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DOCUMENT

ngEO Tailoring for Landsat

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Reference **GMES-GSEG-EOPG-TN-12-0068**
Issue **1**
Revision **1**
Date of Issue **28/01/2013**
Status **Approved/Applicable**
Document Type **TN**
Distribution

European Space Agency
Agence spatiale européenne

APPROVAL

Title ngEO Tailoring for Landsat	
Issue 1	**Revision** 1
Author Andrea Cavallini	**Date** 28/01/2013
Reviewed by	**Date**
Roberto Biasutti EOP-GTU	28/01/2013
Cristiano Lopes EOP-GSI	28/01/2013
Approved by	**Date**
Olivier Barois EOP-GSI	28/01/2013
Roberto Biasutti EOP-GTU	28/01/2013

CHANGE LOG

Reason for change	Issue	Revision	Date
Updated	1	0	25/01/2013

CHANGE RECORD

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Fixed the eop:processingMode attribute value	25/01/2013	14	3.2.1.8

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1 INTRODUCTION

1.1 Purpose of this Document

The scope of this technical note is to provide a **preliminary** tailoring of the ngEO concepts towards Landsat 1 to 7 missions. In more details this TN provides information on both product metadata and browse formats and how they are ingested in ngEO trough the harvesting service. A dedicated chapter is present for each concept in order to show specific tailoring details.

1.2 Acronyms and Abbreviations

Acronym	Description
AD	Applicable Document
EO	Earth Observation
GML	Geography Markup Language
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure
ngEO	Next Generation User Services For Earth Observation
O&M	Observation & Measurement
RD	Reference Document
SSO	Single Sign-On
TN	Technical Note
XML	Extensible Markup Language
XSD	XML Schema Documentation

Table 1-1 – Acronyms and Abbreviations

1.3 Applicable Documents

ID	Document Reference	Document Title	Issue	Date
[AD-1]	ngEO-13-ICD-MFR-071	External ICD for Harvesting Service	1.2	03/07/2012
[AD-2]	ngEO-13-ICD-MFR-059	ngEO Browse Report File Generic Interface	1.3	17/07/2012
[AD-3]	MMFI-GSEG-EOPG-RD-12-0003	Multimission Dissemination Service Requirement Document for as-it-is products	-	16/04/2012
[AD-4]	ENVI-GSEG-EOPG-TN-12-0002	ESA & TPM Online Dissemination Operational Concept Document (OCD)	-	03/09/2012

Table 1-2 – Applicable Documents

1.4 Reference Documents

ID	Document Reference	Document Title	Issue	Date
[RD-1]	ngEO-13-ICD-MFR-021	ngEO Metadata Report File Generic Interface	1.3	06/07/2012
[RD-2]	ngEO-14-ICD-TPZ-086	External ICD for ngEO Feed	1.3	16/07/2012

Table 1-3 – Reference Documents

2 LANDSAT TO NGEO INTERFACE TAILORING OVERVIEW

In order to manage Landsat missions inside ngEO system a specific tailoring has to be provided in order to specify both interface for data exchanging and formats of data itself that have to be of course complaint with ngEO specifications. In the following paragraphs is shown a brief introduction of these concepts.

2.1 ngEO Harvesting Service

While most of the Product Facilities are expected to provide product metadata and browse images to ngEO through the polling mechanism described inside [RD-2] (where Product Facilities initiate the product metadata and browse image exchange, copying them into well-identified baskets polled by the ngEO Feed component), instead Landsat missions rely on an alternative mechanism, named “harvesting” where the initiative of the data retrieval is left to ngEO. In chapter 5 is provided the harvesting tailoring.

2.2 Product Metadata

The Landsat products metadata will be delivered within a dedicated file named index file. Inside this file will be present most of the ngEO expected metadata attributes (some others are fixed or computed at runtime). In chapter 3 is provided the Product metadata tailoring.

2.3 Browse Metadata and Image

The Landsat browse metadata and images will follow the specifications provided in [AD-2]. In Chapter 4 is provided the Browse metadata tailoring.

3 METADATA TAILORING

In this chapter is presented the list of metadata attributes expected for Landsat products. Even though the Landsat metadata products data will be delivered within index files (see 5.2) all the contained values will be mapped by the ngEO harvesting service inside specific ngEO Metadata Report files (as defined in [RD-1]) that will be sent later to the ngEO Feed component for the ingestion. For this reason, all the relevant information needed to build an ngEO Metadata Report file shall be present inside the index file. In the next paragraphs are shown all the product types that will be managed by ngEO as well as all the ngEO Metadata attributes with the relevant Landsat tailoring.

3.1 Landsat Product Types

Considering the current catalogue population, the following table reports the Landsat product types with their relevant mission/sensor/sensor mode/product type combinations. For each combination corresponds a unique ngEO native datasets. This is also important to create correctly the harvesting structure tree (see 5.1)

Mission eop:Platform/ eop:shortName	**Sat. Number** eop:Platform/ eop:serialIdentifier	**Sensor ID** eop:Instrument/ eop:shortName	**Sensor Mode*** eop:Sensor/ eop:operationalMode	**Product Type** eop:productType
Landsat	1, 2, 3, 4, 5	MSS	IM	MSS__GTC_1P
	4, 5	TM	IM	TM__GTC_1P
	7	ETM	IM	ETM_GTC_1P

** The Sensor Mode is arbitrarily set to "IM" for all Landsat products.*

Table 3-1 – Landsat Product Types

3.2 Tailoring of Metadata Report model

3.2.1 Metadata Report Generic Schema

The schema and elements of the generic ngEO Metadata Report are specified in defined in [RD-1]). The tailoring of the `eop:EarthObservation` "opt" substitution group for the Landsat missions is presented in the next section.

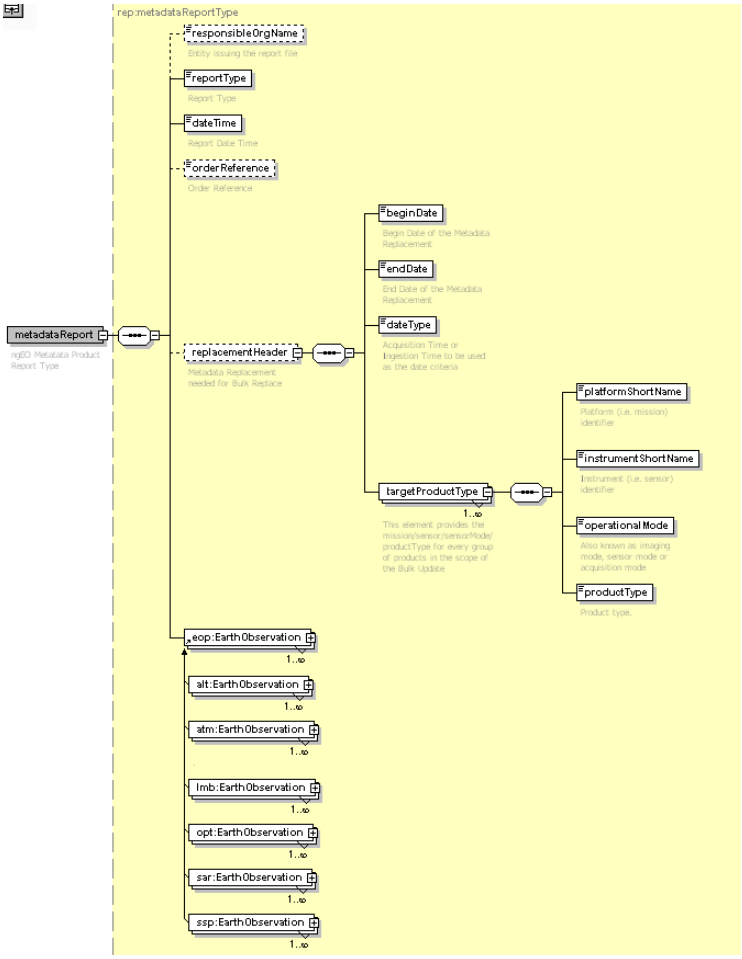

Figure 3-1: rep:metadataReport schema

The model for product metadata embedded in the Metadata Report (see [RD-1]) is a customization of the model for Earth Observation products. The following subsections define the subset of Earth Observation products attributes that are taken into account in the ngEO subsystem.

Please note EO Product model is based on several underlying XML structures taken from O&M and GML standard vocabularies. Some attributes are made mandatory by these inherited structures and, as such, must be present in an EO Product for XML validity sake even if they are ignored by ngEO. All the attributes that are not expected by ngEO are declared as 'ignored' and are represented in grey in the following tables. For each attribute will be specified the tailoring using the following three columns:

- **Landsat Tailoring**: set to **Yes** if the attribute is used otherwise **No**
- **Index Attribute**: Set either to **Yes** if the attribute has to be provided inside the index file or to **No** if the attributes is defined inside the harvesting configuration file (see 5.2)
- **Attribute Name**: the name of the attribute inside the index file defined in [AD-1]

3.2.1.1 eop:EarthObservation

The `eop:EarthObservation` element is the base of every Earth Observation Product.

XML element	Cardinality	Description and ngEO Notes	Landsat Tailoring	Index Attribute	Attribute Name
gml:id attribute	*Ignored*	Mandatory identifier required by GML. Its value must be unique among all the gml:id attributes of the XML file. *The convention is to use the Product ID plus a suffix in order to have the ID unique inside the document. This id is not to be used to retrieve the product ID. There is no need to store this attribute inside the catalogue database.*	same as eop:identifier + counter as suffix.	**No**	**N/A**
om:type/ om:metadata/ om:relatedObservation	*Ignored*	*Various optional properties defined in the O&M Observation model*	***No***	***No***	***N/A***
om:phenomenonTime/ gml:TimePeriod/ gml:beginPosition	1	Acquisition start date time dateTime in ISO 8601 format (CCYY-MM-DDThh:mm[:ss[.cc]]Z) *For EO product this is the sensing time.*	**Yes**	**Yes**	**beginAcquisition**
om:phenomenonTime/ gml:TimePeriod/ gml:endPosition	1	Acquisition end date time dateTime in ISO 8601 format (CCYY-MM-DDThh:mm[:ss[.cc]]Z) *Maybe equal to the start for zero length products.*	**Yes**	**Yes**	**endAcquisition**
om:resultTime/ gml:TimeInstant/ gml:timePosition	1	The time when the result becomes available dateTime in ISO 8601 format (CCYY-MM-DDThh:mm[:ss[.cc]]Z) *The Result Time has to be set either to the availability time (e.g. when the product is available on-line or the processing time) if this is achievable or to the acquisition stop time.*	**Yes**	**Yes**	**availabilityTime**
om:validTime	*Ignored*	*The time period during which the result is intended to be used (e.g. if a meteorological forecast is modelled as an observation, then it is intended to be used during a specific period of time)*	***No***	***No***	***N/A***
om:procedure/ eop:EarthObservationEquipment	*1*	*General properties such as the data identifier, the downlink and archiving information.*	see eop:EarthObservationEquipment		
om:parameter	*Ignored*	*Arbitrary event-specific parameter*	***No***	***No***	***N/A***
om:observedProperty	*Ignored*	*An xlink to the observed property definition* *Report should use nilReason="inapplicable"*	***No***	***No***	***N/A***
om:featureOfInterest/ eop:Footprint	*0..1*	*The observed area (or its projection) on the ground i.e. the footprint of acquisition*	*see* eop:Footprint		
om:resultQuality	*Ignored*	*Information concerning the quality of a result*	***No***		***N/A***
om:result/ eop:EarthObservationResult	*0..1*	*Earth Observation result metadata composed of the browse, mask and product description*	*see opt:EarthObservationResult*		
eop:metaDataProperty/ eop:EarthObservationMetaData	*1*	*Additional external metadata about the data acquisition.*	*see* eop:EarthObservationMetaData		

3.2.1.2 eop:EarthObservationEquipment

The `eop:EarthObservationEquipment` element contains metadata relative to the mechanism used during the EarthObservation. These metadata describe on one hand the platform, instrument and sensor used for the EarthObservation, and, on the other hand, the acquisition parameters of this observation.

XML element	Cardinality	Description and ngEO Notes	Landsat Tailoring	Index Attribute	Attribute Name
gml:id attribute	*Ignored*	Mandatory identifier required by GML. Its value must be unique among all the gml:id attributes of the XML file. *The same convention as before*	same as eop:identifier + counter as suffix.	**No**	**N/A**
eop:platform/eop:Platform/ eop:shortName	1	Platform short name Fixed value: **Landsat**	**Yes**	**No**	**platformShortName**
eop:platform/eop:Platform/ eop:serialIdentifier	0..1	Platform serial identifier (e.g. 1. 2. 3...7) See Table 3-1 for allowed values	**Yes** **Cardinality 1**	**Yes**	**platformSerialIdentifier**
eop:platform/eop:Platform/ eop:orbitType	*Ignored*	*High level characterisation of main mission types (GEO/LEO)*	***No***	***No***	***N/A***
eop:instrument/eop:Instrument/ eop:shortName	1	Instrument (Sensor) name See Table 3-1 for allowed values *It's Mandatory for ngEO for the Native Dataset configurations*	**Yes**	**Yes**	**instrumentShortName**
eop:instrument/eop:Instrument/ eop:description	*Ignored*	*Instrument description*	***No***	***No***	***N/A***
eop:instrument/eop:Instrument/ eop:instrumentType	*Ignored*	*Instrument type*	***No***	***No***	***N/A***
eop:sensor/eop:Sensor/ eop:sensorType	0..1	Sensor type. Fixed value: **OPTICAL**	**Yes** **Cardinality 1**	**No**	**sensorType**
eop:sensor/eop:Sensor/ eop:operationalMode	1	Sensor mode. Possible values are mission specific and should be retrieved using codeSpace. Fixed value: **IM** *It's Mandatory for ngEO for the Native Dataset configurations*	**Yes** **Cardinality 1**	**No**	**operationalMode**
eop:sensor/eop:Sensor/ eop:resolution	*Ignored*	*Image resolution*	***No***	***No***	***N/A***
eop:sensor/eop:Sensor/ eop:swathIdentifier	0..1	Swath identifier (e.g. Envisat ASAR has 7 distinct swaths (I1,I2,I3...I7) that correspond to precise incidence angles for the sensor). Value list can be retrieved with codeSpace.	***No***	***No***	***N/A***
eop:sensor/eop:Sensor/ eop:wavelengthInformation	*Ignored*	*Information about the spectral bands*	***No***	***No***	***N/A***
eop:acquisitionParameters/ eop:Acquisition	*0..1*	*Acquisition parameters*	see eop:EarthObservationEquipment		

3.2.1.3 eop:acquisitionParameters

The `eop:Acquisition` element provides the acquisition parameters of the observation.

XML element	Cardinality	Description and ngEO Notes	Landsat Tailoring	Index Attribute	Attribute Name
eop:orbitNumber	0..1	Acquisition orbit number	**Yes** **Cardinality 1**	**Yes**	**orbitNumber**
eop:lastOrbitNumber	*Ignored*	*Acquisition last orbit number*	***No***	***No***	***N/A***

XML element	Cardinality	Description and ngEO Notes	Landsat Tailoring	Index Attribute	Attribute Name
eop:orbitDirection	0..1	Acquisition orbit direction Fixed value: **DESCENDING**	**Yes** **Cardinality 1**	**No**	**orbitDirection**
eop:wrsLongitudeGrid	0..1	Neutral wrsLongitudeGrid to replace track in track/frame, K in K/J, etc. The optional attribute "eop:codeSpace" is used to point the reference grid	**Yes** **Cardinality 1**	**Yes**	**wrsLongitudeGrid**
eop:wrsLatitudeGrid	0..1	Neutral wrsLatitudeGrid to replace frame in track/frame, J in K/J, etc. The optional attribute "eop:codeSpace" is used to point the reference grid	**Yes** **Cardinality 1**	**Yes**	**wrsLatitudeGrid**
eop:ascendingNodeDate	*Ignored*	*UTC date and time at ascending node of orbit*	***No***	***No***	***N/A***
eop:ascendingNodeLongitude	*Ignored*	*Longitude at ascending node of orbit. Should be expressed in degrees.*	***No***	***No***	***N/A***
eop:startTimeFromAscendingNode	*Ignored*	*Start time of acquisition in milliseconds from Ascending node date.*	***No***	***No***	***N/A***
eop:completionTimeFromAscendingNode	*Ignored*	*Completion time of acquisition in milliseconds from Ascending node date.*	***No***	***No***	***N/A***
eop:orbitDuration	*Ignored*	*Actual orbit duration in milliseconds.*	***No***	***No***	***N/A***
eop:illuminationAzimuthAngle	0..1	Mean illumination/solar azimuth angle given in degrees.	**Yes**	**Yes**	**illuminationAzimuthAngle**
eop:illuminationZenithAngle	0..1	Mean illumination/solar zenith angle given in degrees.	**Yes**	**Yes**	**illuminationZenithAngle**
eop:illuminationElevationAngle	0..1	Mean illumination/solar elevation angle given in degrees.	**Yes**	**Yes**	**illuminationElevationAngle**
eop:incidanceAngle	*Ignored*	*Acquisition global incidence angle given in degrees.*	***No***	***No***	***N/A***
eop:acrossTrackIncidenceAngle	*Ignored*	*Acquisition across track Incidence angle given in degrees.*	***No***	***No***	***N/A***
eop:alongTrackIncidenceAngle	*Ignored*	*Acquisition along track incidence angle given in degrees.*	***No***	***No***	***N/A***
eop:instrumentAzimuthAngle	*Ignored*	*Mean instrument azimuth angle given in degrees.*	***No***	***No***	***N/A***
eop:instrumentZenithAngle	*Ignored*	*Mean instrument zenith angle given in degrees.*	***No***	***No***	***N/A***
eop:instrumentElevationAngle	*Ignored*	*Mean instrument elevation angle given in degrees.*	***No***	***No***	***N/A***
eop:pitch	*Ignored*	*Pitch angle given in degrees.*	***No***	***No***	***N/A***
eop:roll	*Ignored*	*Roll angle given in degrees.*	***No***	***No***	***N/A***
eop:yaw	*Ignored*	*Yaw angle given in degrees.*	***No***	***No***	***N/A***

3.2.1.4 eop:Footprint

The `eop:Footprint` element contains description of the target location observed during the EarthObservation.

XML element	Cardinality	Description and ngEO Notes	Landsat Tailoring	Index Attribute	Attribute Name
gml:id attribute	*Ignored*	Mandatory identifier required by GML. Its value must be unique among all the gml:id attributes of the XML file. *The same convention as before*	same as eop:identifier + counter as suffix.	**No**	**N/A**
eop:multiExtentOf	1	Acquisition footprint coordinates, described by a closed polygon (last point = first point), using CRS:WGS84, Latitude, Longitude pairs (per-WGS84 definition of point ordering, not necessarily per all WFS implementations). Expected structure is: **`gml:Polygon/gml:exterior/gml:LinearRing/gml:posList`** The Polygon geometry shall be encoded in the EPSG:4326 geographic coordinate reference system and the coordinate pairs shall be ordered as lat /lon. Polygons enclose areas with points listed in CCW direction.	**Yes** **Cardinality 1**	**Yes**	**Footprint**
eop:centerOf	*Ignored*	*Acquisition center coordinates*	***No***	***No***	***N/A***
eop:orientation	*Ignored*	*Determines the orientation of the coordinate pairs for the exterior boundary of the footprint polygons. Possible values are CW (clockwise), counter-clockwise (CCW) or OTHER (unspecified orientation).* *Note that this property is only to be provided for footprints that do not follow the normal counterclockwise for exterior boundaries convention as defined in [OGC06-103r4]*	***No***	***No***	***N/A***

3.2.1.5 opt:EarthObservationResult

The `eop:EarthObservationResult` block contains the description of the result of the EarthObservation. The `opt:EarthObservationResult` extends `eop:EarthObservationResult` for optical products.

XML element	Cardinality	Description and ngEO Notes	Landsat Tailoring	Index Attribute	Attribute Name
gml:id attribute	*Ignored*	Mandatory identifier required by GML. Its value must be unique among all the gml:id attributes of the XML file. *The same convention as before*	same as eop:identifier + counter as suffix.	**No**	**N/A**
eop:browse	*Ignored*	*Browses are processed through specific Browse Reports*	***No***	***No***	***N/A***
eop:product/eop:ProductInformation	*0..1*	*Information about the Product*	see eop:ProductInformation		
eop:mask	*Ignored*	*Information about masks*	***No***	***No***	***N/A***
eop:parameter	*Ignored*	*Parameter information about any measured parameters*	***No***	***No***	***N/A***
eop:coverage	*Ignored*	*Reference to coverage exploitation metadata as offered by a corresponding WCS using a HTTP GET encoded DescribeCoverage Request*	***No***	***No***	***N/A***
opt:cloudCoverPercentage	0..1	Cloud cover percentage (i.e. uom='%')	**Yes** **Cardinality 1**	**Yes**	**cloudCoverPercentage**
opt:cloudCoverPercentageAssessmentConfidence	*ignored*	*Cloud cover assessment confidence. Expressed in percents.*	***No***	***No***	***N/A***

XML element	Cardinality	Description and ngEO Notes	Landsat Tailoring	Index Attribute	Attribute Name
opt:cloudCoverPercentageQuotationMode	*ignored*	*Indicator to know how the cloud cover percentage has been calculated* *Values:* ***AUTOMATIC*** ***MANUAL***	***No***	***No***	***N/A***
opt:snowCoverPercentage	*0..1*	*Snow cover percentage (i.e. uom='%')*	***No***	***No***	***N/A***
opt:snowCoverPercentageAssessmentConfidence	*ignored*	*Snow cover assessment confidence. Expressed in percents.*	***No***	***No***	***N/A***
opt:snowCoverPercentageQuotationMode	*ignored*	*Indicator to know how the snow cover percentage has been calculated* *Values:* ***AUTOMATIC*** ***MANUAL***	***No***	***No***	***N/A***

3.2.1.6 eop:ProductInformation

The `eop:ProductInformation` element contains the description of the product.

XML element	Cardinality	Description and ngEO Notes	Landsat Tailoring	Index Attribute	Attribute Name
eop:filename/ ows:ServiceReference/ @xlink:href	1	The Product HTTP URI. According to Landsat dissemination implantation this URI would point to a ZIP file *ngEO requires the URL to contain a pattern allowing the identification of mission / sensor / mode / product type.*	**Yes**	**Yes**	**productURI**
referenceSystemIdentifier	*Ignored*	*Indicates if product is geo-referenced, (in which case should point to a code space for the CRS), when not supplied it is assumed that the browse is provided in "raw" satellite frame of reference*	***No***	***No***	***N/A***
eop:version	0..1	Product version Fixed value: **SLA**	**Yes** **Cardinality 1**	**No**	**productVersion**
eop:size	1	Product size (bytes) allowing the user to realise how long a download is likely to take *If product size is not known, an estimation shall be provided rounding the average estimated size to the 2 most significant digits.*	**Yes**	**Yes**	**productSize**

3.2.1.7 eop:EarthObservationMetaData

The `eop:EarthObservationMetaData` element contains all the metadata relative to an `eop:EarthObservation` that do not fit inside one of the other blocks, i.e. metadata that don't describe the time, the mechanism, the location or the result of the observation. These metadata are mainly the EO Product identifier, the acquisition type and information relative to the downlink and archiving centres.

XML element	Cardinality	Description and ngEO Notes	Landsat Tailoring	Index Attribute	Attribute Name
eop:identifier	1	Identifier for metadata item, includes ground segment namespace to guarantee uniqueness within EOP.	**Yes**	**Yes**	**productId**
eop:creationDate	*Ignored*	*metadata field for the creation / modification date of the catalogue entry*	***No***	***No***	***N/A***
eop:doi	*Ignored*	*Digital Object Identifier identifying the product*	***No***	***No***	***N/A***

XML element	Cardinality	Description and ngEO Notes	Landsat Tailoring	Index Attribute	Attribute Name
eop:parentIdentifier	0..1	Product Facility Dataset / collection Identifier *If the product is associated to various identifiers, the other identifiers have to be provided through Metadata Update Reports.*	**Yes** **Cardinality 1**	**Yes**	**parentIdentifier**
eop:acquisitionType	1	Used to distinguish at a high level the appropriateness of the acquisition for "general" use, whether the product is a nominal acquisition, special calibration product or other. Fixed Value: **NOMINAL**	**Yes**	**No**	**acquisitionType**
eop:acquisitionSubType	*0..1*	*Acquisition sub-type*	***No***	***No***	***N/A***
eop:productType	1	Describes product type in case that mixed types are available within a single collection, this is ground segment specific definition. See Table 3-1 for allowed values *It's Mandatory for ngEO for the Native Dataset configurations*	**Yes**	**Yes**	**productType**
eop:status	1	Refers to product status. Fixed Value: **ARCHIVED**	**Yes**	**No**	**status**
eop:statusDetail	*Ignored*	*Related to eop:status: provides the reason of a failure deletion or rejection*	***No***	***No***	***N/A***
eop:downlinkedTo/ eop:DownlinkInformation	*Ignored*		***No***	***No***	***N/A***
eop:archivedIn/ eop:ArchivingInformation	*Ignored*		***No***	***No***	***N/A***
eop:imageQualityDegradation	0..1	Quality degradation percentage (i.e. uom='%')	**Yes** **Cardinality 1**	**Yes**	**imageQualityDegradation**
eop:imageQualityDegradationQuotationMode	*Ignored*	*Indicator to know how the quality degradation percentage has been calculated*	***No***	***No***	***N/A***
eop:imageQualityStatus	*0..1*	*This optional field must be provided if the product passed a quality check.* *Values: NOMINAL, DEGRADED*	***No***	***No***	***N/A***
eop:imageQualityDegradationTag	*0..n*	*Keywords giving information on the degradations affecting the product. Possible values are mission specific and can be freely defined (e.g. "RADIOMETRY", "MISSING_LINES", ...). This optional field must be provided if eop:imageQualityStatus value is DEGRADED*	***No***	***No***	***N/A***
eop:imageQualityReportURL	*0..1*	*URL of an external detailed quality report*	***No***	***No***	***N/A***
eop:histograms	*Ignored*	*Histograms*	***No***	***No***	***N/A***
eop:composedOf	*Ignored*	*Link to an EO product that is part of this EO product*	***No***	***No***	***N/A***
eop:subsetOf	*Ignored*	*Link to the "father" EO product*	***No***	***No***	***N/A***
eop:linkedWith	*Ignored*	*Link to another EO product*	***No***	***No***	***N/A***
eop:processing/ eop:ProcessingInformation	*0..1*	*Processing information*	*see eop:ProcessingInformation*		
eop:productGroupId	0..1	Identifier of a particular group to which the product belongs to.	***No***	***No***	***N/A***
eop:vendorSpecific/ eop:SpecificInformation/ eop:localAttribute	*0..n*	*Additional attribute name*	*see Local Attributes*		
eop:vendorSpecific/ eop:SpecificInformation/ eop:localValue	*0..n*	*Additional attribute value* *See previous eop :localAttribute field.*	*see Local Attributes*		

3.2.1.8 eop:ProcessingInformation

The `eop:ProcessingInformation` element provides information about the processing date, methods and processing center.

XML element	Cardinality	Description and ngEO Notes	Landsat Tailoring	Index Attribute	Attribute Name
eop:processingCenter	*Ignored*	*Processing centre code.*	***No***	***No***	***N/A***
eop:processingDate	*Ignored*	*Processing date time*	***No***	***No***	***N/A***
eop:compositeType	*Ignored*	*Composite type of product, if available*	***No***	***No***	***N/A***
eop:method	*Ignored*	*Method used to compute datalayer. (e.g. Kalman filtering, ROSE)*	***No***	***No***	***N/A***
eop:methodVersion	*Ignored*	*Method version (e.g. 1.0)*	***No***	***No***	***N/A***
eop:processingMode	0..1	Processing mode. Often referred to as Real Time, Near Real Time etc. Should be a value from ProcessingModeValue. Fixed Value: **OFFLINE**	**Yes** **Cardinality 1**	**Yes**	**processingMode**
eop:processorName	*Ignored*	*Processor software name (e.g. FastROSE)*	***No***	***No***	***N/A***
eop:processorVersion	*Ignored*	*Processor software version (e.g. 1.0)*	***No***	***No***	***N/A***
eop:processingLevel	*Ignored*	*Processing level applied to the product*	***No***	***No***	***N/A***
eop:nativeProductFormat	*Ignored*	*Native product format*	***No***	***No***	***N/A***
eop:auxiliaryDataSetFileName	*Ignored*	*Auxiliary dataset file name*	***No***	***No***	***N/A***

3.2.1.9 Local Attributes

In the following table are summarized the available pairs of localAttribute / localValue elements that can be used to provide additional attributes in the product metadata for Landsat missions.

Attribute Name	Attribute Value	Cardinality	Description	Index Attribute	Attribute Name
upperLeft_Cloud_Vote	Each taking a value from 0 to 9 or "*". * - cloud vote not computed 0 - cloudiness 0% - 9% 1 - cloudiness 10% - 19% 2 - cloudiness 20% - 29% 3 - cloudiness 30% - 39% 4 - cloudiness 40% - 49% 5 - cloudiness 50% - 59% 6 - cloudiness 60% - 69% 7 - cloudiness 70% - 79% 8 - cloudiness 80% - 89% 9 - cloudiness 90% - 100%	0..1	Computed cloud for upper left corner	**Yes**	**add-upperLeftCloudVote**
upperRight_Cloud_Vote		0..1	Computed cloud for upper right corner	**Yes**	**add-upperRightCloudVote**
lowerLeft_Cloud_Vote		0..1	Computed cloud for lower left corner	**Yes**	**add-lowerLeftCloudVote**
lowerRight_Cloud_Vote		0..1	Computed cloud for lower right corner	**Yes**	**add-lowerRightCloudVote**

Table 3-2 - Local Attributes

4 TAILORING OF THE BROWSE REPORT GENERIC INTERFACE

For each product that owns a browse image, two files have to be stored by Landsat PDGS inside the harvested basket:

- ngEO Browse Report file
- Browse Image file

The Browse Report file contains metadata information needed by the Browse Server allowing it to correctly manage the corresponding browse layer (e.g. georeferencing, start / stop time of the browse images, etc.) instead the Browse Image file is the image itself. The ngEO Browse Report file formats is specified in [AD-2] and its tailoring is presented in 4.2. The Browse Image file format for Landsat missions is a simple quick look in PNG format its tailoring is presented in 4.3.

4.1 Landsat Browse Types

Mission eop:Platform/ eop:shortName	**Sat. Number** eop:Platform/ eop:serialIdentifier	**Sensor ID** eop:Instrument/ eop:shortName	**Browse Product Type** rep:browseType
Landsat	1, 2, 3, 4, 5	MSS	MSS__GTC_BP
	4, 5	TM	TM__GTC_BP
	7	ETM	ETM_GTC_BP

Table 4-1 – Landsat Browse Types

4.2 Browse Report file

4.2.1 Browse Report Generic Schema

The full schema and sub elements of the `rep:BrowseReport` is specified [AD-2]. Following the top level structure for information purpose only.

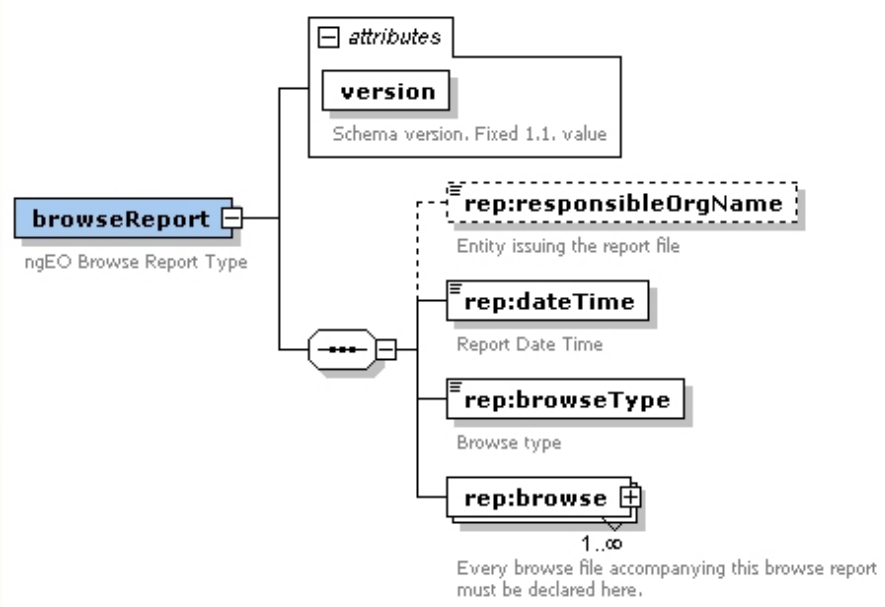

Figure 4-1: ngEO BrowseReport schema

4.2.1.1 rep:report

The `rep:report` mapping to a Browse Report is described by the following table:

XML element	Cardinality	Description and ngEO Notes	Landsat Tailoring	Notes and Sample Value
rep:version (attribute)	1	schema version, fixed to "1.1" value	Yes	1.1
rep:responsibleOrgName	0..1	Entity issuing the report file	**Yes** **Cardinality 1**	SLAP 1.00
rep:dateTime	1	It is the time when the report has been issued.	**Yes**	2011-08-17T09:30:47Z
rep:browseType	1	The name given to the type of Browse Product, as defined by the Product Facility. It serves to identify a category of browse images (analogously to how a productType identifies a category of products)	**Yes**	See Table 4-1 for allowed values
rep:browse/ rep:browseIdentifier	0..1	This is provided so that Product Facilities can update and delete previously inserted browse images. This field is optional; however, Product Facilities should note that an update functionality on existing browse is not possible	**Yes** **Cardinality 1**	TM__GTC_1P_20050130T095200_20050130T095924_MAT_100098.BP
rep:browse/ rep:fileName	1	The fully-specified filename of the Browse Image on the destination filesystem. This is used by the Feed and Browse Server to associate each Browse Report to a Browse Image, which, being binary, has to reside in a file external to the Browse Report instance document.	**Yes**	TM__GTC_1P_20050130T095200_20050130T095924_MAT_100098.BP.PNG
rep:browse/ rep:ImageType	1	A text string identifying, by its commonly approved name, the type of browse image supplied with the report, values: Jpeg, Jpeg2000, GeoTIFF, PNG, BMP Fixed value: **PNG**	**Yes**	PNG
rep:browse/ rep:referenceSystemIdentifier	1	This identifies the coordinate system / datum used for specifying the georeferencing information supplied with the Browse Image. Examples: **EPSG:4326**	Yes	Landsat uses UTM cooridnate system provide in EPSG format e.g.: EPSG:32600 until 32660 for nothern hemisphere and EPSG:32700 until 32760 for southern hemisphere
Only one of the following objects shall be supplied, providing georeferencing information for the associated browse				
rep:browse/ rep:rectifiedBrowse		the browse is based on a projected orthoimage and the corner coordinates are given (to be used together with referenceSystemIdentifier)	**Yes**	
rep:browse/ eop:Footprint		*a polygon delimiting boundary of the browse product is given*	***N/A***	
rep:browse/ rep:regularGrid		*a grid of tie-points is provided for the image, linking line / pixel to coordinates*	***N/A***	
rep:browse/ rep:verticalCurtainFootprint		*a suitable footprint object is supplied which supports the vertical nature of "curtains"*	***N/A***	
rep:browse/ rep:modelInGeotiff		*this is simply a Boolean flag that says that the georeferencing information is contained in the GeoTIFF file*	***N/A***	
rep:browse/ rep:startTime	1	The start time of the browse image as the time of the first observation composing the image, or (to put another way) the time of the first observation in the along-orbit direction.	**Yes**	2014-08-22T11:02:47.000
rep:browse/ rep:endTime	1	The end time of the browse image	**Yes**	2014-08-22T11:02:47.999

Table 4-2: rep:report schema tailoring for Landsat

4.2.2 File Naming Convention

According to [AD-2] any file naming convention can be used as long as the filename is unique for any given report file and that the file name contains a date/time allowing to sort them. Its file name can be either referenced inside the index file or built at runtime starting from the rules defined in the harvesting configuration file. An example of a Browse Report file for a browse named **TM__GTC_1P_20050130T095200_20050130T095924_MAT_100098.BP.PNG** could be:

- **TM__GTC_1P_20050130T095200_20050130T095924_MAT_100098.BP.XML**

4.3 Browse Image file

4.3.1 Format

The Browse Image file format is a simple quick lock in PNG.

4.3.2 File Naming Convention

According to [AD-2] any file naming convention can be used and it is either referenced inside the index file or built at runtime starting from the rules defined in the harvesting configuration file.

5 HARVESTING SERVICE TAILORING

5.1 The harvested directory structure

In general way, harvested baskets can be a single directory or can host a complex structure with a large number of sub-directories. The harvesting process is optimised when a given index file contains only metadata of the same mission / sensor mode / product type. This corresponds to a unique ngEO native datasets. Note that the satellite number is irrelevant and similar products from different satellite numbers end up in the same native dataset and that for Landsat has been set an arbitrary sensor mode (IM). It is therefore recommended to organise the index files in a structure as follow:

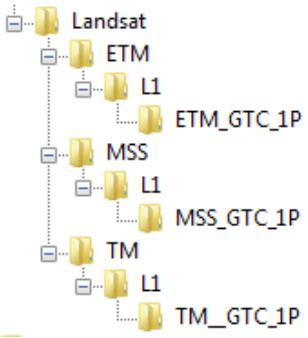

Figure 2- Landsat harvesting basket structure

The only constraints is that index files have to be stored only inside the structure leaves. All the other files (real products, browse images and their browse metadata) can be virtually placed anywhere (e.g. `http://anothersite/...`) as long as they remain accessible by the Harvesting process. According to Landsat requirements (see [AD-3]) on Dissemination System, the access protocol shall be only HTTP/HTTPS, so the specific harvesting configuration will be done in this way.
Note: a dedicated trusted interface will be set-up in order to allow ngEO Harvesting Service to contact Landsat dissemination servers directly bypassing the SSO check point.

5.2 Index file tailoring

5.2.1 File name

An index file is always named according to the following patterns:

`YYYYmmdd-HHMMSS_YYYYmmdd-HHMMSS_YYYYmmdd-HHMMSS.index`

Start period **End period** **Creation date**

Where `YYYYmmdd-HHMMSS` corresponds to a « condensed » time-stamp with the date and time parts separated by the '-' character. E.g.: 20120501-000000_20120531-235959_20120602-120342.index means: "*index file created on June 2nd 2012 at 12:03:42 and covering the whole month of May 2012"*

5.2.2 File structure

The structure of the index file defined in [AD-1] is very simple: a plain text file with an header record declaring the names of all fields composing the subsequent metadata records and one or more rows corresponding each one to a single product metadata. Fields defined in the records are in the same order of the corresponding field names in the header record. Field names are mapped to the ngEO metadata product model as defined in 3.2.1. For the specific Landsat tailoring the index file, as well as the ngEO Metadata model, provides additional custom attributes.
The following four custom attributes have been added:

- add-upperLeftCloudVote
- add-upperRightCloudVote
- add-lowerLeftCloudVote
- add-lowerRightCloudVote

These custom attributes have to be added to the harvesting configuration but this is not sufficient to have them automatically ingested by ngEO: these additional attribute must be previously configured in the corresponding ngEO native datasets. If metadata record contains browse references (i.e. the location of browse image and metadata files with relevant `browseImageLocation` and `browseMetadataLocation` fields), the two browse files are retrieved by the harvesting process and managed as defined in [AD-1].

5.3 Harvesting configuration

The complete list of attributes of the index file for Landsat is provided inside the harvesting configuration file. Within this file are also configured both fixed value attributes as well as custom and run-time computed ones. Following a preliminary configuration model for the Landsat harvested basket. Note that the configuration model is just a sample and its final format is still in a design phase so major changes could occur in the next future and some.

```
<model>
  <!-- Constants definition -->
  <generalConstant name="productUrlRoot">http://root-path-to-landsat-products/</generalConstant>
  <generalConstant name="browseUrlRoot">http://root-path-to-landsat-browses/</generalConstant>

  <!-- Dataset identification -->
  <attribute id="platformShortName">
    <defaultValue>Landsat</defaultValue>
  </attribute>
  <attribute id="instrumentShortName">
    <indexFieldName>INSTRUMENT_SHORT_NAME</indexFieldName>
  </attribute>
  <attribute id="operationalMode">
    <defaultValue>IM</defaultValue>
  </attribute>
  <attribute id="productType">
    <indexFieldName>PRODUCT_TYPE</indexFieldName>
  </attribute>

  <!-- Product identification -->
  <attribute id="productId">
    <indexFieldName>PRODUCT_ID</indexFieldName>
  </attribute>
  <attribute id="parentIdentifier">
    <indexFieldName>PARENT_IDENTIFIER</indexFieldName>
  </attribute>

  <!-- Product date-times -->
  <attribute id="beginAcquisition">
    <indexFieldName>BEGIN_DATE</indexFieldName>
  </attribute>
  <attribute id="endAcquisition">
    <indexFieldName>END_DATE</indexFieldName>
  </attribute>
  <attribute id="availabilityTime">
    <indexFieldName>AVAILABILITY_TIME</indexFieldName>
  </attribute>

  <!-- Information on product image -->
  <attribute id="productURI">
    <formula>concat($productUrlRoot,field(PRODUCT_ID))</formula>
  </attribute>
  <attribute id="productVersion">
    defaultValue>SLA</defaultValue>
  </attribute>
  <attribute id="productSize">
    <indexFieldName>PRODUCT_SIZE</indexFieldName>
  </attribute>

  <!-- Other product metadata -->
  <attribute id="sensorType">
    <defaultValue>OPTICAL</defaultValue>
  </attribute>
  <attribute id="processingMode">
    <defaultValue>NOMINAL</defaultValue>
  </attribute>
  <attribute id="acquisitionType">
    <defaultValue>NOMINAL</defaultValue>
  </attribute>
```

```
    <attribute id="acquisitionSubType">
      <indexFieldName>ACQUISITION_SUB_TYPE</indexFieldName>
    </attribute>
    <attribute id="status">
      <defaultValue>ARCHIVED</defaultValue>
    </attribute>
    <attribute id="imageQualityDegradation">
      <indexFieldName>IMAGE_QUALITY_DEGRADETION</indexFieldName>
    </attribute>
    <attribute id="imageQualityStatus">
      <indexFieldName>IMAGE_QUALITY_STATUS</indexFieldName>
    </attribute>
    <attribute id="imageQualityDegradationTag">
      <indexFieldName>IMAGE_QUALITY_DEGRADATION_TAG</indexFieldName>
    </attribute>
    <attribute id="imageQualityReportURL">
      <indexFieldName>IMAGE_QUALITY_REPORT_URL</indexFieldName>
    </attribute>
    <attribute id="platformSerialIdentifier">
      <indexFieldName>PLATFORM_SERIAL_IDENTIFIER</indexFieldName>
    </attribute>
    <attribute id="orbitNumber">
      <indexFieldName>ORBIT_NUMBER</indexFieldName>
    </attribute>
    <attribute id="orbitDirection">
      <defaultValue>DESCENDING</defaultValue>
    </attribute>
    <attribute id="wrsLongitudeGrid">
      <indexFieldName>WRS_LONGITUDE_GRID</indexFieldName>
    </attribute>
    <attribute id="wrsLatitudeGrid">
      <indexFieldName>WRS_LATITUED_GRID</indexFieldName>
    </attribute>
    <attribute id="illuminationAzimuthAngle">
      <indexFieldName>ILLUMINATION_AZIMUTH_ANGLE</indexFieldName>
    </attribute>
    <attribute id="illuminationZenithAngle">
      <indexFieldName>ILLUMINATION_ZENITH_ANGLE</indexFieldName>
    </attribute>
    <attribute id="illuminationElevationAngle">
      <indexFieldName>ILLUMINATION_ELEVATION_ANGLE</indexFieldName>
    </attribute>

    <!-- metadata for OPTICAL products -->
    <attribute id="cloudCoverPercentage">
      <indexFieldName>CLOUD_COVER_PERCENTAGE</indexFieldName>
    </attribute>

    <!-- Additional product medata -->
    <attribute id="add-upperLeftCloudVote">
      <indexFieldName>UPPER_LEFT_CLOUD_VOTE</indexFieldName>
    </attribute>
    <attribute id="add-upperRightCloudVote">
      <indexFieldName>UPPER_RIGHT_CLOUD_VOTE</indexFieldName>
    </attribute>
    <attribute id="add-lowerLeftCloudVote">
      <indexFieldName>LOWER_LEFT_CLOUD_VOTE</indexFieldName>
    </attribute>
    <attribute id="add-lowerRightCloudVote">
      <indexFieldName>LOWER_RIGHT_CLOUD_VOTE</indexFieldName>
    </attribute>

    <!-- Browse metadata -->
    <attribute id="browseImageLocation">
      <indexFieldName>BROWSE_IMAGE_LOCATION</indexFieldName>
    </attribute>
    <attribute id="browseMetadataLocation">
      <indexFieldName>BROWSE_METADATA_LOCATION</indexFieldName>
    </attribute>
  </model>
```