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Title

Interface Control Document
Reference System S3 Object Storage

	Name and Function	**Date**	**Signature**
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Document type	**Nb WBS**	**Keywords**
ICD		

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SUMMARY

This document describes the Reference System interface to store/access product data on external AWS S3 object storage.

Document controlled by *author name*

DOCUMENT CHANGE LOG

Issue/ Revision	Date	Modification Nb	Modified pages	Observations
01 Draft A	14/09/2022			First version
01 Draft B	15/09/2022		§3.3.2	Take into account WERUM remarks

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1 INTRODUCTION

This document describes the Reference System interface to store/access product data on external AWS S3 object storage. It presents the object storage structure and describes the format of the checksum file necessary for the integrity checks.

1.1 GLOSSARY AND ABBREVIATIONS

Term	Meaning
ESA	European Spatial Agency
RS	Reference System.
AWS S3	Amazon Simple Storage Service (S3) from Amazon Web Services catalogue.
OBS	OBject Storage.
RS Add-on	A RS add-on is an autonomous package ready for deployment on cloud on top of RS platform. It provides a Sentinel processing chain.
RS Core	A RS core is a specific RS add-on. It has the same format. It is deployed in the same way. It is part of the RS platform as a core service.
MD5	message-digest algorithm used as a checksum to verify data integrity.

2 APPLICABLE AND REFERENCE DOCUMENTS

N/A

2.1 APPLICABLE DOCUMENTS

N/A

2.2 REFERENCE DOCUMENTS

Identifier	Document name	Reference	Version
[RD-1]	Sentinel-1 Product Unit Definition and Metadata ICD	ESA-EOPG-EOPGC-SP-1	1.3
[RD-2]	Sentinel-2 Product Unit Definition and Metadata ICD	ESA-EOPG-EOPGC-SP-2	1.3
[RD-3]	Sentinel-3 Product Unit Definition and Metadata ICD	ESA-EOPG-EOPGC-SP-3	1.3

3 OBJECT STORAGE INTERFACE

3.1 REFERENCE SYSTEM CONTEXT

The Copernicus Reference System executes Sentinel 1, Sentinel 2 and Sentinel 3 image processing workflows using SDP provided by ESA.

Because of the cloud, microservice and event driven architecture of RS, the data has to be stored inside a cloud object storage waiting for the next processing in RS Core or RS Add-on.

On RS, the cloud object storage is based on AWS S3 service.

3.2 OBJECT STORAGE STRUCTURE

On S3 object storage, the data is distributed inside buckets depending on the product type. The structure of the object storage is the following:

Tree Level	Element	Type	description
0	+BucketName	Bucket	Dedicated bucket with following pattern rs-(<mission>-)<type><extension> where: <mission> (optional) : "s1" | "s2" | "s3" Each time it is possible, the mission shall be set. <type> : "aux" | "aux-zip" | "l0"| "l0-zip"| "l1"| "l1-zip" | "l2"| "l2-zip"| ""| ""| "" <extension> :"c" | ""
1	++ProductName	Directory	Product stored in the cloud object storage
1	++ProductName.md5sum	File	checksum file associated to a product

<u>Note:</u> The content of the *ProductName* directory is described in Sentinel 1, Sentinel 2 and Sentinel 3 Product Unit Definition and Metadata ICD ([RD-1], [RD-2] & [RD-3]).

3.3 CHECKSUM FILE

Each product stored in the S3 database is associated with a checksum file in order to allow integrity checks after downloading.

3.3.1 CHECKSUM FILE STORAGE PATH

The key of the checksum file entry is the product storage path suffixed by the extension '.md5sum'.

For example:

Kind	Key
Product	s3://rs-s3-l0/S3B_TM_0_NAT____20220913T030945_20220913T045213_20220913T052512_6148_070_232_____LN1_D_AL_002.SEN3/
Checksum	s3://rs-s3-l0/S3B_TM_0_NAT____20220913T030945_20220913T045213_20220913T052512_6148_070_232_____LN1_D_AL_002.SEN3.md5sum

3.3.2 CHECKSUM FILE CONTENT

The checksum file shall comply with the following format, considering that each line correspond to 1 file of the corresponding product:

```
md5Hash eTag fileName1
md5Hash eTag fileName2
md5Hash eTag fileName3

...
```

Where:

key	Format	Mandatory	description
md5Hash	String	YES	Hash of file calculated with MD5 algorithm based on the java security package as described in https://docs.oracle.com/javase/8/docs/api/java/security/MessageDigest.html
eTag	String	YES	S3 entity tag identifying the object, as described in https://docs.aws.amazon.com/AmazonS3/latest/API/API_Object.html (ETag)
fileName	String	YES	Fully qualified file path starting from the bucket.

Note: The *eTag* is often identical to the *md5Hash*.

Ref.   : CORPS-ICD-ADST-001406842
Issue : 1.0 Draft A
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Example:

- Below a L0 slice product on OBS S3:

```
s3://rs-s1-l0/S1A_WV_RAW__0SSV_20220912T040340_20220912T041228_044966_055F2C_
5B62.SAFE/manifest.safe
s3://rs-s1-l0/S1A_WV_RAW__0SSV_20220912T040340_20220912T041228_044966_055F2C_
5B62.SAFE/s1a-wv-raw-s-vv-20220912t040340-20220912t041228-044966-055f2c-annot
.dat
s3://rs-s1-l0/S1A_WV_RAW__0SSV_20220912T040340_20220912T041228_044966_055F2C_
5B62.SAFE/s1a-wv-raw-s-vv-20220912t040340-20220912t041228-044966-055f2c-index
.dat
s3://rs-s1-l0/S1A_WV_RAW__0SSV_20220912T040340_20220912T041228_044966_055F2C_
5B62.SAFE/s1a-wv-raw-s-vv-20220912t040340-20220912t041228-044966-055f2c.dat
s3://rs-s1-l0/S1A_WV_RAW__0SSV_20220912T040340_20220912T041228_044966_055F2C_
5B62.SAFE/support/s1-level-0-annot.xsd
s3://rs-s1-l0/S1A_WV_RAW__0SSV_20220912T040340_20220912T041228_044966_055F2C_
5B62.SAFE/support/s1-level-0-index.xsd
s3://rs-s1-l0/S1A_WV_RAW__0SSV_20220912T040340_20220912T041228_044966_055F2C_
5B62.SAFE/support/s1-level-0.xsd
```

- And the related checksum:

```
5cf8b633b7c8281b7e87e5d526847f98 5cf8b633b7c8281b7e87e5d526847f98
S1A_WV_RAW__0SSV_20220912T040340_20220912T041228_044966_055F2C_5B62.SAFE/supp
ort/s1-level-0-annot.xsd
26566427f1c515bd037dc866d6ffb9f9 26566427f1c515bd037dc866d6ffb9f9
S1A_WV_RAW__0SSV_20220912T040340_20220912T041228_044966_055F2C_5B62.SAFE/supp
ort/s1-level-0.xsd
ac62acdd5ce7dc934adeb6aa8cfea784 ac62acdd5ce7dc934adeb6aa8cfea784
S1A_WV_RAW__0SSV_20220912T040340_20220912T041228_044966_055F2C_5B62.SAFE/supp
ort/s1-level-0-index.xsd
ef26acbe15579d6cbee70f49ae349bbb f3bcdc68fb11f65edaaee18dadb49004-25
S1A_WV_RAW__0SSV_20220912T040340_20220912T041228_044966_055F2C_5B62.SAFE/s1a-
wv-raw-s-vv-20220912t040340-20220912t041228-044966-055f2c.dat
7aad54a57cd5f79f22ebd0ae8dc7978a 7aad54a57cd5f79f22ebd0ae8dc7978a
S1A_WV_RAW__0SSV_20220912T040340_20220912T041228_044966_055F2C_5B62.SAFE/mani
fest.safe
22224ed3c6d9c22381deb5385db6194a 22224ed3c6d9c22381deb5385db6194a
S1A_WV_RAW__0SSV_20220912T040340_20220912T041228_044966_055F2C_5B62.SAFE/s1a-
wv-raw-s-vv-20220912t040340-20220912t041228-044966-055f2c-annot.dat
1a2f4f8b3be4d4853051d4ef97f6961e 1a2f4f8b3be4d4853051d4ef97f6961e
S1A_WV_RAW__0SSV_20220912T040340_20220912T041228_044966_055F2C_5B62.SAFE/s1a-
wv-raw-s-vv-20220912t040340-20220912t041228-044966-055f2c-index.dat
```

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