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NASA Sentinel Gateway (NSG) Functional and Performance Requirements Specification

ESDIS NSG Functional and Performance Requirements Specification Signature/Approval Page

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Preface

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Abstract

This document provides the functional and performance requirements for the NASA Sentinel Gateway.

Keywords: Sentinel, ESA, EOSDIS, NSG, Functional and Performance Requirements, DAACs, US Government Agencies

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1 INTRODUCTION

1.1 Purpose

The purpose of this document is to capture the functional and performance requirements for the NSG.

1.2 Mission Description

The Copernicus Programme is a joint effort between the European Commission (EC) and the European Space Agency (ESA) to provide Earth observation satellite data to improve the management of the environment, understand and mitigate the effects of climate change and ensure civil security. The primary element of the Copernicus Programme is a family of satellite platforms called the Sentinels. Copernicus is openly and freely sharing the Sentinel data, and NASA's goal is to establish a rolling repository for the Sentinel data to ease the distribution load for Copernicus.

The role of the NASA Sentinel Gateway is limited to ingesting Sentinel products from the ESA data site (e.g public science hub and international data hub) and storing and making the Sentinel data available to the Distributed Active Archive Centers (DAACs) and other US Government Agencies.

Our proposed approach to achieve this goal is to provide a rolling repository of the Sentinel data at the NSG. This document describes the functional and performance requirements.

1.3 Related Documentation

The latest versions of all documents below should be used. The latest ESDIS Project documents can be obtained from URL: <https://ops1-cm.ems.eosdis.nasa.gov>. ESDIS documents have a document number starting with either 423 or 505. Other documents are available for reference in the ESDIS project library website at: http://esdisfmp01.gsfc.nasa.gov/esdis_lib/default.php unless indicated otherwise.

1.3.1 Applicable Documents

The following documents are referenced within, or are directly applicable, or contain policies or other directive matters that are binding upon the content of this document.

COPE-GSOP-EOPG-IC-15-0009	ESA-NASA Technical Operating Arrangements
423-ICD-0002- AA	Interface Control Document (ICD) between EOS Networks and the EOSDIS Subsystems, Appendix AA, NASA Sentinel Gateway

1.3.2 Reference Documents

The following documents are not binding on the content but referenced herein and, amplify or clarify the information presented in this document.

423-OPS-003	NSG Prototype Phase-I Ingest, Archive, and Distribution Systems Operations Concept
423-RQMT-007	NASA Sentinel Gateway Prototype Requirements
423-41-57	ICD between the EOSDIS Core System (ECS) and the Science Investigator-led Processing Systems (SIPS) Volume 0 Interface Mechanisms

2 REQUIREMENTS

2.1 Ingest Requirements

- 2.1.1 The NSG shall interface with the ESA data hub as specified in the ESA-NASA Technical Operating Arrangements.
- 2.1.2 The NSG shall acquire and ingest Sentinel Level-1 and Level-2 data products, as designated by ESDIS, from the ESA data hub.
- 2.1.3 The NSG shall acquire and ingest data products for Sentinel 1A, Sentinel 1B, Sentinel 3A, Sentinel 3B, and Sentinel 5P.
- 2.1.4 The NSG shall provide the capability to submit requests for data products to the ESA data hub.
- 2.1.5 The NSG shall provide the capability to submit requests for retransmission of data products from the ESA data hub.
- 2.1.6 The NSG shall provide the capability to reconcile missing data and data integrity issues with the ESA data hub.
- 2.1.7 The NSG shall provide the capability to ingest reprocessed Sentinel data products from the ESA data hub.
- 2.1.8 The NSG shall be capable of ingesting the Sentinel products within a month of availability from the ESA data hub to ensure that the data products required by the NSG are ingested prior to being rolled off from the ESA data hub.
- 2.1.9 The NSG shall be capable of sustaining a combined ingest data volume of 6.77 TB/day from all Sentinel missions.

2.2 Functional Requirements

- 2.2.1 The NSG shall be capable of verifying the integrity of the products downloaded from the ESA data hub.
- 2.2.2 The NSG shall be capable of providing integrity checks to the DAACs and other US government agencies.
- 2.2.3 The NSG shall be capable of receiving and processing data product notifications (e.g. Product Acceptance Notifications (PAN) or Product Delivery Record Discrepancy (PDRD) used in the Polling with Delivery Records (PDR) mechanism) from the DAACs and other US government agencies.
- 2.2.4 The NSG shall be capable of reconciling data issues (e.g. missing data, data integrity, data anomalies, etc.) from the DAACs and other US government agencies.
- 2.2.5 The NSG shall provide the capability to extract and store metadata, used for keeping an inventory of the data ingested and distributed, from the Sentinel data files ingested by the NSG.

2.3 Distribution Requirements

- 2.3.1 The NSG shall interface with the DAACs using the PDR mechanism.
- 2.3.2 The NSG shall interface with other US government agencies using the PDR mechanism.
- 2.3.3 The NSG shall be capable of making Sentinel data products available, as designated by ESDIS, to the DAACs and other US government agencies.
- 2.3.4 The NSG shall provide file transfer protocols for the DAACs and other US government agencies to pull data products from the NSG rolling repository.
- 2.3.5 The NSG shall be capable of sustaining distribution rates as specified in the Sentinel appendices of the Interface Control Document Between the EOS Networks and the EOSDIS Subsystems (reference 423-ICD-0002_AA).
- 2.3.6 The NSG shall be capable of staging the Sentinel data products for distribution to the DAACs and US Government agencies within 15 minutes after the products are ingested by the NSG.
- 2.3.7 The NSG shall be capable of providing a maximum 60-day rolling repository to temporarily store the Sentinel data products for the DAACs and the US government agencies to retrieve.
- 2.3.8 The NSG shall be capable of distributing 5.5 times (4x distribution plus 1.5x contingency) the nominal daily ingest data volume per day.

2.4 Operational and User Support/Services Requirements

- 2.4.1 The NSG shall inform users of any planned downtime and gaps in the Sentinel data.
- 2.4.2 The NSG shall provide the capability to monitor the health and status of the NSG system.
- 2.4.3 The NSG shall be capable of supporting operations 24 hours per day, 7 days per week on a continuous basis with 8 hours per day, five days per week operator attendance.

2.5 Configuration Control Requirements

- 2.5.1 The NSG shall maintain configuration control of hardware and software.

2.6 Security

2.6.1 The NSG shall comply with the NASA security requirements that are consistent with the NPR 2810.1, Security of Information Technology.

2.7 Metrics

2.7.1 The NSG shall maintain the operations metrics related to Sentinel data ingest and distribution statistics.

APPENDIX A ABBREVIATIONS AND ACRONYMS

CMO	Configuration Management Office
DCN	Document Change Notice
DAAC	Distributed Active Archive Center
EC	European Commission
ECS	EOSDIS Core System
EED	EOSDIS Evolution Development
EOS	Earth Observing System
EOSDIS	Earth Observing System Data and Information System
ESA	European Space Agency
ESDIS	Earth Science Data Information System
GSFC	Goddard Space Flight Center
ICD	Interface Control Document
NASA	National Aeronautics and Space Agency
NPR	NASA Procedural Requirements
NSG	NASA Sentinel Gateway
PDR	Polling with Delivery Record
SIPS	Science Investigator-led Processing Systems
TB	TeraByte
TBD	To Be Determined
URL	Uniform Resource Locator