METS application profile for digitised media Version 2.3.1

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Based on the zvdd METS application profile 2.0 by Stefan Funk (Lower Saxony State and University Library Göttingen).
This document deliberately bases its presentation and wording on the zvdd MODS application profile created by Stefanie Rühle, Alexander Jahnke and Gerrit Kühle (Lower Saxony State and University Library Göttingen).

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1 Introduction

This METS application profile is used to define a container format for the consistent description of digitised documents. The goal is to improve the interoperability of structural data of different media types in order to make digital assets searchable and usable in comprehensive applications even if they were originally created in different projects. As examples of such comprehensive applications, we refer to the DFG-Viewer[1], the German Digital Library[2] with the archive portal D[3] and Europeana[4] .

This documentation is therefore mainly addressing persons and organisations who create metadata for digitised media and who want to make them accessible in different applications. We also address persons and organisations who create applications for the display of digitised media.

This application profile is normally used conjointly with the following standards:

- one or more descriptive metadata profiles[5], which define bibliographic or archival descriptions of the digitised work and are available for different media types;
- the DFG-Viewer structure data record[6], which describes which structure types are used in the logical structure unit of the METS structure description;
- optionally additional application profiles to code technical meta data (e.g. MIX, BLAPSI) and process information (e.g. AES, PREMIS). These specifications are, however, not relevant for the presentation in DFG viewer and are therefore not defined in this context.

1.1 Implementation information

The basis for this application profile is the *Metadata Encoding and Transmission Standard* (METS) in version 1.10, which is maintained by the Library of Congress.[7] Furthermore, this profile also defines a supplemental namespace for specific elements of the DFG-Viewers.

The degrees of obligation for the described elements is differentiated according to obligatory, conditional (conditionally obligatory) and optional and orients itself towards the DFG-Viewers' requirements.

[1] http://dfg-viewer.de

[2] http://www.deutsche-digitale-bibliothek.de

[3] https://www.archivportal-d.de

[4] http://europeana.eu

[5] http://dfg-viewer.de/profil-der-metadaten/

[6] http://dfg-viewer.de/strukturdatenset/

[7] http://www.loc.gov/standards/mets/

The profile can be limited and upgraded for project specific requirements if necessary. All limitations and upgrades, however, have to conform with METS and may not be in conflict with the semantics specified in the present profile.

According to the DFG's best practice for "Digitisation"[8], this profile has to be applied conjointly with an application profile for descriptive metadata[9] in the context of digitisation projects funded by the German Research Foundation (DFG). Together, those two application profiles describe the data format necessary for the correct presentation of digital assets in the DFG-viewer.

Metadata that corresponds to this profile has to be available in UTF-8[10] code. XML data is fundamentally case-sensitive, the specified upper case / lower case script of elements, attributes and values in the application profile is therefore mandatory.

[8] http://www.dfg.de/formulare/12_151/

[9] http://dfg-viewer.de/profil-der-metadaten/

[10] http://tools.ietf.org/html/rfc3629

2 Metadata profile for use of METS elements and attributes

The following chapter describes the permissible METS data elements for this application profile. The description follows the following set-up:

METS-Definition: Represents the definition or description of the element or subelement in the *METS Schema Documentation*[11].

Comments: Contains profile specific information about the element or subelement.

Repeatable: Indicates if an element or subelement can be repeated.

Degree of obligation: Indicates if an element or subelement has to be present at least once. The obligation can result from a specific requirement by the DFG-Viewer and the general METS scheme. The following values are applicable:

obligatory: the element must be present (is, however, not necessarily interpreted by the DFG-Viewer);
optional: the element may be present;
conditional: The use of the element depends on the context in which it is used.

Attributes: Names the attributes which can or must be used with an element or subelement.

Values: Names the attributes or their value range which are permissible with the use of a certain element, subelement or attribute.

[11] http://www.loc.gov/standards/mets/mets-schemadocs.html

2.1 Specifications for the logical document structure

The logical structure of a document represents the intellectually distinguishable, but not necessarily physically differentiated parts. Generally, the logical structure can be coded in any detail, but has to consist of at least one primary unit which describes the entire (e.g. a binding, a sound document or an archival description unit) unit described in the designated entry of the METS-file. Furthermore, it is also possible to code both hierarchical subordinate structures (e.g. chapters, composition or process) as well as superordinate structures (e.g. magazine, a double album or official gazette).

2.1.1 Logical structure - mets:structMap

METS-Definition: The structural map is the heart of a METS document, defining the hierarchical arrangement of a primary source document which has been digitized.

Comments: Contains the logical structure of the work.

Repeatable: Yes
A document with several parallel logical structures (e.g. a palimpsest) can have several `mets:structMap` .

Degree of obligation: obligatory
Every METS file has to have at least one logical structural element.

Attributes: For the logical structure, the `TYPE` attribute with the value ***`LOGICAL`*** has to be used.

2.1.2 Subelements for mets:structMap

2.1.2.1 Structural element - mets:div

METS-Definition: The METS standard represents a document structurally as a series of nested div elements, that is, as a hierarchy (e.g., a book, which is composed of chapters, which are composed of subchapters, which are composed of text).

Comments: Contains one logical structural element of the work.

Repeatable: Yes
The logical structure can be made up of any number of `mets:div` , which can also be nested in any way in order to map the hierarchy.

Degree of obligation: obligatory
Every METS file has to have at least one logical structural element.

Attributes: The `ID` attribute is used to link within the METS file and it is mandatory to allocate it clearly .
The type of structural element has to be defined more closely in the `TYPE` attribute. For this purpose, only values from the DFG-

Viewer structure data list[12] are permissible.
The LABEL attribute can contain a term under which the structural element should appear in the DFG-Viewer navigation. If no LABEL is given, the applicable translation of TYPE is shown instead.
The ORDERLABEL attribute can include a sort value such as a volume count which has to appear in the DFG viewer navigation.
If there is a descriptive metadata section for the structural element (see chapter 2.5), then its ID has to be specified in the DMDID attribute.
For the primary structural element of the METS file, the ID for the administrative metadata section relevant for the DFG-Viewer (see chapter 2.6) has to be specified in the ADMID attribute.
The CONTENTIDS attribute should contain the PURL and/or URN, which identify the structural element, separated with spaces.

2.1.2.2 Reference to external METS-files - mets:div / mets:mptr

METS-Definition: The mptr element allows a div to be associated with a separate METS document containing the content corresponding with that div, rather than pointing to an internal file or file group. A typical instance of this would be the case of a METS document for a journal run, with a div element for each individual journal issue. The div elements for the issues might point to separate METS documents for each issue, rather than having files and file groups for every issue encoded in one document.

Comments: Contains a reference to another METS-file in which the relevant structure is described.

Repeatable: No
Every `mets:div` may only contain one `mets:mptr` . The primary structural element must not, however, contain a `mets:mptr` (which means a METS file must not reference itself).

Degree of obligation: optional

Attributes: The link is specified as a URL in the `xlink:href` attribute. The LOCTYPE attribute also specifies the URL type. The following values are permissible:
URL: for a Uniform Resource Location,
PURL: for a persistent URL.

Values: It is mandatory to specify the reference as a URL.

2.1.3 Periodic publishing sequences

The DFG viewer can make periodically published media (e.g. magazines, newspapers or musical ephemera) navigable in the form of a calendar view. Thereby, the individual editions are located on a calendar sheet according to their date of publication. Application of the calender view is optional, however, requires adherence to the

[12] http://dfg-viewer.de/strukturdatenset/

following conventions for coding of the logical structure of a periodical[13]:

1. A METS file must include the bibliographic description of the periodical, as well as references to a separate METS file per calendar year or 12-month period, of which digital editions are available. The attribute ORDERLABEL of the `mets:div` that represents the year must include the year according to the Gregorian calendar (or both years of a period separated by a slash) and the attribute TYPE must have the value ***year***.

2. Depending on the year or period of the digitalized publication sequence, a separate METS file must be available whose logical structure reflects the distribution of the issues for the months (TYPE="***month***") and days (TYPE="***day***") and refers to separate METS files for each issue (TYPE="***issue***"). The attribute ORDERLABEL of the `mets:div` must include the numerical value of the month or day. Only the months and days must be coded for which digitalized issues are available. If there are more than one issue per day, those have to be distinguished by LABEL. As superordinate structure unit, reference to the METS file of the periodical must be made.

3. For each issue, a METS file must be available whose logical structure must at least refer to the METS files for the year or period and the periodical.

[13] refer to application examples under http://dfg-viewer.de/profil-der-metadaten/beispiele/

2.1.4 Examples

Minimum information for the DFG-Viewer

```
<mets:structMap TYPE="LOGICAL">
   <mets:div ID="logical_1" TYPE="monograph" ADMID="amd_1" DMDID="dmd_1" />
</mets:structMap>
```

Structure of a volume of a magazine described in a separate METS file

```
<mets:structMap TYPE="LOGICAL">
   <mets:div ID="logical_1" TYPE="periodical" LABEL="BIS – Das Magazin für
   Bibliotheken in Sachsen">
        <mets:mptr LOCTYPE="URL" xlink:href="http://example.com/periodical.xml" />
        <mets:div ID="logical_2" TYPE="volume" ADMID="amd_1" DMDID="dmd_1"
        LABEL="Jahrgang 2012" CONTENTIDS="http://example.com/BIS">
             <mets:div ID="logical_3" TYPE="issue" DMDID="dmd_2" LABEL="Heft 1" />
             <mets:div ID="logical_4" TYPE="issue" DMDID="dmd_3" LABEL="Heft 2" />
             <mets:div ID="logical_5" TYPE="issue" DMDID="dmd_4" LABEL="Heft 3" />
             <mets:div ID="logical_6" TYPE="issue" DMDID="dmd_5" LABEL="Heft 4" />
        </mets:div>
   </mets:div>
</mets:structMap>
```

A musical ephemera with seasonal publication run

```
<mets:structMap TYPE="LOGICAL">
   <mets:div ID="logical_1" TYPE="periodical" ADMID="amd_1" DMDID="dmd_1"
   LABEL="Organ Concerts">
        <mets:div ID="logical_2" TYPE="year" ORDERLABEL="1983/1984" LABEL="Season
        1983/84">
             <mets:mptr LOCTYPE="URL" xlink:href="http://example.com/year83.xml" />
        </mets:div>
        <mets:div ID="logical_3" TYPE="year" ORDERLABEL="1984/1985" LABEL="Season
        1984/85">
             <mets:mptr LOCTYPE="URL" xlink:href="http://example.com/year84.xml" />
        </mets:div>
   </mets:div>
</mets:structMap>
```

A musical ephemera with seasonal publication run (Season 1983/84)

```
<mets:structMap TYPE="LOGICAL">
   <mets:div ID="logical_1" TYPE="periodical" LABEL="Organ Concerts">
        <mets:mptr LOCTYPE="URL" xlink:href="http://example.com/concert.xml" />
        <mets:div ID="logical_2" TYPE="year" ORDERLABEL="1983/1984" LABEL="Season
        1983/1984" ADMID="amd_1" DMDID="dmd_1">
             <mets:div ID="logical_3" TYPE="month" ORDERLABEL="1983-12"
             LABEL="December 1983">
                  <mets:div ID="logical_4" TYPE="day" ORDERLABEL="1983-12-24"
                  LABEL="Christmas 1983">
                       <mets:div ID="logical_5" TYPE="issue" LABEL="Afternoon
                       Concert">
                            <mets:mptr LOCTYPE="URL"
                            xlink:href="http://example.com/issue19831224_1.xml" />
                       </mets:div>
                       <mets:div ID="logidcal_6" TYPE="issue" LABEL="Evening
                       Concert">
                            <mets:mptr LOCTYPE="URL"
                            xlink:href="http://example.com/issue19831224_2.xml" />
                       </mets:div>
                  </mets:div>
             </mets:div>
             <mets:div ID="logical_7" TYPE="month" ORDERLABEL="1984-01"
             LABEL="January 1984">
                  <mets:div ID="logical_8" TYPE="day" ORDERLABEL="1984-01-06">
                       <mets:div ID="logical_9" TYPE="issue">
                            <mets:mptr LOCTYPE="URL"
                            xlink:href="http://example.com/issue19840106.xml" />
                       </mets:div>
                  </mets:div>
             </mets:div>
        </mets:div>
   </mets:div>
</mets:structMap>
```

A musical ephemera with seasonal publication run (Program of January 6th, 1984)

```
<mets:structMap TYPE="LOGICAL">
   <mets:div ID="logical_1" TYPE="periodical" LABEL="Organ Concerts "
   DMDID="dmd_1">
        <mets:mptr LOCTYPE="URL" xlink:href="http://example.com/concert.xml" />
        <mets:div ID="logical_2" TYPE="year" ORDERLABEL="1983/1984" LABEL="Season
        1983/1984">
             <mets:mptr LOCTYPE="URL" xlink:href="http://example.com/year83.xml" />
             <mets:div ID="logical_3" TYPE="issue" LABEL="Concert" ADMID="amd_1"
             DMDID="dmd_2">
                  <mets:div ID="logical_4" TYPE="title_page" />
                  <mets:div ID="logical_5" TYPE="dedication" />
                  <mets:div ID="logical_6" TYPE="article" />
             </mets:div>
        </mets:div>
   </mets:div>
</mets:structMap>
```

2.2 Specifications for the physical document structure

The physical structure of a document represents the materially distinguishable parts, i.e. individual pages or audio tracks. In general, the physical structure always has two hierarchical levels: containing the individual pages or audio tracks, which result in one physical sequence.

2.2.1 Physical structure - mets:structMap

METS-Definition: The structural map is the heart of a METS document, defining the hierarchical arrangement of a primary source document which has been digitized.

Comments: Contains the physical structure of the work.

Repeatable: No
A document may only have one physical structure.

Degree of obligation: conditional
The METS file has to contain the physical structure, as long as it does not exclusively describe the virtually existent bibliographic units (e.g. a newspaper or the complete record of a work with several volumes).

Attributes: For the physical structure, the TYPE attribute with the value *PHYSICAL* has to be used.

2.2.2 Subelements for mets:structMap

2.2.2.1 Structural element - mets:div

METS-Definition: The METS standard represents a document structurally as a series of nested div elements, that is, as a hierarchy (e.g., a book, which is composed of chapters, which are composed of subchapters, which are composed of text).

Comments: Contains one physical structural element of the work.

Repeatable: Yes
The physical structure is made up from one `mets:div` for the sequence of individual pages and one subordinate `mets:div` per individual page.

Degree of obligation: obligatory
Every physical structure has to consist of at least two `mets:div` (i.e. show at least 1 page, which forms the entire sequence).

Attributes: The ID attribute is used to link within the METS file and it is mandatory to allocate it clearly .
The type of structural element has to be defined more closely in the TYPE attribute. For this purpose the sequence has to be

highlighted with the ***physsequence*** value, the individual pages with ***page*** value and audio tracks with ***track***.[14]
The ORDER attribute has to contain a numerical sorting value, which is used to bring the individual pages into their correct physical sequence.
The ORDERLABEL attribute can contain the pagination of the individual page according to the original.
The LABEL attribute can include the foliation of the individual page or the specification of record side and track number.
The CONTENTIDS attribute should contain the PURL and/or URN, which identify the structural element, separated with spaces.

2.2.2.2 Reference to digital representation - mets:div / mets:mptr

METS-Definition: The fptr element associates a div element with content files that represent that div.

Comments: Includes a reference to one digital presentation of the structural element referenced in the METS file (see chapter 2.4).

Repeatable: Yes
Every `mets:div` may contain any number of `mets:fptr` .

Degree of obligation: obligatory
Every individual page has to have at least one digital representation which can be displayed in the DFG-Viewer.

Attributes: The reference is managed via the FILEID attribute, which contains the ID of the relevant element in the file section.

[14] In exceptions, the ***doublepage*** value is also permissible for double-sided scanned digital assets. This option is, however, available mainly for compatibility reasons for older digital assets and should be avoided if at all possible. The DFG viewer can also present single pages as double pages.

2.2.3 Examples

Minimum information for the DFG-Viewer

```
<mets:structMap TYPE="PHYSICAL">
   <mets:div ID="physical_1" TYPE="physSequence">
        <mets:div ID="physical_2" TYPE="page" ORDER="1">
             <mets:fptr FILEID="file_1" />
        </mets:div>
   </mets:div>
</mets:structMap>
```

Additional specification for pagination and several digital representations

```
<mets:structMap TYPE="PHYSICAL">
   <mets:div ID="physical_1" TYPE="physSequence">
        <mets:div ID="physical_2" TYPE="page" ORDER="1">
             <mets:fptr FILEID="file_1" />
             <mets:fptr FILEID="file_2" />
        </mets:div>
        <mets:div ID="physical_3" TYPE="page" ORDER="2" ORDERLABEL="I">
             <mets:fptr FILEID="file_3" />
             <mets:fptr FILEID="file_4" />
        </mets:div>
        <mets:div ID="physical_4" TYPE="page" ORDER="3" ORDERLABEL="II">
             <mets:fptr FILEID="file_5" />
             <mets:fptr FILEID="file_6" />
        </mets:div>
   </mets:div>
</mets:structMap>
```

Sound carrier with two sides with two tracks each

```
<mets:structMap TYPE="PHYSICAL">
   <mets:div ID="physical_1" TYPE="physSequence">
        <mets:div ID="physical_2" TYPE="track" ORDER="1" LABEL="A/01">
             <mets:fptr FILEID="file_1" />
        </mets:div>
        <mets:div ID="physical_3" TYPE="track" ORDER="2" LABEL="A/02">
             <mets:fptr FILEID="file_2" />
        </mets:div>
        <mets:div ID="physical_4" TYPE="track" ORDER="3" LABEL="B/01">
             <mets:fptr FILEID="file_3" />
        </mets:div>
        <mets:div ID="physical_5" TYPE="track" ORDER="4" LABEL="B/02">
             <mets:fptr FILEID="file_4" />
        </mets:div>
   </mets:div>
</mets:structMap>
```

2.3 Linking of logical and physical structure

The linking is always carried out from the logical to the physical structure, i.e. all physical structural elements, of which the logical structure is made up, are allocated to every logical structural element. A logical structure can be made up from several physical structural elements (e.g. pages) and a physical structure can belong to several logical structural elements.

2.3.1 Structure links - mets:structLink

METS-Definition: The Structural Map Linking section allows the specification of hyperlinks between different components of a METS structure delineated in a structural map.

Comments: Includes a link between logical and physical structure of the work/archival material.

Repeatable: No

Degree of obligation: conditional
If the METS file contains both logical as well as physical structures, then these have to be linked.

2.3.2 Subelements for mets:structLink

2.3.2.1 Linking – mets:smLink

METS-Definition: An element linking two elements in the structural map, used to indicate that a hyperlink exists between the two METS components represented by the two structural map nodes.

Comments: Contains the link between one logical and one physical structural element.

Repeatable: Yes
The sequence of `mets:smLink` for every logical structure has to correspond to the correct arrangement of the physical structural elements within this logical structure.

Degree of obligation: obligatory
There has to be at least one link between the primary logical structure and the sequence of the individual pages.

Attributes: The attribute `xlink:from` must include the ID of a logical structural element.
The attribute `xlink:to` must include the ID of a physical structural element.

2.3.3 Examples

Minimum information for the DFG-Viewer

```
<mets:structLink>
   <mets:smLink xlink:from="logical_1" xlink:to="physical_1" />
</mets:structLink>
```

Logical structures consist of three relevant physical individual pages

```
<mets:structLink>
   <mets:smLink xlink:from="logical_2" xlink:to="physical_2" />
   <mets:smLink xlink:from="logical_2" xlink:to="physical_3" />
   <mets:smLink xlink:from="logical_2" xlink:to="physical_4" />
   <mets:smLink xlink:from="logical_3" xlink:to="physical_4" />
   <mets:smLink xlink:from="logical_3" xlink:to="physical_5" />
   <mets:smLink xlink:from="logical_3" xlink:to="physical_6" />
</mets:structLink>
```

2.4 Digital representations

Every physical structural element can be represented by one or several digital forms. These can be different resolutions of the same scan of an individual page, but also scans of the same page which were made with different techniques. Furthermore, the full text of the original may also be available in machine-readable form. If it is a sound document, then the recording of the individual tracks is the digital representation.

2.4.1 File section - mets:fileSec

METS-Definition: The overall purpose of the content file section element <fileSec> is to provide an inventory of and the location for the content files that comprise the digital object being described in the METS document.

Comments: Contains the references to the digital representations of the work/archival material.

Repeatable: No

Degree of obligation: conditional
If the METS file contains a physical structure, then a digital representation has to be specified for every individual page.

2.4.2 Subelements for mets:fileSec

2.4.2.1 File groups - mets:fileGrp

METS-Definition: A sequence of file group elements <fileGrp> can be used to group the digital files that comprise the content of a METS object.

Comments: Contains the references to the digital representations of a certain type.

Repeatable: Yes
Within `mets:fileSec` there can be any number of `mets:fileGrp` which, however, have to have different `USE` attribute values.

Degree of obligation: obligatory
There has to be at least one `mets:fileGrp` with the `USE="DEFAULT"` attribute.

Attributes: The `USE` attribute specifies the purpose of the representations within the file group. The following attribute values are analysed in the context of the DFG viewer:

DEFAULT: normal presentation derivatives,
DOWNLOAD: downloadable (PDF) derivatives,
THUMBS: Preview images per page (max. 150x150 Pixel),
TEASER: Preview of the work (max. 150x150 Pixel),
AUDIO: for digital sound recordings,
FULLTEXT: Full text and layout information.

2.4.2.2 File – mets:fileGrp/mets:file

METS-Definition: The file element <file> provides access to the content files for the digital object being described by the METS document.

Comments: Includes the reference to a digital representation.

Repeatable: Yes
Within `mets:fileGrp` there can be any number of `mets:file`.

Degree of obligation: obligatory
There has to be at least one digital representation in a file group.

Attributes: The `ID` attribute is used to link within the METS file and it is mandatory to allocate it clearly .
The `MIMETYPE` attribute must contain the media type of the digital representation according to RFC2046[15] or one of the following special values:

`application/vnd.kitodo.iiif`: if using the IIIF Image API 2.0+[16],
`application/vnd.netfpx`: if using the Internet Image Protocol (IIP)[17],
`application/vnd.kitodo.zoomify`: if using the commercial Zoomify standard.

2.4.2.3 File link – mets:fileGrp/mets:file/mets:FLocat

METS-Definition: The file location element <FLocat> provides a pointer to the location of a content file.

Comments: Includes the reference to an external file.

Repeatable: No

Degree of obligation: obligatory
Within every `mets:file` there must be exactly one `mets:FLocat`.

Attributes: The link is specified as a URL in the `xlink:href` attribute. The `LOCTYPE` attribute also specifies the URL type. The following values are permissible:

`URL`: for a Uniform Resource Location,
`PURL`: for a persistent URL.

Values: It is mandatory to specify the reference as a URL. If using one of the supported image servers (see 2.4.2.2) this has to be the base URL of the image without any parameters for scaling, rotation, etc.

[15] http://tools.ietf.org/html/rfc2046

[16] https://iiif.io/api/image/

[17] https://iipimage.sourceforge.io/documentation/protocol/

2.4.3 Examples

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```
<mets:fileSec>
   <mets:fileGrp USE="DEFAULT">
        <mets:file ID="file_1" MIMETYPE="image/jpeg">
             <mets:FLocat LOCTYPE="URL" xlink:href="http://example.com/img1.jpg" />
        </mets:file>
        <mets:file ID="file_2" MIMETYPE="image/jpeg">
             <mets:FLocat LOCTYPE="URL" xlink:href="http://example.com/img2.jpg" />
        </mets:file>
        <mets:file ID="file_3" MIMETYPE="image/jpeg">
             <mets:FLocat LOCTYPE="URL" xlink:href="http://example.com/img3.jpg" />
        </mets:file>
   </mets:fileGrp>
</mets:fileSec>
```

Using an IIIF Image Server

```
<mets:fileSec>
   <mets:fileGrp USE="DEFAULT">
        <mets:file ID="file_1" MIMETYPE="application/vnd.kitodo.iiif">
             <mets:FLocat LOCTYPE="URL" xlink:href="http://example.com/img1.jp2" />
        </mets:file>
        <mets:file ID="file_2" MIMETYPE="application/vnd.kitodo.iiif">
             <mets:FLocat LOCTYPE="URL" xlink:href="http://example.com/img2.jp2" />
        </mets:file>
        <mets:file ID="file_3" MIMETYPE="application/vnd.kitodo.iiif">
             <mets:FLocat LOCTYPE="URL" xlink:href="http://example.com/img3.jp2" />
        </mets:file>
   </mets:fileGrp>
</mets:fileSec>
```

2.5 Descriptive metadata

Individual descriptive metadata can be embedded into the METS file for every individual logical structural element. This is obligatory for the primary logical structural element. The metadata itself is not coded in METS, but in a specific format in its own namespace. Different application profiles for different media types are available for the DFG-viewer.[18]

2.5.1 Metadata section for mets:dmdSec

METS-Definition: A descriptive metadata section <dmdSec> records descriptive metadata pertaining to the METS object as a whole or one of its components. Descriptive metadata can be expressed according to many current description standards (i.e., MARC, MODS, Dublin Core, TEI Header, EAD, VRA, FGDC, DDI) or a locally produced XML schema.

Comments: Contains the descriptive metadata of a logical structural element.

Repeatable: Yes
There can be a descriptive metadata section for every logical structural element.

Degree of obligation: obligatory
There has to be a `mets:dmdSec` for at least the primary logical structural element.

Attributes: The `ID` attribute is used to link within the METS file and it is mandatory to allocate it clearly .

2.5.2 Subelements for mets:dmdSec

2.5.2.1 Embedded metadata – mets:mdWrap

METS-Definition: A metadata wrapper element <mdWrap> provides a wrapper around metadata embedded within a METS document.

Comments: Contains the descriptive metadata in an embedded data format.

Repeatable: No

Degree of obligation: obligatory

Attributes: The `MDTYPE` attribute specifies the format of the embedded metadata. Only the following values are permitted in the context of the DFG viewer:

- ***MODS***: for metadata in MODS format,
- ***TEIHDR***: for metadata in TEI-header format.

Values: The embedded metadata is enclosed in `mets:xmlData` and has to declare its own namespace.

[18] http://dfg-viewer.de/profil-der-metadaten/

2.5.3 Examples

Embedded MODS metadata

```
<mets:dmdSec ID=”dmd_1”>
   <mets:mdWrap MDTYPE=“MODS“>
        <mets:xmlData>
             <mods:mods>
                ...
             </mods:mods>
        </mets:xmlData>
   </mets:mdWrap>
</mets:dmdSec>
```

Embedded TEI-Header metadata

```
<mets:dmdSec ID=”dmd_2”>
   <mets:mdWrap MDTYPE=“TEIHDR“>
        <mets:xmlData>
             <tei:teiHeader>
                ...
             </tei:teiHeader>
        </mets:xmlData>
   </mets:mdWrap>
</mets:dmdSec>
```

2.6 Administrative metadata

Further administrative specifications have to be made for the digital asset in addition to the bibliographic and descriptive metadata. This is the contact data of the digitising facility, legal information, technical metadata and references to catalogue information of the resource.

2.6.1 Metadata section - mets:amdSec

METS-Definition: The administrative metadata section <amdSec> contains the administrative metadata pertaining to the digital object, its components and any original source material from which the digital object is derived.

Comments: Contains the administrative metadata of the digital asset.

Repeatable: Yes

Degree of obligation: Obligatory
At least with the primary logical structural element, a `mets:amdSec` has to be linked to the DFG viewer specific information (compare **Fehler! Verweisquelle konnte nicht gefunden werden.**) in `mets:rightsMD` and `mets:digiprovMD`.

Attributes: The `ID` attribute is used to link within the METS file and it is mandatory to allocate it clearly .

2.6.2 Subelements for mets:amdSec

2.6.2.1 Technical metadata - mets:techMD

METS-Definition: A technical metadata element <techMD> records technical metadata about a component of the METS object, such as a digital content file.

Comments: Contains the technical metadata. Every digital represenatation in `mets:file` can be linked with its own `mets:amdSec/mets:techMD`.

Repeatable: No

Degree of obligation: optional

Attributes: The `ID` attribute is used to link within the METS file and it is mandatory to allocate it clearly .

2.6.2.2 Embedded technical data - mets:techMD/mets:mdWrap

METS-Definition: A metadata wrapper element <mdWrap> provides a wrapper around metadata embedded within a METS document.

Comments: Contains the technical information in an embedded format.

Repeatable: No

Degree of obligation: obligatory

Attributes: The MDTYPE or OTHERMDTYPE attributes have to specify the format of the embedded data such as ***BLAPSI*** or ***MIX***.

Values: The embedded metadata are enclosed in `mets:xmlData`.

2.6.2.3 Rights declaration - mets:rightsMD

METS-Definition: An intellectual property rights metadata element <rightsMD> records information about copyright and licensing pertaining to a component of the METS object.

Comments: Contains the legal declarations.

Repeatable: No

Degree of obligation: Obligatory
At least the primary logical structural element has to have a linked `mets:amdSec/mets:rightsMD`.

Attributes: The ID attribute is used to link within the METS file and it is mandatory to allocate it clearly .

2.6.2.4 Embedded rights specifications – mets:rightsMD/mets:mdWrap

METS-Definition: A metadata wrapper element <mdWrap> provides a wrapper around metadata embedded within a METS document.

Comments: Contains the rights specifications in an embedded data format.

Repeatable: No

Degree of obligation: obligatory

Attributes: The MDTYPE attribute has to be allocated with the value ***OTHER*** and the attribute OTHERMDTYPE with the value ***DVRIGHTS***.

Values: The embedded metadata are enclosed in `mets:xmlData` and have to be coded according to chapter 2.7.1.

2.6.2.5 Creation - mets:digiprovMD

METS-Definition: A digital provenance metadata element <digiprovMD> can be used to record any preservation-related actions taken on the various files which comprise a digital object (e.g., those subsequent to the initial digitization of the files such as transformation or migrations) or, in the case of born digital materials, the files' creation.

Comments: Contains information for the original resource.

Repeatable: No

Degree of obligation: Obligatory
At least the primary logical structural element has to have a linked `mets:amdSec/mets:digiprovMD`.

Attributes: The ID attribute is used to link within the METS file and it is mandatory to allocate it clearly .

2.6.2.6 Embedded references – mets:digiprovMD/mets:mdWrap

METS-Definition: A metadata wrapper element <mdWrap> provides a wrapper around metadata embedded within a METS document.

Comments: Contains information to catalogue references, finding aids and local presentation.

Repeatable: No

Degree of obligation: obligatory

Attributes: The MDTYPE attribute has to be allocated with the value ***OTHER*** and the attribute OTHERMDTYPE with the value ***DVLINKS***. Deviating values may also be used to code process information of the digitisation (such as ***AES***).

Values: The embedded metadata are enclosed in `mets:xmlData` and have to be coded according to chapter 2.7.3 or another specification.

2.6.3 Examples

Minimum information for the DFG-Viewer

```
<mets:amdSec ID=”amd_1”>
   <mets:rightsMD ID=“rights“>
        <mets:mdWrap MDTYPE=“OTHER“ OTHERMDTYPE=“DVRIGHTS“>
             <mets:xmlData>
                <dv:rights>...</dv:rights>
             </mets:xmlData>
        </mets:mdWrap>
   </mets:rightsMD>
   <mets:digiprovMD ID=“digiprov“>
        <mets:mdWrap MDTYPE=”OTHER” OTHERMDTYPE=”DVLINKS”>
             <mets:xmlData>
                <dv:links>...</dv:links>
             </mets:xmlData>
        </mets:mdWrap>
   </mets:digiprovMD>
</mets:amdSec>
```

Technical meta data of an audio file

```
<mets:amdSec ID=”amd_1”>
   <mets:techMD ID=“tech_1“>
        <mets:mdWrap MDTYPE=“OTHER“ OTHERMDTYPE=“BLAPSI“>
             <mets:xmlData>
                <blapsi:file_duration>0:04:09</blapsi:file_duration>
                <blapsi:file_size>72748748</blapsi:file_size>
                <blapsi:file_sample>48000</blapsi:file_sample>
                <blapsi:file_resolution>24</blapsi:file_resolution>
                <blapsi:file_channels>1</blapsi:file_channels>
                <blapsi:file_length>11961920</blapsi:file_length>
             </mets:xmlData>
        </mets:mdWrap>
   </mets:techMD>
</mets:amdSec>
```

2.7 DFG-viewer specific specifications

Specific data fields, which do not originate from the METS standard, are used to code individual administrative metadata. They are therefore located in their own XML namespace which has to be declared as follows:
`xmlns:dv="http://dfg-viewer.de/"`

2.7.1 Rights specifications – dv:rights

Comments: Contains right specifications for the digital asset.
Repeatable: No
Degree of obligation: obligatory

2.7.2 Subelement to dv:rights

2.7.2.1 Owner of the digital asset - dv:owner

Comments: Contains the name of the owner of the digital asset which is usually the digitising facility. This is also considered to be the rights holder for the given licenses.
Repeatable: No
Degree of obligation: obligatory

2.7.2.2 Logo of owner – dv:ownerLogo

Comments: Contains a URL to the digital asset owner's logo. The logo is integrated into the design of the DFG-Viewer.
Repeatable: No
Degree of obligation: obligatory
Values: The logo dimensions can be found in the documentation.[19]

2.7.2.3 Homepage of owner – dv:ownerSiteURL

Comments: Contains the digital asset owner's homepage URL. The URL is linked in the DFG-Viewer with the owner's logo.
Repeatable: No
Degree of obligation: obligatory

[19] http://dfg-viewer.de/hinweise-zur-bildbearbeitung/

2.7.2.4 Contact data of owner - dv:ownerContact

Comments: Contains digital asset owner's contact details which is also offered in the DFG-viewer.

Repeatable: No

Degree of obligation: obligatory

Values: Either the URL to a contact form or a complete mailto-link have to be specified.

2.7.2.5 Aggregator of digital asset license – dv:aggregator

Comments: Contains the name of identifier of the data owning aggregator or portal.

Repeatable: No

Degree of obligation: optional

2.7.2.6 Logo of aggregator– dv:aggregatorLogo

Comments: Contains a URL for a logo of the data owning aggregator or portal. The logo is integrated into the design of the DFG-Viewer.

Repeatable: No

Degree of obligation: optional

Values: The logo dimensions can be found in the DFG-viewer documentation.[20]

2.7.2.7 Homepage of aggregator– dv:aggregatorSiteURL

Comments: Contains a URL for a homepage of the data owning aggregator or portal. The URL is linked in the DFG-Viewer with the aggregator's logo.

Repeatable: No

Degree of obligation: optional

2.7.2.8 Name of sponsor – dv:sponsor

Comments: Contains the name of the sponsor of the digitisation which is usually the German Research Association.

Repeatable: No

Degree of obligation: optional

[20] http://dfg-viewer.de/hinweise-zur-bildbearbeitung/

2.7.2.9 Logo of sponsor – dv:sponsorLogo

Comments: Includes a URL to the logo of the sponsor, who supported the digitising. The logo is integrated into the design of the DFG-Viewer and replaces there the logo of the German Research Institute.

Repeatable: No

Degree of obligation: optional

Values: The logo dimensions can be found in the DFG-viewer documentation.[21]

2.7.2.10 Homepage of sponsor – dv:sponsorSiteURL

Comments: Contains the sponsor's homepage URL. The URL is linked in the DFG-Viewer with the sponsor's logo.

Repeatable: No

Degree of obligation: optional

2.7.2.11 Digital asset license – dv:license

Comments: Contains specifications about the license under which the digital asset was published.

Repeatable: No

Degree of obligation: optional
If no specifications are made about the license, then the value ***reserved*** is assumed.

Values: The use of the following values is obligatory:[22]

pdm: Marking as public domain,
cc0: Licensing as a CCO-license,
cc-by: Licensing as a CC-BY-license,
cc-by-sa: Licensing as a CC-BY-SA-license,
cc-by-nd: Licensing as a CC-BY-ND-license,
cc-by-nc: Licensing as a CC-BY-NC-license,
cc-by-nc-sa: Licensing as a CC-BY-NC-SA-license,
cc-by-nc-nd: Licensing as a CC-BY-NC-ND-license,
reserved: other rights reserved.

2.7.3 Links – dv:links

Comments: Includes links to related or alternative derivates.

Repeatable: No

Degree of obligation: obligatory

[21] http://dfg-viewer.de/hinweise-zur-bildbearbeitung/

[22] http://creativecommons.org/licenses/

2.7.4 Subelements to dv:links

2.7.4.1 Catalogue or searching guide reference - dv:reference

Comments: Includes a reference to a catalogue or searching guide reference.

Repeatable: Yes

Degree of obligation: obligatory
Within `dv:file` there has to be at least one `dv:reference`.

Attributes: If several references are specified, then it has to be specified in the `linktext` attribute which reference it is.

2.7.4.2 Local presentation - dv:presentation

Comments: Contains a reference to a local presentation.

Repeatable: No

Degree of obligation: optional

2.7.4.3 SRU research interface – dv:sru

Comments: Contains a link to the SRU interface.

Repeatable: No

Degree of obligation: optional

Values: The specification has to be made in form of a valid URL but without URL parameter. The DFG viewer adds the required SRU-parameters necessary for the query of the interface automatically. The SRU/ALTO application profile in version 1.0[23] describes which parameter the interface has to support as a minimum.

2.7.4.4 IIIF Manifest – dv:iiif

Comments: Contains a link to an IIIF manifest of the digitised medium.

Repeatable: No

Degree of obligation: optional

Values: Has to be a valid URI of a *Presentation API*[24] of the International Image Interoperability Framework (IIIF).

[23] http://dfg-viewer.de/profil-der-metadaten/

[24] https://iiif.io/api/presentation/

2.7.5 Examples

Minimum information for the DFG-Viewer

```
<dv:rights>
   <dv:owner>SLUB Dresden</dv:owner>
   <dv:ownerLogo>http://digital.slub-dresden.de/logo.gif</dv:ownerLogo>
   <dv:ownerSiteURL>http://digital.slub-dresden.de/</dv:ownerSiteURL>
   <dv:ownerContact>mailto:sebastian.meyer@slub-dresden.de</dv:ownerContact>
</dv:rights>
<dv:links>
   <dv:reference>http://slub-dresden.de/FOZK.pl?PPN=356448053</dv:reference>
   <dv:presentation>http://slub-dresden.de/356448053</dv:presentation>
</dv:links>
```

Additional specification of a license and an additional reference

```
<dv:rights>
   <dv:owner>SLUB Dresden</dv:owner>
   <dv:ownerLogo>http://digital.slub-dresden.de/logo.gif</dv:ownerLogo>
   <dv:ownerSiteURL>http://digital.slub-dresden.de/</dv:ownerSiteURL>
   <dv:ownerContact>mailto:sebastian.meyer@slub-dresden.de</dv:ownerContact>
   <dv:license>cc-by</dv:license>
</dv:rights>
<dv:links>
   <dv:reference linktext=”OPAC”>
      http://slub-dresden.de/FOZK.pl?PPN=356448053
   </dv:reference>
   <dv:reference linktext=”WorldCat”>
      http://worldcat.org/search?356448053
   </dv:reference>
   <dv:presentation>http://slub-dresden.de/356448053</dv:presentation>
   <dv:sru>http://digital.slub-dresden.de/sru/356448053</dv:sru>
</dv:links>
```