IN14B-03: A Unified Level of Service Model for NASA Earth Science Data Stewardship

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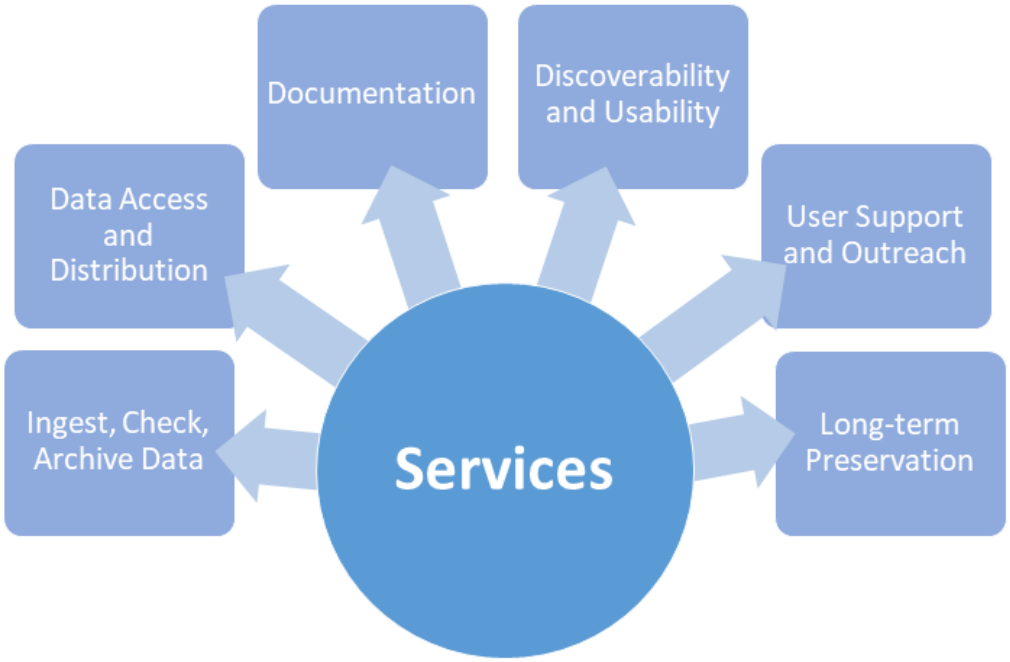
PRESENTED AT:

WHAT IS LEVEL OF SERVICE?

Data archived at NASA Distributed Active Archive Centers (DAACs) are provided long-term, quality data stewardship that includes more than just data ingest and storage.

However, each data product can not, and likely should not have all the same services applied. The goal is typically to apply the appropriate amount of services in order to optimize the data usability and access while balancing the resources and time/effort required.



The term Level of Service refers to the quantity and types of services applied to data during archival and preservation. Services include the activities related to data ingest, storage, documentation, distribution, ensuring usability and discovery, user support, outreach, and preservation.

The process of determining what services to provide a data product has historically been carried out independently at each of the NASA DAACs. Therefore, data producers interacting with different data centers often do not get the same services for similar data products. This can lead to confusion and frustration.

This Level of Service model has been designed to bring consistency to service determinations for data across all NASA DAACs and to improve communication of the DAAC roles and responsibilities, making it easier for data producers and data users to know what to expect with respect to data stewardship.

HOW TO ASSIGN DATA A SERVICE LEVEL

The primary goals of this Level of Service model are to:

- Provide a framework for clearly communicating information about data stewardship at NASA DAACs.
- Use consistent terminology so that data producers interacting with multiple DAACs can understand the process no matter which data center they interact with.
- Present clear definitions and service level descriptions so that all data producers and users can understand how services are assigned and have realistic expectations of DAAC effort.
- List DAAC common data stewardship requirements by service level. DAAC-specific services are not included in the model and need to be specified separately.
- Improve enterprise-wide transparency, efficiency and cost-effectiveness of the data stewardship process.

		Data Product Category					
		Science Mission Product	NASA- Funded Data Products	Facility Created Product	NASA Research Community Product	NASA Applied Science Product	non-NASA Research Community Product
Data Processing Level	Raw Data (L0)	basic	n/a	n/a	n/a	n/a	n/a
	Calibrated Data (L1A/L1B)	standard	basic	n/a	basic	n/a	n/a
	Swath Data (L2)	comprehensive	standard	standard	standard	standard	standard
	Gridded Data (L3/L4)	comprehensive	comprehensive	comprehensive	comprehensive	standard	standard
	Auxiliary/ Ancillary Data	standard	basic	basic	basic	basic	basic
	NRT Data	comprehensive	n/a	comprehensive	standard	standard	n/a

To utilize the Level of Service model, one needs to know two common data characteristics: the NASA data processing level and the data product category. The NASA data processing level identifies the nature of the data, from raw instrument data (Level 0) to gridded variable data products (Level 3) to model output (Level 4). A description of NASA data processing levels (https://science.nasa.gov/earth-science/earth-science-data/data-processing-levels-for-eosdis-data-products) is freely available online.

The NASA data product category descriptions are related to the funding mechanisms behind the data production. There are six categories

- Science Mission Products
- NASA-funded Data Products
- Facility Created Products
- NASA Research Community Products
- NASA Applied Science Products
- Non-NASA Research Community Products

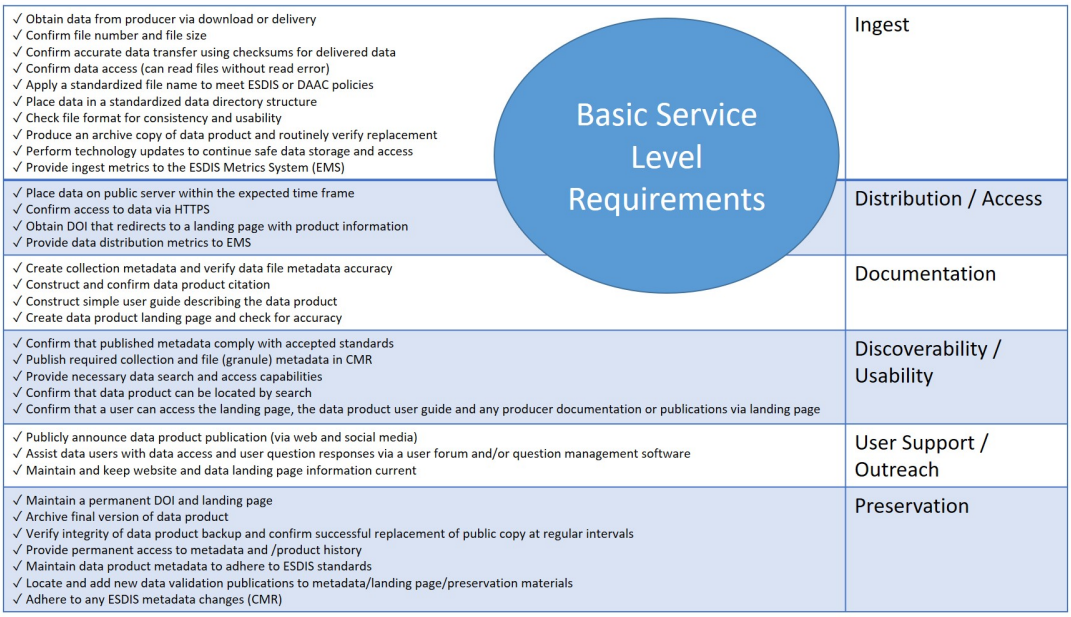
The table identifies which of three service levels apply to data of a given processing level and data category. The terms are basic, standard, and comprehensive. Currently these terms are in use at NSDC DAAC for their Level of Service model.

SERVICE CATEGORIES / REQUIREMENTS

The intent of this Unified Level of Service model is to specify for DAACs the service requirements as opposed to suggesting how those requirements are to be met. This leaves room for DAAC personnel to decide what is the best way for them to meet the requirements.

While many of the service categories list below deal with data publication (or the act of accepting, archiving, and making data publicly available), not all service categories involve this type of work.

Documentation, Discoverability and Usability, User Support and Outreach include services that continue beyond the time of data publication and focus on the DAAC work that may not necessarily be associated with any one data product. The requirements listed by category below only apply to upcoming/future datasets at this time. How to handle already published and supported data has not yet been determined.



The basic level services are listed above. The basic level requirements are designed to provide for a minimal level of data stewardship that makes the data findable and accessible. The additional requirements for standard and comprehensive services build on this set of baseline requirements, bringing greater quality data care and support.

THE IMPORTANCE OF COMMUNICATION

The Level of Service model description document contains example statements for how a DAAC can communicate the levels of service to data producers and data users. DAACs can then individually choose how to display the information, but by using the examples, the information content will match that of the model.

A good example of how to effectively communicate level of service to data producers and data users is currently in use at the National Snow and Ice Data Center (NSIDC) DAAC. This example clearly and succinctly outlines the Level-of-Service model in use at NSIDC DAAC with visual cues and simplified, non-jargon text. The lists shown below match the NSIDC service model in use. (see references for more information).

Use of this type of material helps data producers and data users develop reasonable service expectations for data in terms they can understand.

BASIC SERVICE

Includes all **Basic** services:

DATA

- File sizes, checksums, and number of files have been verified.
- File names are descriptive and consistent.
- File format and structure are appropriate for expected data use.
- Key metadata—geospatial, temporal, and science variable information—are provided and well-defined.
- Data can be accessed via all supported methods.
- Data are backed up and versioned.

DOCUMENTATION

- Data discovery and usage metadata are available.
- Links are provided to supporting documentation describing data content and methodologies.
- Data set landing page and data citation, including Digital Object Identifier (DOI), are available.

USER SUPPORT

- Assistance with data access.
- Assistance with basic data usage questions and referral to external documentation or data provider for more complex questions.

STANDARD SERVICE

Includes all **Basic** services **plus**:

DATA

- Data usability has been verified in select data analysis tools.

DOCUMENTATION

- User guide is provided with the following content: detailed descriptions of science variables, geospatial and temporal information, and data quality.

USER SUPPORT

- Assistance with data usage questions.
- Guidance on use of data in select data analysis tools.

COMPREHENSIVE SERVICE

Includes all **Standard** services **plus**:

DATA

- Data customization services—subsetting, reformatting, and/or reprojection—are available for select data.

DOCUMENTATION

- Comprehensive user guide is provided with the following content: detailed descriptions of science variables, geospatial and temporal information, data quality, and data methodologies.

USER SUPPORT

- Assistance with complex data usage and methodologies questions.
- Guidance on use of data customization services for select data.

The unified Level of Service model description document provides the content for this type of approach in the form of several lists that matches the requirements of the Unified Level of Service model.

CV

Deborah Smith leads the Airborne Data Mangement Group within IMPACT (Interagency Implementation and Concepts Team) located at the University of Alabama in Huntisville NSSTC offices. She works to improve airborne data access and discovery, usability and value.

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The following document was important to the request for development of this Level of Service model:

SE-TIM Session: Dataset Level of Service: What is it? Where do we want to go with it?, by Amanda Leon and Eric Tauer, August 29, 2018

ABSTRACT

During the past year, the Interagency Implementation and Concepts Team (IMPACT) reviewed existing service models in use at various NASA data centers in an effort to produce a unified, cohesive, and comprehensive Level of Service Model for all of NASA Distributed Active Archive Centers (DAACs). NASA DAACs are responsible for ensuring NASA Earth Science data are accurately and securely ingested, distributed, supported, and preserved. The term “Service" as used here refers to the spectrum of data management activities and outputs provided by DAACs in support of the data cared fo by each data cente. The unified Level-of-Service (LoS) model described in this presentation utilizes both the NASA-defined data product category and the data processing level to easily identify an appropriate level-of-service to be applied to a data product throughout the full data life cycle. This LoS model is to be used by DAACs when appraising incoming data in order to determine the appropriate and required services to provide. The LoS model utilizes a 3-level system in which services build upon previous levels and thereby require greater commitment and effort both on the part of the DAAC personnel and the data producer at the highest level. The LoS model description also contains examples of ways to communicate with data producers and data users what services can be expected, thereby bringing more consistent user experiences across the enterprise. In this presentation, we will outline the features of the LoS model and describe how it relates to the FAIR data practices and the NOAA Maturity Matrix model.

REFERENCES

Achieving Scaleable Data Management Through a Dataset Level of Service Model, Amanda Leon et al., AGU Fall Meeting 2018, IN41F-0895

SE-TIM Session: Dataset Level of Service: What is it? Where do we want to go with it?, by Amanda Leon and Eric Tauer, August 29, 2018

SWITCH TEMPLATE