDFXVersion}{PDF/X-1:2001}%
1491         \hyxmp@add@simple{pdfx:GTS_PDFXConformance}{\@pdfxstandard}%
1492       \else
1493         \ifnum\@tempcnta<4
1494           \hyxmp@add@simple{pdfx:GTS_PDFXVersion}{\@pdfxstandard}%
1495         \else
1496           \hyxmp@add@simple{pdfxid:GTS_PDFXVersion}{\@pdfxstandard}%
1497         \fi
1498       \fi
1499   \fi
1500 }

```

### 3.6.9 The IPTC Photo Metadata schema

`\xmplinesep` Lines in multiline fields are separated by `\xmplinesep` in the generated XML. This defaults to an LF (`^J`) character but written as an XML character entity for consistency across operating systems.

```

1501 \begingroup
1502   \catcode'\&=12
1503   \catcode'\#=12
1504   \gdef\xmplinesep{&#xA;}
1505 \endgroup

```

`\hyxmp@list@to@lines` Given a property (`#1`) and a macro containing a comma-separated list (`#2`), replace commas with `\xmplinesep`. Do nothing if the list is empty.

```

1506 \newcommand*{\hyxmp@list@to@lines}[2]{%
1507   \@ifnotmtargexp{#2}{%

```

```

1508     \bgroup
1509     \hyxmp@add@to@xml{%
1510         \hyxmp@extra@indent_____<#1>%
1511     }%

```

`\@elt@first` The first element of the list is output as is.

```

1512     \def\@elt@first##1{%
1513         \hyxmp@add@to@xml{##1}%
1514         \let\@elt=\@elt@rest
1515     }%

```

`\@elt@rest` The remaining elements of the list are output with a preceding line separator (`\xmplinesep`).

```

1516     \def\@elt@rest##1{%
1517         \hyxmp@add@to@xml{\xmplinesep##1}%
1518     }%

```

`\@elt` Re-encode the text from Unicode if necessary. Then redefine `\@elt` to insert a line separator between terms.

```

1519     \let\@elt=\@elt@first
1520     \hyxmp@xmllify{#2}%
1521     \hyxmp@commas@to@list\hyxmp@list{\hyxmp@xmllified}%
1522     \hyxmp@list
1523     \hyxmp@add@to@xml{</#1>^^J}%
1524 \egroup
1525 }%
1526 }

```

`\hyxmp@iptc@schema` Add properties defined by the IPTC Photo Metadata schema [10] to the `\hyxmp@xml` macro. We currently support only the `lptc4xmpCore:CreatorContactInfo` property, although this is a structure containing multiple fields.

```

1527 \gdef\hyxmp@iptc@schema{%

```

Because we currently support only `lptc4xmpCore:CreatorContactInfo` it suffices to check if we have any relevant data. If so, we instantiate a `lptc4xmpCore:ContactInfo` structure with all available fields.

```

1528 \ifx\hyxmp@iptc@data\@empty
1529 \else
1530     \hyxmp@add@to@xml{%
1531         _____<Iptc4xmpCore:CreatorContactInfo rdf:parseType="Resource">^^J%
1532     }%

```

We locally redefine `\hyxmp@extra@indent` to increase the indentation of the assignments to `lptc4xmpCore:CreatorContactInfo`'s fields.

```

1533     \bgroup
1534     \edef\hyxmp@extra@indent{\hyxmp@extra@indent\space\space}%
1535     \hyxmp@list@to@lines{Iptc4xmpCore:CiAdrExtadr}{\@pdfcontactaddress}%
1536     \hyxmp@add@simple{Iptc4xmpCore:CiAdrCity}{\@pdfcontactcity}%
1537     \hyxmp@add@simple{Iptc4xmpCore:CiAdrRegion}{\@pdfcontactregion}%

```

```

1538     \hyxmp@add@simple{Iptc4xmpCore:AdrPcode}{\@pdfcontactpostcode}%
1539     \hyxmp@add@simple{Iptc4xmpCore:AdrCtry}{\@pdfcontactcountry}%

\xmplinesep The IPTC standard states that sets of telephone numbers, email addresses, and
              URLs for the contact person or institution, “[m]ay have to be separated by a
              comma in the user interface” [10]. This is rather ambiguous: Does the comma
              appear only in the user interface or also in the generated XML? Here we assume
              the latter interpretation and temporarily redefine \xmplinesep as a comma and
              use \hyxmp@list@to@lines to insert the data. Unlike \hyxmp@add@simple, this
              approach trims all spaces surrounding commas.

1540     \def\xmplinesep{,}%
1541     \hyxmp@list@to@lines{Iptc4xmpCore:TelWork}{\@pdfcontactphone}%
1542     \hyxmp@list@to@lines{Iptc4xmpCore:EmailWork}{\@pdfcontactemail}%
1543     \hyxmp@list@to@lines{Iptc4xmpCore:UrlWork}{\@pdfcontacturl}%
1544     \egroup
1545     \hyxmp@add@to@xml{%
1546 -----</Iptc4xmpCore:CreatorContactInfo>^^J%
1547     }%
1548     \fi
1549 }

```

### 3.6.10 The PRISM Basic Metadata schema

\hyxmp@prism@schema Add properties defined by the PRISM Basic Metadata schema [8].

```

1550 \newcommand*{\hyxmp@prism@schema}{%
1551   \ifx\hyxmp@prism@data\@empty
1552   \else
1553     \hyxmp@add@simple{prism:complianceProfile}{three}%
1554   \fi
1555   \hyxmp@add@simple@lang{prism:subtitle}{\@pdfsubtitle}%
1556   \hyxmp@add@simple@lang{prism:publicationName}{\@pdfpublication}%
1557   \hyxmp@add@simple{prism:aggregationType}{\@pdfpubtype}%
1558   \hyxmp@add@simple@lang{prism:bookEdition}{\@pdfbookedition}%
1559   \hyxmp@add@simple{prism:volume}{\@pdfvolumenum}%
1560   \hyxmp@add@simple{prism:number}{\@pdfissuenum}%
1561   \hyxmp@add@simple{prism:pageRange}{\@pdfpagerange}%
1562   \hyxmp@add@simple{prism:isbn}{\@pdfisbn}%
1563   \hyxmp@add@simple{prism:issn}{\@pdfissn}%
1564   \hyxmp@add@simple{prism:eIssn}{\@pdfeissn}%
1565   \hyxmp@add@simple{prism:doi}{\@pdfdoi}%
1566   \hyxmp@add@simple{prism:url}{\@pdfurl}%
1567   \hyxmp@add@simple{prism:byteCount}{\@pdfbytes}%
1568   \hyxmp@add@simple{prism:pageCount}{\@pdfnumpages}%
1569 }

```

### 3.6.11 The Journal Article Versions (JAV) schema

\hyxmp@jav@schema Add properties defined by the NISO/ALPSP Journal Article Versions schema [1].

```

1570 \newcommand*{\hyxmp@jav@schema}{%
1571   \hyxmp@add@simple{jav:journal_article_version}{\@pdfpubstatus}%
1572 }

```

### 3.6.12 The XMP Paged-Text schema

`\hyxmp@xmptpg@schema` The XMP Paged-Text schema [5] includes properties related to the construction of the PDF file itself. We acquire most of this information through Lua<sub>TEX</sub> mechanisms and therefore include much less information when run from other <sub>TEX</sub> engines.

```

1573 \newcommand*{\hyxmp@xmptpg@schema}{%
1574   \ifLuaTeX
1575     \luadirect{write_xmp_font_list(\the\hyxmp@cct)}%
1576   \fi
1577   \hyxmp@add@simple{xmpTPg:NPages}{\@pdfnumpages}%
1578 }

```

`\hyxmp@cct` We store the current category-code table to ensure that `write_xmp_font_list`'s output uses our redefined category codes.

```

1579 \ifLuaTeX
1580   \newcatcodetable\hyxmp@cct
1581   \savecatcodetable\hyxmp@cct
1582 \fi

```

`\hyxmp@prot@us` Define an underscore character that's protected from being converted into a space when passed to `\hyxmp@add@to@xml`. `\hyxmp@prot@us` is used within `write_xmp_font_list` (below) in particular to typeset filenames that may contain underscores.

```

1583 \bgroup
1584   \catcode'\_ =11
1585   \gdef\hyxmp@prot@us{_%}
1586 \egroup

```

Here we define a Lua function, `write_xmp_font_list`, that writes font information to the XMP packet.

```

1587 \ifLuaTeX
1588   \begin{luacode*}
1589 function write_xmp_font_list (cct)
1590   local function show_field(name, ...)
1591     for i = 1, select("#", ...) do
1592       local val = select(i, ...)
1593       if val then
1594         local xml = string.gsub(val, "&", "&amp;")
1595         xml = string.gsub(xml, "<", "&lt;")
1596         xml = string.gsub(xml, ">", "&gt;")
1597         xml = string.gsub(xml, "_", "\\hyxmp@prot@us ")
1598         tex.print(cct, "-----<stFnt:" .. name .. ">" ..
1599           xml .. "</stFnt:" .. name .. ">^^J%")
1600       return

```

```

1601     end
1602   end
1603 end
1604 tex.print(cct, "\\hyxmp@add@to@xml{%")
1605 tex.print(cct, "_____<xmpTPg:Fonts>^^J%")
1606 tex.print(cct, "_____<rdf:Bag>^^J%")
1607 for i, f in font.each() do
1608   tex.print(cct, "_____<rdf:li rdf:parseType=\"Resource\">^^J%")
1609   if f.filename then
1610     local fname = string.gsub(f.filename, "^harfloaded:(.*)", "%1")
1611     local info = fontloader.info(fname)
1612     if info then
1613       show_field("fontFace", info.fullname)
1614       show_field("fontFamily", info.familyname)
1615       show_field("fontName", info.fontname)
1616       show_field("versionString", info.version)
1617     end
1618     local baseName = string.gsub(f.filename, ".*[/\\](.*)", "%1")
1619     show_field("fontFileName", baseName)
1620   else
1621     show_field("fontName", f.psname, f.fullname, f.name)
1622   end
1623   if f.format and f.format ~= "unknown" then
1624     show_field("fontType", f.format)
1625   end
1626   tex.print(cct, "_____</rdf:li>^^J%")
1627 end
1628 tex.print(cct, "_____</rdf:Bag>^^J%")
1629 tex.print(cct, "_____</xmpTPg:Fonts>^^J%")
1630 tex.print(cct, "%")
1631 end
1632 \end{luacode*}
1633 \fi

```

### 3.6.13 XMP extension schemata

Not all of the schemata supported by hyperxmp are predefined by XMP. PDF/A conversion would normally fail for documents that employ “custom” schemata. However, this problem can be circumvented by declaring non-standard schemata in the XMP packet itself, following a technique described in a PDF Association technical note [14]. In this section, we declare only those schemata we actually use.

```

\hyxmp@check@iptc@data Define \hyxmp@iptc@data as the concatenation of all IPTC photo metadata supplied
\hyxmp@iptc@data      by the document.
1634 \newcommand*{\hyxmp@check@iptc@data}{%
1635   \edef\hyxmp@iptc@data{%
1636     \@pdfcontactaddress
1637     \@pdfcontactcity
1638     \@pdfcontactregion

```

```

1639     \@pdfcontactpostcode
1640     \@pdfcontactcountry
1641     \@pdfcontactphone
1642     \@pdfcontactemail
1643     \@pdfcontacturl
1644 }%
1645 }%

\hyxmp@check@prism@data Define \hyxmp@prism@data as the concatenation of all PRISM metadata supplied
\hyxmp@prism@data by the document.
1646 \newcommand*{\hyxmp@check@prism@data}{%
1647   \edef\hyxmp@prism@data{%
1648     \@pdfbookedition
1649     \@pdfbytes
1650     \@pdfdoi
1651     \@pdffeissn
1652     \@pdfisbn
1653     \@pdfissn
1654     \@pdfissuenum
1655     \@pdfnumpages
1656     \@pdfpagerange
1657     \@pdfpublication
1658     \@pdfpubtype
1659     \@pdfsubtitle
1660     \@pdfurl
1661     \@pdfvolumenum
1662   }%
1663 }%

\hyxmp@check@jav@data Define \hyxmp@jav@data as the concatenation of all JAV metadata supplied by the
\hyxmp@jav@data document.
1664 \newcommand*{\hyxmp@check@jav@data}{%
1665   \edef\hyxmp@jav@data{%
1666     \@pdfpubstatus
1667   }%
1668 }

\hyxmp@begin@extension@decls Begin a block of XML tags that indicates we're declaring one or more extension
schemas.
1669 \newcommand*{\hyxmp@begin@extension@decls}{%
1670   \hyxmp@add@to+xml{%
1671     <pdfaExtension:schemas>^^J%
1672     <rdf:Bag>^^J%
1673   }%
1674 }

\hyxmp@end@extension@decls End the block of XML tags begun by \hyxmp@begin@extension@decls.
1675 \newcommand*{\hyxmp@end@extension@decls}{%
1676   \hyxmp@add@to+xml{%

```

```

1677 _____</rdf:Bag>^^J%
1678 _____</pdfaExtension:schemas>^^J%
1679  }%
1680 }

```

`\hyxmp@begin@ext@decl` Begin the declaration of a single extension schema. `\hyxmp@begin@ext@decl` accepts the schema's name, prefix, and namespace URI.

```

1681 \newcommand*{\hyxmp@begin@ext@decl}[3]{%
1682   \hyxmp@add@to@xml{%
1683     _____<rdf:li rdf:parseType="Resource">^^J%
1684     _____<pdfaSchema:schema>#1</pdfaSchema:schema>^^J%
1685     _____<pdfaSchema:prefix>#2</pdfaSchema:prefix>^^J%
1686     _____<pdfaSchema:namespaceURI>#3</pdfaSchema:namespaceURI>^^J%
1687     _____<pdfaSchema:property>^^J%
1688     _____<rdf:Seq>^^J%
1689   }%
1690 }%

```

`\hyxmp@end@ext@decl` End the declaration of a single extension schema.

```

1691 \newcommand*{\hyxmp@end@ext@decl}{%
1692   \hyxmp@add@to@xml{%
1693     _____</rdf:Seq>^^J%
1694     _____</pdfaSchema:property>^^J%
1695     _____</rdf:li>^^J%
1696   }%
1697 }%

```

`\hyxmp@declare@property` Declare a single extension-schema property. `\hyxmp@declare@property` takes as input an optional type (defaults to Text) and a mandatory name, category, and description.

```

1698 \newcommand{\hyxmp@declare@property}[4][Text]{%
1699   \hyxmp@add@to@xml{%
1700     _____<rdf:li rdf:parseType="Resource">^^J%
1701     _____<pdfaProperty:name>}%
1702     \xdef\hyxmp@xml{\hyxmp@xml#2}%
1703     \hyxmp@add@to@xml{</pdfaProperty:name>^^J%
1704     _____<pdfaProperty:valueType>#1</pdfaProperty:valueType>^^J%
1705     _____<pdfaProperty:category>#3</pdfaProperty:category>^^J%
1706     _____<pdfaProperty:description>#4</pdfaProperty:description>^^J%
1707     _____</rdf:li>^^J%
1708   }%
1709 }%

```

`\hyxmp@declare@field` Declare a single field in a custom datatype required by an extension schema. `\hyxmp@declare@field` takes as input an optional type (defaults to Text) and a mandatory name and description.

```

1710 \newcommand{\hyxmp@declare@field}[3][Text]{%
1711   \hyxmp@add@to@xml{%
1712     _____<rdf:li rdf:parseType="Resource">^^J%

```

```

1713 -----<pdfaField:name>#2</pdfaField:name>^^J%
1714 -----<pdfaField:valueType>#1</pdfaField:valueType>^^J%
1715 -----<pdfaField:description>#3</pdfaField:description>^^J%
1716 -----</rdf:li>^^J%
1717 }%
1718 }

```

`\hyxmp@pdf@extensions` Declare the Adobe PDF schema.

```

1719 \newcommand*{\hyxmp@pdf@extensions}{%
1720   \hyxmp@begin@ext@decl
1721     {Adobe PDF Schema}%
1722     {pdf}%
1723     {http://ns.adobe.com/pdf/1.3/}%
1724   \hyxmp@declare@property
1725     {Trapped}%
1726     {internal}%
1727     {Indication if the document has been modified to include trapping information}%
1728   \hyxmp@end@ext@decl
1729 }%

```

`\hyxmp@mm@extensions` Declare the XMP Media Management schema.

```

1730 \newcommand*{\hyxmp@mm@extensions}{%
1731   \hyxmp@begin@ext@decl
1732     {XMP Media Management Schema}%
1733     {xmpMM}%
1734     {http://ns.adobe.com/xap/1.0/mm/}%
1735   \hyxmp@declare@property
1736     [URI]
1737     {DocumentID}%
1738     {internal}%
1739     {UUID based identifier for all versions and renditions of a document}%
1740   \hyxmp@declare@property
1741     [URI]
1742     {InstanceID}%
1743     {internal}%
1744     {UUID based identifier for specific incarnation of a document}%
1745   \hyxmp@declare@property
1746     {VersionID}%
1747     {internal}%
1748     {Document version identifier}%
1749   \hyxmp@declare@property
1750     [RenditionClass]%
1751     {RenditionClass}%
1752     {internal}%
1753     {The manner in which a document is rendered}%
1754   \hyxmp@end@ext@decl
1755 }%

```

`\hyxmp@pdfa@id@extensions` Declare the PDF/A Identification schema [13].



```

1756 \newcommand*{\hyxmp@pdfa@id@extensions}{%
1757   \hyxmp@begin@ext@decl
1758     {PDF/A Identification Schema}%
1759     {pdfaid}%
1760     {http://www.aiim.org/pdfa/ns/id/}%
1761   \hyxmp@declare@property
1762     [Integer]%
1763     {part}%
1764     {internal}%
1765     {Part of PDF/A standard}%
1766   \hyxmp@declare@property
1767     {conformance}%
1768     {internal}%
1769     {Conformance level of PDF/A standard}%
1770   \hyxmp@end@ext@decl
1771 }%

```

`\hyxmp@pdfua@id@extensions` Declare the PDF/UA Universal Accessibility schema.

```

1772 \newcommand*{\hyxmp@pdfua@id@extensions}{%
1773   \hyxmp@begin@ext@decl
1774     {PDF/UA Universal Accessibility Schema}%
1775     {pdfuaid}%
1776     {http://www.aiim.org/pdfua/ns/id/}%
1777   \hyxmp@declare@property
1778     [Integer]%
1779     {part}%
1780     {internal}%
1781     {Part of ISO 14289 standard}%
1782   \hyxmp@end@ext@decl
1783 }%

```

`\hyxmp@pdfx@id@extensions` Declare the schema used pre-PDF/X-4. Because Adobe Acrobat DC (at least) defines this even for PDF/X-4 and later, we follow suit.

```

1784 \newcommand*{\hyxmp@pdfx@id@extensions}{%
1785   \ifx\hyxmp@pdfx@major\empty
1786   \else
1787     \hyxmp@begin@ext@decl
1788       {Adobe Document Info PDF/X eXtension Schema}%
1789       {pdfx}%
1790       {http://ns.adobe.com/pdfx/1.3/}%
1791     \hyxmp@declare@property
1792       {GTS_PDFXVersion}%
1793       {internal}%
1794       {ID of PDF/X standard}%
1795     \hyxmp@declare@property
1796       {GTS_PDFXConformance}%
1797       {internal}%
1798       {Conformance level of PDF/X standard}%
1799     \hyxmp@end@ext@decl
1800   \fi

```

Declare the schema used in PDF/X-4 and later versions.

```

1801 \@tempcnta=0\hyxmp@pdfx@major\relax
1802 \ifnum\@tempcnta>3
1803   \hyxmp@begin@ext@decl
1804     {PDF/X ID Schema}%
1805     {pdfxid}%
1806     {http://www.npes.org/pdfx/ns/id/}%
1807   \hyxmp@declare@property
1808     {GTS_PDFXVersion}%
1809     {internal}%
1810     {ID of PDF/X standard}%
1811   \hyxmp@end@ext@decl
1812 \fi
1813 }%

```

`\hyxmp@iptc@extensions` Because IPTC metadata are not recognized by the PDF/A standard, PDF/A conversion would normally fail for documents that utilize IPTC metadata. Declaring the IPTC metadata we support enables the document to be converted to PDF/A format.

```

1814 \newcommand*{\hyxmp@iptc@extensions}{%
1815   \hyxmp@begin@ext@decl
1816     {IPTC Core Schema}%
1817     {Iptc4xmpCore}%
1818     {http://iptc.org/std/Iptc4xmpCore/1.0/xmlns/}%
1819   \hyxmp@declare@property
1820     [ContactInfo]
1821     {CreatorContactInfo}
1822     {external}
1823     {Document creator's contact information}

```

We can't call `\hyxmp@end@ext@decl` because we need first need to define the `Iptc4xmpCore:ContactInfo` structure.

```

1824   \hyxmp@add@to+xml{%
1825     _____</rdf:Seq>^^J%
1826     _____</pdfaSchema:property>^^J%
1827     _____<pdfaSchema:valueType>^^J%
1828     _____<rdf:Seq>^^J%
1829     _____<rdf:li rdf:parseType="Resource">^^J%
1830     _____<pdfaType:type>ContactInfo</pdfaType:type>^^J%
1831     _____<pdfaType:namespaceURI>http://iptc.org/std/Iptc4xmpCore/1.0/xmlns/</pdfaType:
1832     _____<pdfaType:prefix>Iptc4xmpCore</pdfaType:prefix>^^J%
1833     _____<pdfaType:description>%
1834     Basic set of information to get in contact with a person%
1835     </pdfaType:description>^^J%
1836     _____<pdfaType:field>^^J%
1837     _____<rdf:Seq>^^J%
1838   }%
1839   \hyxmp@declare@field
1840     {CiAdrCity}%

```

```

1841         {Contact information city}%
1842 \hyxmp@declare@field
1843         {CiAdrCtry}%
1844         {Contact information country}%
1845 \hyxmp@declare@field
1846         {CiAdrExtadr}%
1847         {Contact information address}%
1848 \hyxmp@declare@field
1849         {CiAdrPcode}%
1850         {Contact information local postal code}%
1851 \hyxmp@declare@field
1852         {CiAdrRegion}%
1853         {Contact information regional information such as state or province}%
1854 \hyxmp@declare@field
1855         {CiEmailWork}%
1856         {Contact information email address(es)}%
1857 \hyxmp@declare@field
1858         {CiTelWork}%
1859         {Contact information telephone number(s)}%
1860 \hyxmp@declare@field
1861         {CiUrlWork}%
1862         {Contact information Web URL(s)}%
1863 \hyxmp@add@to+xml{%
1864 -----</rdf:Seq>^^J%
1865 -----</pdfaType:field>^^J%
1866 -----</rdf:li>^^J%
1867 -----</rdf:Seq>^^J%
1868 -----</pdfaSchema:valueType>^^J%
1869 -----</rdf:li>^^J%
1870 }%
1871 }

```

\hyxmp@prism@extensions Because PRISM metadata are not recognized by the PDF/A standard, PDF/A conversion would normally fail for documents that utilize PRISM metadata. Declaring the PRISM metadata we support enables the document to be converted to PDF/A format.

```

1872 \newcommand*{\hyxmp@prism@extensions}{%
1873 \hyxmp@begin@ext@decl
1874     {PRISM Basic Metadata}%
1875     {prism}%
1876     {http://prismstandard.org/namespaces/basic/3.0/}%
1877 \hyxmp@declare@property
1878     {complianceProfile}%
1879     {internal}%
1880     {PRISM specification compliance profile to which this document adheres}%
1881 \hyxmp@declare@property
1882     {publicationName}%
1883     {external}%
1884     {Publication name}%
1885 \hyxmp@declare@property

```

```

1886     {aggregationType}%
1887     {external}%
1888     {Publication type}%
1889 \hyxmp@declare@property
1890     {bookEdition}%
1891     {external}%
1892     {Edition of the book in which the document was published}%
1893 \hyxmp@declare@property
1894     {volume}%
1895     {external}%
1896     {Publication volume number}%
1897 \hyxmp@declare@property
1898     {number}%
1899     {external}%
1900     {Publication issue number within a volume}%
1901 \hyxmp@declare@property
1902     {pageRange}%
1903     {external}%
1904     {Page range for the document within the print version of its publication}%
1905 \hyxmp@declare@property
1906     {issn}%
1907     {external}%
1908     {ISSN for the printed publication in which the document was published}%
1909 \hyxmp@declare@property
1910     {eIssn}%
1911     {external}%
1912     {ISSN for the electronic publication in which the document was published}%
1913 \hyxmp@declare@property
1914     {isbn}%
1915     {external}%
1916     {ISBN for the publication in which the document was published}%
1917 \hyxmp@declare@property
1918     {doi}%
1919     {external}%
1920     {Digital Object Identifier for the document}%
1921 \hyxmp@declare@property
1922     [URL]
1923     {url}%
1924     {external}%
1925     {URL at which the document can be found}%
1926 \hyxmp@declare@property
1927     [Integer]
1928     {byteCount}%
1929     {internal}%
1930     {Approximate file size in octets}%
1931 \hyxmp@declare@property
1932     [Integer]
1933     {pageCount}%
1934     {internal}%
1935     {Number of pages in the print version of the document}%

```

```

1936 \hyxmp@declare@property
1937     {subtitle}%
1938     {external}%
1939     {Document's subtitle}%
1940 \hyxmp@end@ext@decl
1941 }%

\hyxmp@jav@extensions Because JAV metadata are not recognized by the PDF/A standard, PDF/A conversion
                        would normally fail for documents that utilize JAV metadata. Declaring the JAV
                        metadata we support enables the document to be converted to PDF/A format.
1942 \newcommand*{\hyxmp@jav@extensions}{%
1943     \hyxmp@begin@ext@decl
1944         {NISO/ALPSP Journal Article Versions}%
1945         {jav}%
1946         {http://www.niso.org/schemas/jav/1.0/}%
1947     \hyxmp@declare@property
1948         [Closed Choice of Text]%
1949         {journal_article_version}%
1950         {external}%
1951         {Article status, one of "A0", "SMUR", "AM", "P", "VoR", "CVoR", or "EVoR"}%
1952     \hyxmp@end@ext@decl
1953 }%

\hyxmp@declare@extensions Declare all XMP extension schemata. We'll always have at least one, the XMP Media
                            Management extensions, because we automatically generate xmpMM:DocumentID
                            and xmpMM:InstanceID values.
1954 \newcommand*{\hyxmp@declare@extensions}{%
1955     \hyxmp@begin@extension@decls
1956         Declare the Adobe PDF schema (always present).
1957     \hyxmp@pdf@extensions
1958         Declare the XMP Media Management extensions (always present).
1959     \hyxmp@mm@extensions
1960         Declare the PDF/A Identification extensions, but only when generating a PDF/A
1961         document.
1962     \ifHy@pdfa
1963         \hyxmp@pdfa@id@extensions
1964     \fi
1965         Conditionally declare the PDF/UA Universal Accessibility extensions.
1966     \ifx\@pdfuapart\@empty
1967     \else
1968         \hyxmp@pdfua@id@extensions
1969     \fi

\next Conditionally declare the PDF/X extensions.
1970     \ifx\@pdfxversion\@empty
1971     \else
1972         \hyxmp@pdfx@id@extensions
1973     \fi

```

Conditionally declare IPTC photo metadata extensions.

```
1969 \ifx\hyxmp@iptc@data\@empty
1970 \else
1971 \hyxmp@iptc@extensions
1972 \fi
```

Conditionally declare PRISM basic metadata extensions.

```
1973 \ifx\hyxmp@prism@data\@empty
1974 \else
1975 \hyxmp@prism@extensions
1976 \fi
```

Conditionally declare JAV metadata.

```
1977 \ifx\hyxmp@jav@data\@empty
1978 \else
1979 \hyxmp@jav@extensions
1980 \fi
```

```
1981 \hyxmp@end@extension@decls
1982 }
```

### 3.6.14 Combining schemata into an XMP packet

`\hyxmp@bom` Define a macro for the Unicode byte-order marker (BOM).

```
1983 \begingroup
1984 \ifhyxmp@unicodetex
1985 \lccode'\!="FEFF %
1986 \lowercase{%
1987 \gdef\hyxmp@bom{!}
1988 }%
1989 \else
1990 \catcode'\^^ef=12
1991 \catcode'\^^bb=12
1992 \catcode'\^^bf=12
1993 \gdef\hyxmp@bom{^^ef^^bb^^bf}%
1994 \fi
1995 \endgroup
```

`\hyxmp@construct@packet` Successively add XML data to `\hyxmp+xml` until we have something we can insert  
`\hyxmp+xml` into the document's PDF catalog.

```
1996 \def\hyxmp@construct@packet{%
1997 \gdef\hyxmp+xml{}%
1998 \hyxmp@add@to+xml{<?xpacket begin="\hyxmp@bom" %
1999 id="W5M0MPCehiHzreSzNTczkc9d"?>^^J%
2000 <x:xmpmeta xmlns:x="adobe:ns:meta/">^^J%
2001 __<rdf:RDF %
2002 xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns\hyxmp@hash">^^J%
2003 ____<rdf:Description rdf:about="">^^J%
```

Specify every namespace we can potentially use, even the ones we end up not actually using.

```

2004 -----xmlns:pdf="http://ns.adobe.com/pdf/1.3/"^^J%
2005 -----xmlns:xmpRights="http://ns.adobe.com/xap/1.0/rights/"^^J%
2006 -----xmlns:dc="http://purl.org/dc/elements/1.1/"^^J%
2007 -----xmlns:photoshop="http://ns.adobe.com/photoshop/1.0/"^^J%
2008 -----xmlns:xmp="http://ns.adobe.com/xap/1.0/"^^J%
2009 -----xmlns:xmpMM="http://ns.adobe.com/xap/1.0/mm/"^^J%
2010 -----xmlns:stEvt="http://ns.adobe.com/xap/1.0/sType/ResourceEvent\hyxmp@hash"^^J%
2011 -----xmlns:pdfaid="http://www.aiim.org/pdfa/ns/id/"^^J%
2012 -----xmlns:pdfuaid="http://www.aiim.org/pdfua/ns/id/"^^J%
2013 -----xmlns:pdfx="http://ns.adobe.com/pdfx/1.3/"^^J%
2014 -----xmlns:pdfxid="http://www.npes.org/pdfx/ns/id/"^^J%
2015 -----xmlns:prism="http://prismstandard.org/namespaces/basic/3.0/"^^J%
2016 -----xmlns:jav="http://www.niso.org/schemas/jav/1.0/"^^J%
2017 -----xmlns:xmpTPg="http://ns.adobe.com/xap/1.0/t/pg/"^^J%
2018 -----xmlns:stFnt="http://ns.adobe.com/xap/1.0/sType/Font\hyxmp@hash"^^J%
2019 -----xmlns:Iptc4xmpCore="http://iptc.org/std/Iptc4xmpCore/1.0/xmlns/"^^J%
2020 -----xmlns:pdfaExtension="http://www.aiim.org/pdfa/ns/extension/"^^J%
2021 -----xmlns:pdfaSchema="http://www.aiim.org/pdfa/ns/schema\hyxmp@hash"^^J%
2022 -----xmlns:pdfaProperty="http://www.aiim.org/pdfa/ns/property\hyxmp@hash"^^J%
2023 -----xmlns:pdfaType="http://www.aiim.org/pdfa/ns/type\hyxmp@hash"^^J%
2024 -----xmlns:pdfaField="http://www.aiim.org/pdfa/ns/field\hyxmp@hash">^^J%
2025 }%

```

Declare non-standard schemata.

```

2026 \hyxmp@check@iptc@data
2027 \hyxmp@check@prism@data
2028 \hyxmp@check@jav@data
2029 \hyxmp@declare@extensions

```

Insert all the metadata we know how to insert.

```

2030 \hyxmp@pdf@schema
2031 \hyxmp@xmpRights@schema
2032 \hyxmp@dc@schema
2033 \hyxmp@photoshop@schema
2034 \hyxmp@xmp@basic@schema
2035 \hyxmp@pdfa@id@schema
2036 \hyxmp@pdfua@id@schema
2037 \hyxmp@pdfx@id@schema
2038 \hyxmp@mm@schema
2039 \hyxmp@iptc@schema
2040 \hyxmp@prism@schema
2041 \hyxmp@jav@schema
2042 \hyxmp@xmptpg@schema
2043 \hyxmp@add@to+xml{%
2044 ____</rdf:Description>^^J%
2045 __</rdf:RDF>^^J%
2046 </x:xmpmeta>^^J%
2047 \hyxmp@padding
2048 <?xpacket end="w"?>^^J%
2049 }%
2050 }

```

### 3.7 Embedding the XMP packet

The PDF specification says that “a metadata stream may be attached to a document through the Metadata entry in the document catalogue” [4] so that’s what we do here.

```

\hyxmp@embed@packet Determine which hyperref driver is in use and invoke the appropriate embedding
\hyxmp@driver function.
2051 \newcommand*{\hyxmp@embed@packet}{%
2052   \hyxmp@construct@packet
2053   \def\hyxmp@driver{hpdfTeX}%
2054   \ifx\hyxmp@driver\Hy@driver
2055     \hyxmp@embed@packet@pdfTeX
2056   \else
2057     \def\hyxmp@driver{hLuaTeX}%
2058     \ifx\hyxmp@driver\Hy@driver
2059       \hyxmp@embed@packet@LuaTeX
2060     \else
2061       \def\hyxmp@driver{hdvipdfm}%
2062       \ifx\hyxmp@driver\Hy@driver
2063         \hyxmp@embed@packet@dvipdfm
2064       \else
2065         \def\hyxmp@driver{hXeTeX}%
2066         \ifx\hyxmp@driver\Hy@driver
2067           \hyxmp@embed@packet@XeTeX
2068         \else
2069           \@ifundefined{pdfmark}{%
2070             \PackageWarningNoLine{hyperxmp}{%
2071               Unrecognized hyperref driver ‘\Hy@driver’.\MessageBreak
2072               \hyxmp@jobname.tex’s XMP metadata will *not* be\MessageBreak
2073               embedded in the resulting file}%
2074             }{%
2075               \hyxmp@embed@packet@pdfmark
2076             }%
2077           \fi
2078         \fi
2079       \fi
2080     \fi
2081 }

```

#### 3.7.1 Embedding using pdfTeX

Up to version 0.85, LuaTeX supported the pdfTeX primitives, and hyperref didn’t distinguish the two backends. However, from hyperxmp’s perspective there is one key difference: the effect of `\pdfcompresslevel` is local to a group in pdfTeX but is global in LuaTeX.

The PDF object representing the XMP packet is supposed to include an uncompressed stream so it can be read by non-PDF-aware tools. However, we don’t want to unnecessarily uncompress *every* PDF stream. The solution, provided by



Hans Hagen on the `luatex` mailing list (thread: “Leaving a single PDF object uncompressed”, 6 JUL 2016), is to provide the `uncompressed` flag to `\pdfobj`. Our definition of `\hyxmp@embed@packet@pdftex` uses the `ifluatex` package to distinguish the pdfTeX case from the pre-0.85 LuaTeX case.

```
2082 \RequirePackage{ifluatex}
```

`\hyxmp@embed@packet@pdftex` Embed the XMP packet using pdfTeX primitives, which are supported by both pdfTeX and pre-0.85 LuaTeX. The only difference is that in the former case we locally specify `\pdfcompresslevel=0` to leave the PDF object uncompressed while in the latter case we pass the `uncompressed` flag to `\pdfobj` to achieve the same effect.

```
2083 \newcommand*{\hyxmp@embed@packet@pdftex}{%
2084   \bgroup
2085   \ifluatex
2086   \else
2087     \pdfcompresslevel=0
2088   \fi
2089   \immediate\pdfobj \ifluatex uncompressed\fi stream attr {%
2090     /Type /Metadata
2091     /Subtype /XML
2092   }{\hyxmp@xml}%
2093   \pdfcatalog {/Metadata \the\pdflastobj\space 0 R}%
2094   \egroup
2095 }
```

### 3.7.2 Embedding using LuaTeX 0.85+

`\hyxmp@embed@packet@luatex` Embed the XMP packet using LuaTeX 0.85+ primitives.

```
2096 \newcommand*{\hyxmp@embed@packet@luatex}{%
2097   \immediate\pdfextension obj uncompressed stream attr {%
2098     /Type /Metadata
2099     /Subtype /XML
2100   }{\hyxmp@xml}%
2101   \pdfextension catalog {/Metadata \the\numexpr\pdffeedback lastobj\relax\space 0 R}%
2102 }
```

### 3.7.3 Embedding using any pdfmark-based backend

`\hyxmp@embed@packet@pdfmark` Embed the XMP packet using `hyperref`’s `\pdfmark` command. I believe `\pdfmark` is used by the `dvipdf`, `dvipsone`, `dvips`, `dviwindo`, `nativepdf`, `pdfmark`, `ps2pdf`, `textures`, and `vtexpdfmark` options to `hyperref`, but I’ve tested only a few of those.

```
2103 \newcommand*{\hyxmp@embed@packet@pdfmark}{%
2104   \pdfmark{%
2105     pdfmark=/NamespacePush
2106   }%
2107   \pdfmark{%
2108     pdfmark=/OBJ,
2109     Raw={/_objdef \string\hyxmp@Metadata\string} /type /stream}%

```

```

2110 }%
2111 \pdfmark{%
2112   pdfmark=/PUT,
2113   Raw={\string{hyxmp@Metadata\string}
2114     2 dict begin
2115       /Type /Metadata def
2116       /Subtype /XML def
2117       currentdict
2118     end
2119 }%
2120 }%
2121 \pdfmark{%
2122   pdfmark=/PUT,
2123   Raw={\string{hyxmp@Metadata\string} (\hyxmp@xml)}%
2124 }%
2125 \pdfmark{%
2126   pdfmark=/Metadata,
2127   Raw={\string{Catalog\string} \string{hyxmp@Metadata\string}}%
2128 }%
2129 \pdfmark{%
2130   pdfmark=/NamespacePop
2131 }%
2132 }

```

### 3.7.4 Embedding using dvipdfm

`\hyxmp@embed@packet@dvipdfm` Embed the XMP packet using dvipdfm-specific `\special` commands. Note that dvipdfm rather irritatingly requires us to count the number of characters in the `\hyxmp@xml` stream ourselves.

```

2133 \newcommand*{\hyxmp@embed@packet@dvipdfm}{%
2134   \hyxmp@string@len{\hyxmp@xml}%
2135   \special{pdf: object @hyxmp@Metadata
2136     <<
2137       /Type /Metadata
2138       /Subtype /XML
2139       /Length \the\@tempcnta
2140     >>
2141     stream~J\hyxmp@xml endstream%
2142   }%
2143   \special{pdf: docview
2144     <<
2145       /Metadata @hyxmp@Metadata
2146     >>
2147   }%
2148 }

```

`\hyxmp@string@len` Set `\@tempcnta` to the number of characters in a given string (`#1`). The approach is first to tally the number of space characters then to tally the number of non-space characters. While this is rather sloppy I haven't found a better way to achieve

the same effect, especially given that all of the characters in #1 have already been assigned their category codes.

```
2149 \newcommand*{\hyxmp@string@len}[1]{%
2150   \@tempcnta=0
2151   \expandafter\hyxmp@count@spaces#1 {} %
2152   \expandafter\hyxmp@count@non@spaces#1{}%
2153 }
```

`\hyxmp@count@spaces` Count the number of spaces in a given string. We rely on the built-in pattern matching of T<sub>E</sub>X’s `\def` primitive to pry one word at a time off the head of the input string.

```
2154 \def\hyxmp@count@spaces#1 {%
2155   \def\hyxmp@one@token{#1}%
2156   \ifx\hyxmp@one@token\@empty
2157     \advance\@tempcnta by -1
2158   \else
2159     \advance\@tempcnta by 1
2160     \expandafter\hyxmp@count@spaces
2161   \fi
2162 }
```

`\hyxmp@count@non@spaces` Count the number of non-spaces in a given string. Ideally, we’d count both spaces and non-spaces but T<sub>E</sub>X won’t bind #1 to a space character (category code 10). Hence, in each iteration, #1 is bound to the next non-space character only.

```
2163 \newcommand*{\hyxmp@count@non@spaces}[1]{%
2164   \def\hyxmp@one@token{#1}%
2165   \ifx\hyxmp@one@token\@empty
2166   \else
2167     \advance\@tempcnta by 1
2168     \expandafter\hyxmp@count@non@spaces
2169   \fi
2170 }
```

### 3.7.5 Embedding using X<sub>q</sub>T<sub>E</sub>X

`\hyxmp@embed@packet@xetex` Embed the XMP packet using xdvipdfmx-specific `\special` commands. I don’t know how to tell xdvipdfmx always to leave the Metadata stream uncompressed, so the XMP metadata is likely to be missed by non-PDF-aware XMP viewers.

```
2171 \newcommand*{\hyxmp@embed@packet@xetex}{%
2172   \special{pdf:stream @hyxmp@Metadata (\hyxmp@xml)
2173     <<
2174       /Type /Metadata
2175       /Subtype /XML
2176     >>
2177   }%
2178   \special{pdf:put @catalog
2179     <<
2180       /Metadata @hyxmp@Metadata
```

```

2181     >>
2182   }%
2183 }

```

### 3.8 Final clean-up

As explained in Section 3.1, all invocations of `\AtEndPreamble` have been stored in `\hyxmp@aep@toks` rather than executed. Now that `hyperxmp` has been initialized completely, it is finally safe to execute the accumulated `\AtEndPreamble` stanzas.

```
2184 \the\hyxmp@aep@toks
```

Having saved the category code of “ ” at the start of the package code (Section 3.1), we now restore that character’s original category code.

```
2185 \catcode'\="=\hyxmp@dq@code
```

## 4 Help Wanted

**Comma handling** Ideally, `\xmpquote` should automatically replace all commas with `\xmpcomma`. Unfortunately, my  $\text{\TeX}$  skills are insufficient to pull that off. If you know a way to make `\xmpquote{Hello, world}` work with both Unicode and non-Unicode encodings and with all  $\text{\TeX}$  engines (`pdf $\text{\TeX}$` , `Lua $\text{\TeX}$` , `X $\text{\TeX}$` , etc.), please send me a code patch.

## A Sample XMP Packet

The following is an example of a complete XMP packet as may be produced by `hyperxmp`. This packet corresponds to the metadata included in the sample  $\text{\LaTeX}$  document presented on pages 10–11. For clarity, metadata values, either specified explicitly by the document or introduced automatically by `hyperxmp`, are colored blue.

```

<?xpacket begin="\357\273\277" id="W5M0MpCehiHzreSzNTczkc9d"?>
<x:xmpmeta xmlns:x="adobe:ns:meta/">
  <rdf:RDF xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#">
    <rdf:Description rdf:about=""
      xmlns:pdf="http://ns.adobe.com/pdf/1.3/"
      xmlns:xmpRights="http://ns.adobe.com/xap/1.0/rights/"
      xmlns:dc="http://purl.org/dc/elements/1.1/"
      xmlns:photoshop="http://ns.adobe.com/photoshop/1.0/"
      xmlns:xmp="http://ns.adobe.com/xap/1.0/"
      xmlns:xmpMM="http://ns.adobe.com/xap/1.0/mm/"
      xmlns:stEvt="http://ns.adobe.com/xap/1.0/sType/ResourceEvent#"
      xmlns:pdfaid="http://www.aiim.org/pdfa/ns/id/"
      xmlns:pdfuaid="http://www.aiim.org/pdfua/ns/id/"
      xmlns:pdfx="http://ns.adobe.com/pdfx/1.3/"
      xmlns:pdfxid="http://www.npes.org/pdfx/ns/id/"
      xmlns:prism="http://prismstandard.org/namespaces/basic/3.0/"

```

```

xmlns:jav="http://www.niso.org/schemas/jav/1.0/"
xmlns:xmpTPg="http://ns.adobe.com/xap/1.0/t/pg/"
xmlns:stFnt="http://ns.adobe.com/xap/1.0/sType/Font#"
xmlns:Iptc4xmpCore="http://iptc.org/std/Iptc4xmpCore/1.0/xmlns/"
xmlns:pdfaExtension="http://www.aiim.org/pdfa/ns/extension/"
xmlns:pdfaSchema="http://www.aiim.org/pdfa/ns/schema#"
xmlns:pdfaProperty="http://www.aiim.org/pdfa/ns/property#"
xmlns:pdfaType="http://www.aiim.org/pdfa/ns/type#"
xmlns:pdfaField="http://www.aiim.org/pdfa/ns/field#">
<pdfaExtension:schemas>
  <rdf:Bag>
    ⋮
    [over 200 lines of boilerplate definitions not shown]
    ⋮
  </rdf:Bag>
</pdfaExtension:schemas>
<pdf:Keywords>
  energy quanta, Hertz effect, quantum physics
</pdf:Keywords>
<pdf:Producer>
  LuaHBTeX, Version 1.12.0 (TeX Live 2020)
</pdf:Producer>
<pdf:PDFVersion>1.5</pdf:PDFVersion>
<xmpRights:Marked>True</xmpRights:Marked>
<xmpRights:WebStatement>
  http://creativecommons.org/licenses/by-nc-nd/3.0/
</xmpRights:WebStatement>
<dc:format>application/pdf</dc:format>
<dc:title>
  <rdf:Alt>
    <rdf:li xml:lang="x-default">
      On a heuristic viewpoint concerning the production
      and transformation of light
    </rdf:li>
    <rdf:li xml:lang="en">
      On a heuristic viewpoint concerning the production
      and transformation of light
    </rdf:li>
    <rdf:li xml:lang="de">
      Über einen die Erzeugung und Verwandlung des Lichtes
      betreffenden heuristischen Gesichtspunkt
    </rdf:li>
  </rdf:Alt>
</dc:title>
<dc:description>
  <rdf:Alt>
    <rdf:li xml:lang="en">photoelectric effect</rdf:li>

```

```

    </rdf:Alt>
</dc:description>
<dc:rights>
  <rdf:Alt>
    <rdf:li xml:lang="en">Copyright (C) 1905, Albert Einstein</rdf:li>
  </rdf:Alt>
</dc:rights>
<dc:publisher>
  <rdf:Bag>
    <rdf:li>Wiley-VCH</rdf:li>
  </rdf:Bag>
</dc:publisher>
<dc:creator>
  <rdf:Seq>
    <rdf:li>Albert Einstein</rdf:li>
  </rdf:Seq>
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    <rdf:li>energy quanta</rdf:li>
    <rdf:li>Hertz effect</rdf:li>
    <rdf:li>quantum physics</rdf:li>
  </rdf:Bag>
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  <rdf:Seq>
    <rdf:li>1905-03-17</rdf:li>
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</dc:type>
<dc:source>einstein.tex</dc:source>
<dc:identifier>info:lccn/50013519</dc:identifier>
<photoshop:AuthorsPosition>
  Technical Assistant, Level III
</photoshop:AuthorsPosition>
<photoshop:CaptionWriter>Scott Pakin</photoshop:CaptionWriter>
<xmp:CreateDate>2020-07-25T21:37:02-06:00</xmp:CreateDate>
<xmp:ModifyDate>2020-07-25T21:37:02-06:00</xmp:ModifyDate>
<xmp:MetadataDate>2020-07-25T21:37:02-06:00</xmp:MetadataDate>
<xmp:CreatorTool>LaTeX with hyperref package</xmp:CreatorTool>
<xmpMM:DocumentID>

```

```

        uuid:6d1ac9ec-4ff2-515a-954b-648eeb4853b0
</xmpMM:DocumentID>
<xmpMM:InstanceID>
    uuid:3e4c4182-b182-46c9-995f-754c41d13390
</xmpMM:InstanceID>
<xmpMM:VersionID>2.998e8</xmpMM:VersionID>
<xmpMM:RenditionClass>default</xmpMM:RenditionClass>
<Iptc4xmpCore:CreatorContactInfo rdf:parseType="Resource">
    <Iptc4xmpCore:CiAdrExtadr>Kramgasse 49</Iptc4xmpCore:CiAdrExtadr>
    <Iptc4xmpCore:CiAdrCity>Bern</Iptc4xmpCore:CiAdrCity>
    <Iptc4xmpCore:CiAdrPcode>3011</Iptc4xmpCore:CiAdrPcode>
    <Iptc4xmpCore:CiAdrCtry>Switzerland</Iptc4xmpCore:CiAdrCtry>
    <Iptc4xmpCore:CiTelWork>031 312 00 91</Iptc4xmpCore:CiTelWork>
    <Iptc4xmpCore:CiEmailWork>aeinstein@ipi.ch</Iptc4xmpCore:CiEmailWork>
    <Iptc4xmpCore:CiUrlWork>
        http://einstein.biz/,
        https://www.facebook.com/AlbertEinstein
    </Iptc4xmpCore:CiUrlWork>
</Iptc4xmpCore:CreatorContactInfo>
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<prism:subtitle xml:lang="en-US">
    Putting that bum Maxwell in his place
</prism:subtitle>
<prism:publicationName xml:lang="de">
    Annalen der Physik
</prism:publicationName>
<prism:aggregationType>journal</prism:aggregationType>
<prism:volume>322</prism:volume>
<prism:number>6</prism:number>
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<prism:issn>0003-3804</prism:issn>
<prism:eIssn>1521-3889</prism:eIssn>
<prism:doi>10.1002/andp.19053220607</prism:doi>
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    http://www.physik.uni-augsburg.de/annalen/history/einstein-papers/190517132-148.pdf
</prism:url>
<prism:byteCount>41197</prism:byteCount>
<prism:pageCount>1</prism:pageCount>
<jav:journal_article_version>VoR</jav:journal_article_version>
<xmpTPg:Fonts>
    <rdf:Bag>
        <rdf:li rdf:parseType="Resource">
            <stFnt:fontFace>LMRoman10-Regular</stFnt:fontFace>
            <stFnt:fontFamily>LM Roman 10</stFnt:fontFamily>
            <stFnt:fontName>LMRoman10-Regular</stFnt:fontName>
            <stFnt:versionString>
                2.004;PS 2.004;hotconv 1.0.49;makeotf.lib2.0.14853
            </stFnt:versionString>
            <stFnt:fontFileName>lmroman10-regular.otf</stFnt:fontFileName>
            <stFnt:fontType>opentype</stFnt:fontType>

```

```

</rdf:li>
<rdf:li rdf:parseType="Resource">
  <stFnt:fontFace>LMRoman17-Regular</stFnt:fontFace>
  <stFnt:fontFamily>LM Roman 17</stFnt:fontFamily>
  <stFnt:fontName>LMRoman17-Regular</stFnt:fontName>
  <stFnt:versionString>
    2.004;PS 2.004;hotconv 1.0.49;makeotf.lib2.0.14853
  </stFnt:versionString>
  <stFnt:fontFileName>lmroman17-regular.otf</stFnt:fontFileName>
  <stFnt:fontType>opentype</stFnt:fontType>
</rdf:li>
<rdf:li rdf:parseType="Resource">
  <stFnt:fontFace>LMRoman12-Regular</stFnt:fontFace>
  <stFnt:fontFamily>LM Roman 12</stFnt:fontFamily>
  <stFnt:fontName>LMRoman12-Regular</stFnt:fontName>
  <stFnt:versionString>
    2.004;PS 2.004;hotconv 1.0.49;makeotf.lib2.0.14853
  </stFnt:versionString>
  <stFnt:fontFileName>lmroman12-regular.otf</stFnt:fontFileName>
  <stFnt:fontType>opentype</stFnt:fontType>
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<rdf:li rdf:parseType="Resource">
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</rdf:li>
<rdf:li rdf:parseType="Resource">
  <stFnt:fontName>cmex10</stFnt:fontName>

```



```

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</xmpTPg:Fonts>
<xmpTPg:NPages>1</xmpTPg:NPages>
</rdf:Description>
</rdf:RDF>
</x:xmpmeta>
<?xpacket end="w"?>

```

## References

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## Change History

|   |   |    |
|---|---|----|
| v1.0  | X <sub>Y</sub> TeX backend (xdvipdfmx) .. | 1  |
| General: Initial version .....                                    | Added support for the                     |    |
| v1.1  | Photoshop schema .....                    | 1  |
| \hyxmp@construct@packet:  | Made the package compatible               |    |
| Explicitly set the category                                       | with <code>ngerman</code> . Thanks to     |    |
| codes of characters $\langle EF \rangle$ , $\langle BB \rangle$ , | Tobias Mueller for the bug                |    |
| and $\langle BF \rangle$ to “letter”. Thanks to                   | report. ....                              | 20 |
| Daniel Schömer for the bug  |   |    |
| report .....  | v1.3                                      |    |
| 86  | General: Introduced the                   |    |
| v1.2  | <code>pdfmetalang</code> package option,  |    |
| General: Added support for the                                    | which enables an author to                |    |

|      |  |    |  |  |
|------|--|----|--|--|
|      | specify the language in which he wrote the document's metadata   | 35 |  |  |
| v1.4 |  |    |  |  |
|      | \hyxmp@mm@schema: Renamed the xapMM namespace prefix to xmpMM  | 71 |  |  |
|      | \hyxmp@rdf@dc: Included metadata in the x-default language regardless of the specified metadata language   | 66 |  |  |
|      | \hyxmp@xmpRights@schema: Renamed the xapRights namespace prefix to xmpRights   | 70 |  |  |
| v1.5 |  |    |  |  |
|      | General: Made the XMP inclusion more robust. Thanks to Heiko Oberdiek for the bug report and suggested modifications.  | 20 |  |  |
| v2.0 |  |    |  |  |
|      | \ProcessKeyvalOptions: Added this macro  | 31 |  |  |
|      | \XMPTruncateList: Added this macro   | 44 |  |  |
|      | \hyxmp@ProcessKeyvalOptions: Added this macro  | 31 |  |  |
|      | \hyxmp@SpaceOther: Added by Heiko Oberdiek   | 55 |  |  |
|      | \hyxmp@add@simple: Added this macro  | 57 |  |  |
|      | \hyxmp@add@to@xml: Updated also to replace commas  | 63 |  |  |
|      | \hyxmp@bom: Added by Heiko Oberdiek  | 86 |  |  |
|      | \hyxmp@comma: Added this macro   | 44 |  |  |
|      | \hyxmp@construct@packet: Modified by Heiko Oberdiek to use an appropriate BOM representation via \hyxmp@bom  | 86 |  |  |
|      | \hyxmp@crap@convert: Added by Heiko Oberdiek   | 55 |  |  |
|      | \hyxmp@crap@test: Added by Heiko Oberdiek  | 55 |  |  |
|      | \hyxmp@dc@schema: Added support for dc:language and dc:source  | 69 |  |  |
|      | \hyxmp@is@unicode: Added by Heiko Oberdiek   | 52 |  |  |
|      | \hyxmp@list@to@xml: Modified by Heiko Oberdiek to use the new Unicode-processing macros  | 68 |  |  |
|      | \hyxmp@photoshop@schema: Simplified using \hyxmp@add@simple  | 72 |  |  |
|      | \hyxmp@skiptorelax: Added by Heiko Oberdiek  | 55 |  |  |
|      | \hyxmp@skipzeros: Added by Heiko Oberdiek  | 54 |  |  |
|      | \hyxmp@toxml: Added by Heiko Oberdiek  | 53 |  |  |
|      | Escaped parentheses written with pdfmarks to prevent dvips from line-wrapping the XMP packet   | 53 |  |  |
|      | \hyxmp@toxml@unicodetex: Added by Heiko Oberdiek   | 54 |  |  |
|      | \hyxmp@xetex@crap: Added by Heiko Oberdiek   | 54 |  |  |
|      | \hyxmp@xmlify: Completely rewritten by Heiko Oberdiek to better support Unicode-enabled T <sub>E</sub> X programs  | 51 |  |  |
|      | \hyxmp@xmp@basic@schema: Added this macro  | 71 |  |  |
|      | \hyxmp@xmpRights@schema: Modified to include xmpRights:Marked only when pdfcopyright is specified and xmpRights:WebStatement only when pdflicenseurl is specified      | 70 |  |  |
|      | \hyxmp@zero: Added by Heiko Oberdiek   | 56 |  |  |
|      | \ifhyxmp@unicodetex: Added by Heiko Oberdiek   | 51 |  |  |
|      | \xmpcomma: Added this macro  | 44 |  |  |
|      | \xmpquote: Added this macro  | 44 |  |  |
|      | General: Added support for the XMP Basic schema and miscellaneous other bits of metadata   | 1  |  |  |
|      | Heiko Oberdiek's major rewrite of the code to better support native-Unicode T <sub>E</sub> X implementations (X <sub>Y</sub> T <sub>E</sub> X and LuaT <sub>E</sub> X) | 1  |  |  |
|      | New \AtBeginDocument code from Heiko Oberdiek to properly encode \pdfmetalang  | 35 |  |  |
| v2.1 |  |    |  |  |
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| <code>\hyxmp@parse@acmart</code> : Bug fix: Correct a missing “else” argument in two invocations of <code>\@if@def@and@nonempty</code> . . . .   | 40 | Rewrite the core part of this macro to divide it into four, cleanly defined cases . . . . .   | 66 |
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