1 Status of this Memo

This memo provides information to the NASA Earth Science Data Systems (ESDS) community. This memo does not specify an ESDS standard of any kind. Distribution of this memo is unlimited.

2 Change Explanation

This RFC does not update or change a previous RFC.

3 Copyright Notice

4 Abstract

This document defines the Service Entry Resource Format (SERF) content metadata, a collection of attributes for describing services related to global change and Earth science data. From its conception in the late 1990's as a way to document and exchange information on data services to its implementation in the Global Change Master Directory (GCMD), The SERF has evolved to serve the user community in the discovery, access and use of Earth science tools, applications, educational resources, and models.

5 Table of Contents

6 Introduction

As an additional service for the Earth sciences community, Global Change Master Directory (GCMD) also offers descriptive information about commercial and non-commercial data services that could assist its user community in analyzing, processing, and evaluating Earth science data sets. The Service Entry Resource Format (SERF) is used to create directory entries that describe a group of data services and applications. The directory contains several fields, allowing users to find tools, applications, educational resources, and models useful to their needs. The GCMD is an implementation of the SERF.

7 Our work

The GCMD database holds more than 20,000 descriptions of Earth science data sets and services covering all aspects of Earth and environmental sciences. The SERF component consists of approximately 2,000 descriptions. One can use the full-text search box or select from the available keywords to search for services.
The GCMD offers authoring tools to write, validate, submit, and update metadata records. The web-based docBuilder tool allows metadata authors to add or modify service descriptions (SERFs). In addition, subscription services are available to notify users of new entries.

What is a SERF?

SERF is the acronym for Service Entry Resource Format, a de-facto standard used to create directory entries that describe a group of services. A SERF consists of a collection of fields that detail specific information about the service. Seven fields are required in the SERF; the others expand upon and clarify the information. Some of the fields are free-text; others require the use of valid values.

The SERF provides users the ability to discover services to manipulate data. The SERF contains those fields that are necessary for users to decide whether a particular service would be useful for their needs. Using a specific set of fields also helps to "normalize" the search for data services through the use of several alternative search engines.

History of the SERF

In 1998, a proposal was submitted to the Earth Science Technology Office (ESTO) for cataloging Earth science services and for aiding researchers in finding tools that they may use with and their data products. Many data products available to researchers also have related data services, yet there was no easy way of locating these software, tools and services. This prototype would provide a system to catalog and allow users to locate Earth science services. This included providing a service metadata format, metadata authoring tools, and a web-based

interface for cataloging, searching and retrieving Earth science services. The GCMD already had a similar infrastructure in place to deal with data products. The existing data description format was modified to create a Services Entry Resource Format (SERF) metadata format.

The GCMD proposed a list of service categories and topic keywords that was based on a number of Earth science service-related keywords obtained from other groups. These were made available for comments and feedback to a number of potential user groups such as the EOSDIS User Services Working Group (USWG), Earth Science Information Partnership (ESIP) Federation, and the Committee on Earth Observation Satellites (CEOS) organizations. Service related catalog tools were created based on the existing data tools. This allowed the current data products system to be used as a springboard to implement a new service related system. The prototype system and a SERF document creator were made public in 2000.

Fields of the SERF

The SERF Guide document, also referred to as the "Writer's Guide," provides information about each field of the SERF, including its syntax, specifications, recommendations, and examples. Several example SERFs are also provided. Information here is meant to be illustrative of the content of the Writer's Guide, which is the sole specification document. The SERF fields included in the Writer's Guide are cited below and are designated as **required**, **highly recommended**, or **recommended**.

These fields are required:

Entry Identifier

The **<Entry_ID>** is the unique identifier of the metadata record. The **<Entry_ID>** is determined by the metadata author and may be identical to identifiers used by the service provider's organization. For example, the National Snow and Ice Data Center (NSIDC) DAAC identifies their metadata records as *NSIDC-xxxx*, where *xxxx* is a numerical designator. Also, the identifier is case insensitive meaning nsidc-xxxx and NSIDC-xxx refer to the same metadata record.

Entry Title

The **<Entry_Title>** is the title of the service described by the metadata.

<Entry_Title> should be descriptive enough so that when a user is presented with a list of titles the general content of the service can be determined. For example, *<Entry_Title>Data Mining</Entry_Title>* would **not** be an adequate service title as it does not provide enough descriptive information to guide the user.

In order to make titles descriptive, important elements about the service may be included in the **<Entry_Title>**, i.e., type of service, investigator, project. For example, *<Entry_Title> Algorithm Development and Mining System (ADaM)</Entry_Title>* provides an adequate amount of information to guide the user.

Parameters (Service Keywords)

The **<Service_Parameters>** field allow for the specification of Earth science services keywords that are representative of the services, tools, and/or resources being described. These keywords are important for the precise search and retrieval of information from the GCMD. The author must select these keywords from the controlled set of services keywords. The **<Service_Parameters>** field consists of a 4-level hierarchical classification of services keywords, defined as follows:

- **<Service_Category>** is the highest keyword category. The default is *"EARTH SCIENCE SERVICES"*.
- **<Service_Topic>** is the next highest level in the keyword hierarchy under <Category>.
  There are 8 Topics:
  Data Analysis and Visualization
  Data Management/Data Handling
  Education/Outreach
  Environmental Advisories
  Hazards Management
  Metadata Handling
  Models
  Reference and Information Services
- **<Service_Term>** is next level in the hierarchy under **<Service_Topic>**. There can be several controlled **<Service_Term>** keywords for each **<Service_Topic>**.
- **<Service_Specific_Name>** is the next level in the hierarchy under **<Service_Term>.** There can be several controlled **<Service_Specific_Name>** keywords for each **<Service_Term>**.

Parameters (Science Keywords)

The **<Parameters>** field allows for the specification of Earth science keywords that are representative of the service being described. These keywords are important for the precise search and retrieval of information from the GCMD. The author must select these keywords from the controlled set of science keywords. The <**Parameters>** field consists of a 7-level hierarchical classification of science keywords, defined as follows:

- **<Category>** is the highest keyword category. The default is "*EARTH SCIENCE*".
- **<Topic>** is the next highest level in the keyword hierarchy under **<Category>**.
  There are 14 Topics:
  Agriculture
  Atmosphere
  Biosphere
  Biological Classification
  Climate Indicators
  Cryosphere
  Human Dimensions
  Land Surface
  Oceans
  Paleoclimate
  Solid Earth
  Spectral/Engineering

Sun-Earth Interactions
Terrestrial Hydrosphere

- **<Term>** is next level in the hierarchy under **<Topic>**. There can be several controlled **<Term>** keywords for each **<Topic>**. For example, <Topic>Atmosphere</Topic> <Term>Aerosols </Term>.
- **<Variable_Level_1>** is the next level in the hierarchy under **<Term>**. There can be several controlled **<Variable_Level_1>** keywords for each **<Term>**. For example, <Topic>Atmosphere</Topic> <Term>Aerosols </Term> <Variable_Level_1>Aerosol Optical Depth</Variable_Level_1>.
- **<Variable_Level_2>** is the next level in the hierarchy under **<Variable_Level_1>**. There can be several controlled **<Variable_Level_2>** keywords for each **<Variable_Level_1>**. For example, <Topic>Biological Classification</Topic> <Term>Animals/Invertebrates</Term> <Variable_Level_1>Arthropods </Variable_Level_1> <Variable_Level_2>Crustaceans</Variable_Level_2>.
- **<Variable_Level_3>** is the next level in the hierarchy under **<Variable_Level_2**>. There can be several controlled **<Variable_Level_3>** keywords for each **<Variable_Level_2>**. For example, <Topic>Biological Classification</Topic> <Term> Animals/Invertebrates </Term> <Variable_Level_1>Arthropods</Variable_Level_1> <Variable_Level_2>Crustaceans</Variable_Level_2> <Variable_Level_3>Decapods </Variable_Level_3>
- **<Detailed_Variable>** is an uncontrolled free text field that allows the metadata author to specify any keywords to more exactly describe the measurement represented by the data. For example, <Topic>Biological Classification</Topic> <Term> Animals/Invertebrates </Term> <Variable_Level_1>Arthropods</Variable_Level_1> <Variable_Level_2>Crustaceans</Variable_Level_2> <Variable_Level_3>Decapods </Variable_Levele_3> <Detailed_Variable>Lobsters </Detailed_Variable>

ISO Topic Category

The **<ISO_Topic_Category>** field is used to identify the keywords in the ISO 19115 - Geographic Information Metadata (http://www.isotc211.org/) Topic Category Code List. It is a high-level geographic data thematic classification to assist in the grouping and search of available geographic data sets. The **<ISO_TOPIC_Category>** keywords are as follows:

- Farming
- Biota
- Boundaries
- Climatology/Meteorology/Atmosphere
- Economy
- Elevation
- Environment
- Geoscientific Information
- Health
- Imagery/Base Maps/Earth Cover
- Intelligence/Military
- Inland Waters

- Location
- Oceans
- Planning Cadastre
- Society
- Structure
- Transportation
- Utilities/Communications

For definitions of these keywords, see:
http://gcmd.nasa.gov/User/difguide/iso_topics.html

Service Provider

The **<Service_Provider>** is the service provider, organization, or institution responsible for distributing the service.

- **<Service_Organization>** consist of the service provider **<Short_Name>** and **<Long_Name>,** which is the name of the service provider that distributes the service.
- **<Service_Organization_URL>** is the URL of the service provider.
- **<Personnel>** Contact information for the service including name, email, phone, FAX, and address

Summary

The **<Summary>** is a brief description of the service that allows potential users to determine if the service is useful for their needs. The following are suggestions to populate the **<Summary>** field:

- Capitalization should follow standard constructs. For readability, all capital letters or all lower case letters should not be used. Use the appropriate case where applicable.
- Acronyms should be expanded to provide understanding.
- The **<Summary>** may contain tabular information.
- URLs will be automatically hyperlinked.
- Where applicable, the **<Summary>** should include brief statements of the following information:
    - Service organization (description of how services/software are organized within and by file).
    - Read software (if available).
    - Methodology or analytical tools.
    - Other pertinent information

Metadata Name

This ISO 19115 **<Metadata_Name>** field is used to identify the current SERF standard name. This field is automatically populated when using the GCMD metadata authoring tools.

Metadata Version

This **<Metadata_Version>** field is used to identify the current SERF metadata standard version. This field is automatically populated when using the GCMD metadata authoring tool.

These fields are highly recommended:

Service Citation

The **<Service_Citation>** field allows the author to properly cite the service producer. This field has 2 functions:

1. To indicate how this service should be cited in the professional scientific literature, and
2. If this service is a compilation of other services, to document and credit the services that were used in producing this compilation.

This field is not to be used to list bibliographic references of scientific research articles arising from the service. This field provides a citation for the service itself, not articles related to the research results. To list references related to the research results, use the **<Reference>** field. **<Service_Citation>** consists of:

- **<Originators>** The name of the organization(s) or individual(s) with primary intellectual responsibility for the service's development.
- **<Title>** The Title of the service; this may be the same as Entry Title.
- **<Release_Date>** The date when the service was made available for release.
- **<Provider>** The name of the individual or organization that made the service available for release.
- **<Edition>** The Edition or version of the service. For example, <Edition>Version 1.2</Edition>
- **<URL** The URL of the online resource containing the service.

Personnel

<Personnel> defines the point of contact for more information about the service or the metadata.

- The contact personnel are defined by the **<Role>,** which include:
  Technical Contact: The person who is knowledgeable about the technical content of the service.
  SERF Author: The person who is responsible for the content of the SERF. If the responsibility shifts from the original author to another person, the SERF Author field should be updated to the new responsible person.
  Service Provider Contact: The person who is responsible for the distribution of the service. This **<Role>** is only used within the **<Service_Provider>** field.
- **<First_Name>, <Middle_Name>** and **<Last_Name>** are the first, middle and last name of the person or organization defined in the **<Personnel>** field. Initials may be used for the **<First_Name>** and **<Middle_Name>**. Organizational names may be substituted for personal names.
- **<Email>** is the email address of the personal or organization. Note: Authors may use "@" in formatting email addresses, however the "@" symbol will not be displayed to the public to avoid potential spam attacks.
- **<Phone>** is the telephone number of the person or organization. Telephone extensions are allowed. If not in the U.S. or Canada, use the two-digit country code followed by the phone number. Otherwise, use the 10-digit phone number including area code. For example: **<Phone>***+44 5555 555555***</Phone>** or **<Phone>***301-555-5555***</Phone>**

- **<FAX>** is the FAX number of the person or organization. The same rules for **<Phone>** apply to FAX numbers.
- **<Contact Address>** contain the address information of the person or organization. It consists of:

  <Address> is the organization name, department, mail stop, street address, etc. of the person organization.
  <City> is the city or town of the person or organization.
  <Province or State> is the province (particularly Canadian provinces) region or state (particularly in the United States).
  <Postal Code> is the postal code of the person or organization.
  <Country> is the country of the person or organization.

Instrument (Sensor Name)

The Instrument or **<Sensor_Name>** is the name of the instrument used to acquire the data related to the service There are 3 categories of instruments, with additional levels of hierarchical classifications (see the Writer's Guide for Ancillary Descriptions):

- Earth Remote Sensing Instruments
- In Situ/Laboratory Instruments
- Solar/Space Observing Instruments.

When using the GCMD metadata authoring tools, **<Sensor_Name>** classifications are automatically populated by selecting the **<Short_Name>.** This field allows for the specification of keywords that are the names of the instrument(s) used to collect or measure the data. These keywords are important for the search and retrieval of information from the GCMD. The field **<Sensor_Name>** consists of the short name and the long name of the instrument. There is a 1:1 correspondence between the short name and the long name:

- **<Short_Name>** is the abbreviated name of the instrument used to acquire the data.
- **<Long_Name>** is the full name of the instrument used to acquire the data.

Platform (Source Name)

The Platform or **<Source_Name>** is the name of the platform used to acquire the data related to the service. There are 11 categories of platforms, with additional levels of hierarchical classifications (see the Writer's Guide for Ancillary Descriptions):

- Aircraft
- Balloons/Rockets
- Earth Observation Satellites
- In Situ Land-based Platforms
- In Situ Ocean-based Platforms
- Interplanetary Spacecraft
- Maps/Charts/Photographs
- Models
- Navigation Platforms
- Solar/Space Observation Platforms
- Space Stations/Manned Spacecraft

When using the GCMD metadata authoring tools, **<Source_Name>** classifications are automatically populated by selecting the **<Short_Name>.** This field allows for the specification of keywords that are representative of the platform(s) or source used to collect the data. These keywords are important for the search and retrieval of information from the GCMD. The field **<Source_Name>** consists of the short name and the long name of the platform (source). There is a 1:1 correspondence between the short name and the long name:

- **<Short_Name>** is the abbreviated name of the platform (source) used to acquire the data.
- **<Long_Name>** is the full name of the platform (source) used to acquire the data.

Project

The **<Project>** is the name of the scientific program, field campaign, or project from which the service is related.

This field allows for the specification of keywords that are the names of the projects. These keywords are important for the search and retrieval of information from the GCMD. The field **<Project>** consists of the short name and the long name of the project. There is a 1:1 correspondence between the short name and the long name:

- **<Short_Name>** is the abbreviated name of the project from which the data were collected.
- **<Long_Name>** is the full name of the project from which the data were collected.

Quality

The **<Quality>** field allows the author to provide information about the quality of the service or any quality assurance procedures followed in producing the service described in the metadata. Suggestions for information to include in the **<Quality>** field:

- Description should be succinct.
- Include indicators of service quality or quality flags, validated or unvalidated.
- Include recognized or potential problems with quality (e.g., successful or unsuccessful usage by the research community).
- Established quality control mechanisms should be included.
- Established quantitative quality measurements should be included.

Access Constraints

The **<Access_Constraints>** field allows the author to provide information about any constraints for accessing the service. This includes any special restrictions, legal prerequisites, limitations and/or warnings on obtaining the service. Some words that may be used in this field include: Public, In-house, Limited. Additional detailed instructions on how to access the service can be entered in this field.

Use Constraints

The **<Use_Constraints>** field allows the author to describe how the service may or may not be used after access is granted to assure the protection of privacy or intellectual property. This includes any special restrictions, legal prerequisites, terms and conditions, and/or limitations on using the service. Service providers may request acknowledgement of the service from users and claim no responsibility for quality and completeness of the service.

Distribution

The **<Distribution>** field describes media options, size, format, and fees involved in distributing the service.

- **<Distribution_Media>** The media options for the user receiving the service.
- **<Distribution_Size>** An approximate size (in KB, MB or GB) for the entire service or software. Specify if the service is compressed and the method of compression.
- **<Distribution_Format>** The format used to distribute the service.
- **<Fees>** Cost of **<Distribution_Media>** or distribution costs if any. Specify if there are no costs.

Related URL

The **<Related_URL>** field specifies links to Internet sites that contain information related to the service as well as related Internet sites such as project home pages, related data archives/servers, metadata extensions, direct links to online software packages, and web mapping services. The **<Related_URL>** field consists of:

- **<URL_Content_Type>** describes the type of resource being referenced by the URL. The <**URL_Content_Type>** is selected from a list of controlled URL content type keywords and consists of:
  - **<Type>** describes the type resources being referenced by the URL.
- **<Subtype>** describes the subtype of the resource being referenced by the URL.
- **<URL>** is the URL to the resource associated with the data set.
- **<Description>** provides information about the resource defined by the **<URL>**.

Service Language

<Service_Language> describes the language used in the preparation, storage, and description of the service. It is the language of the information object, not the language used to describe or interact with the metadata record. **<Service_Language>** does not refer to the language of the metadata. For example, <Service_Language>Spanish</Service_Language>

SERF Revision History

The **<SERF_Revision_History>** allows the author to provide a list of changes made to the SERF over time. This provides a mechanism for tracking revisions to SERF content.

These fields are optional, but recommended.

Keyword (Ancillary Keyword)

The **<Keyword>** field allows authors to provide any words or phrases needed to further describe the service.

Multimedia Sample

The **<Multimedia_Sample>** field allows the author to provide information that will enable the display of a sample image, movie or sound clip within the SERF.

- **<File>** describes the filename where the multimedia sample can be found. If the multimedia sample file resides on the GCMD server, the filename should be specified in this field. If the file is to be transferred to the GCMD, arrangements should be made with GCMD staff. (Note: this is not typical).
- **<URL>** is the URL to be accessed
- **<Format>** is the format of the multimedia sample file (which may differ from the format of the data files), i.e. GIF, TIFF, JPEG.
- **<Caption>** is a one-line description of the multimedia sample used as a caption when the sample is displayed. The caption is especially useful for images such as graphs and photos.
- **<Description>** A more detailed description of the multimedia sample.

Reference (Publications/References)

The <**Reference>** field describes key bibliographic citations pertaining to the service. Bibliographic citations may be provided in styles used by professional scientific journals such as APA or MLA.

Parent SERF

The **<Parent_SERF>** field allows the capability to relate generalized aggregated metadata records (parents) to metadata records with highly specific information (children). Population of the **<Parent_SERF>** field should be reserved for instances where many metadata records are basically subsets that can be better represented by one parent metadata record, which describes the entire collection. Typically, the parent metadata record will have many children metadata records, which refer to the parent through the **<Parent_SERF>** field. In some instances, a child may point to more than one parent. The **<Parent_SERF>** is populated with an **<Entry_ID>.**

The **<Parent_SERF>** is only populated if there are children metadata records that refer to a parent metadata record. Upon display of results, both parent and children metadata are available with explicit linkages between parent and child records through the **<Parent_SERF>** field.

IDN Node

The Internal Directory Name (IDN) Node **<IDN_Node>** field is used internally to identify association, responsibility and/or ownership of the service. Note: The **<IDN_Node>** field is not displayed to the user. The author may populate **<IDN_Node>** from a set of controlled keywords.

SERF Creation Date

The **<SERF_Creation_Date>** specifies the date the metadata record was created. The **<SERF_Creation_Date>** is automatically populated through the authoring tool with the date the metadata entry was created; however, the author may change the date.

Future SERF Review Date

The **<Future_SERF_Revision_Date>** allows for the specification of a future service at which the SERF should be reviewed for accuracy of scientific or technical content. Future metadata changes may be due to:

- Anticipated changes in the personnel fields.
- Planned changes to the service content (e.g., change in processing algorithm).
- Expected inclusion of the service as part of a campaign.
- Planned review of metadata and/or data by the service provider.

7.1 Additional Work

Service Keywords

The GCMD permits the normalization of the search for SERFs through 8 sets of controlled keywords, counting Platforms and Instruments. Service keywords evolve as new metadata records are added and existing records are modified to meet the changing needs of the Earth science community.

The following rules have been used in determining TERMs (i.e. **<Service_Term>** level keywords**)** for the GCMD Service Keywords. These rules are used in GCMD's procedures for modifying TOPICs (i.e. **<Service_Topic>** level keywords), TERMs, and SERVICE SPECIFIC NAME (i.e. **<Service_Specific_Name>** level keywords) to assist the user in locating Earth science service sets of interest. These VALIDs are expected to remain fairly stable over time, although suggestions for additions and/or changes will always be considered.

1. The service advertised in the GCMD must be specific and directly related to the processing, viewing, analysis, archival, retrieval, production, interpretation, acquisition, formatting, or indexing of Earth science data. Services will not be considered if the service was not specifically created for Earth science applications. The GCMD staff will be responsible for determining the appropriateness for inclusion and for the quality control of the entries by working with service providers.

2. A four level hierarchy of Services keywords will be maintained positioned as CATEGORY/TOPIC/TERM/SERVICE SPECIFIC NAME.

3. All keywords at the four levels of hierarchy should be parallel and 'mutually exclusive'. The GCMD keyword authorities will determine if modifications or additions are appropriate. All modifications or additions must strictly adhere to the rules contained herein.

4. Services should be classified by their primary purposes. Existing service keywords at the TOPIC/TERM/ SERVICE SPECIFIC NAME level will be used to associate the services that apply to the SERF. The summary can be used for further clarification. Providers may not submit more than one entry (SERF) for any one service.

5. Existing science keywords at the TOPIC/TERM/VARIABLE level will be used to associate the service with a science TOPIC/TERM/VARIABLE.

7.2 Collaborations (i.e. Who's Using the SERF)

NASA Collaborations

- **NASA Data Centers**
  The GCMD works with several NASA Data Centers who offer Earth science tools, visualization applications, and models to the science community. These tools are documented and made available in the GCMD. The NASA GSFC Services portal provides access to these services.

- **NASA Earth Observing System Data Information System (EOSDIS)**
  The GCMD provides service descriptions for all of NASA's EOSDIS publically available services and related tools. Users can link directly to the services held at the Distributed Data Archive Centers (DAACs) from the services descriptions. EOSDIS partners are required to document their services within the GCMD.

- **Federation of Earth Science Information Partners (ESIP)**
  The GCMD collaborates with several Federation of Earth Science Information Partners (ESIP's). ESIP partners are required to document their services with the GCMD. The GCMD has provided a customized ESIP services portal to search for services. The GCMD is also searchable from the ESIP Federation Interactive Network for Discovery (FIND).

International Collaborations

- **Committee on Earth Observation Satellites International Directory Network (CEOS IDN)**
  The CEOS IDN is an international effort to assist researchers in locating information on available data sets and data services. The GCMD shares information with other CEOS IDN nodes throughout the world and also provides software, search interfaces and metadata writing tools.

- **International Polar Year (IPY)**
  With the beginning of the International Polar Year (2007/2008) in March 2007, the GCMD is participating in a worldwide effort in the data, services and information management of IPY. The directory's Expression of Intent (EoI) for an IPY Metadata and Information Portal Network for the Data and Information Service (DIS) is in development. The GCMD EoI along with other related EoIs were brought together under the IPY DIS for Distributed Data Management full proposal submitted to NSF in April 2006. The JCADM/AMD and ARCTIC portal contributions are expected to play a key role in IPY. In 2006, a prototype IPY services portal was established.

- **Global Earth Observation System of Systems (GEOSS)**
  The Global Earth Observation System of Systems (GEOSS) is an international effort to monitor the Earth for societal benefits and sustainable development. GCMD has developed web portals that will potentially increase the use of Earth observation data and services. GCMD continues to coordinate with the global community of international (e.g. CEOS International Directory Network), intergovernmental, and regional organizations providing solutions for the 10-year GEOSS Implementation Plan. A GEOSS Services portal has been created to allow the community to document these GEOSS community tool and services.

- **Open Geospatial Consortium (OGC)**
  The GCMD showcases interoperable and standardized software and applications through the Open Geospatial Consortium (OGC) services portal. This portal will allow the broadest community possible to search and use services that promote geospatial interoperability and easy exchange of information.

Portal Collaborations

GCMD has recognized the importance of customization for partner organizations and is generating subset views of the GCMD directory through portals. Portals have made it easier for organizations to maintain and document their data and services in one place without duplicating the effort to create another online directory.

Many organizations acknowledge the importance of metadata related to their area of interest but do not have the resources required to manage the content. One possible solution to this dilemma is to host the metadata through the GCMD and create a portal to view the virtual subset of the metadata (SERFs). Portals help provide science, or application-specific focus for other agencies, science focus groups, consortia, etc. Portals may be trademarked with the logo of an organization while possessing the full functionality of the GCMD search engine and tools.

Using a portal to search a virtual subset is advantageous in that as metadata (SERFs) are added to the subset, it is also freely available from the GCMD general search pages for scientists in other disciplines to access and use.

Usage statistics are also regularly tracked and available. Over one hundred portals are already in use. Please see GCMD Portals. Some portals in the GCMD are not publicly accessible, only for internal use by specific organizations or user groups, upon request. Currently free-text and/or a keyword interface are offered.

7.3 Service Homepage & SERF DocBUILDER Tool

Figure 1. GCMD Service Homepage

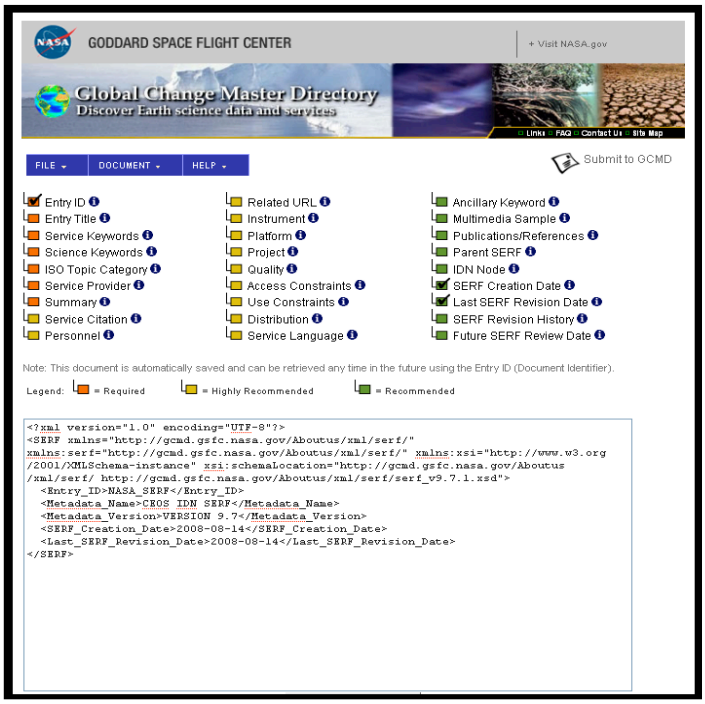

Figure 2. SERF DocBUILDER

8 References

Normative References

1. Service Entry Resource Format (SERF) Writer's Guide, 2008. Global Change Master Directory. National Aeronautics and Space Administration. [http://gcmd.nasa.gov/User/serfguide/].
2. Olsen, L.M., G. Major, K. Shein, J. Scialdone, R. Vogel, S. Leicester, H. Weir, S. Ritz, T. Stevens, M. Meaux, C.Solomon, R. Bilodeau, M. Holland, T. Northcutt, R. A. Restrepo, 2007. NASA/Global Change Master Directory (GCMD) Earth Science Keywords. Version 6.0.0.0.0

Informative References

1. GCMD Services Main Web Page: http://gcmd.nasa.gov/KeywordSearch/Home.do?Portal=GCMD_Services&MetadataType=1
2. GCMD Services docBUILDER: http://gcmd.nasa.gov/DocumentBuilder/Home.do?Portal=GCMD&MetadataType=1
3. GCMD Portal Index: http://gcmd.nasa.gov/Data/portal_index.html

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10 Appendix A

Glossary of acronyms

Acronym	Description
AMD	Antarctic Master Directory
APA	American Psychological Association
CEOS	Committee on Earth Observation Satellites
DAACs	Distributed Data Archive Centers, NASA
DIS	Data and Information Service, IPY
EoI	Expression of Intent
EOSDIS	Earth Observing System Data and Information System
ESTO	Earth Science Technology Office
ESDS	Earth Science Data Systems
ESIP	Federation of Earth Science Information Partners
FIND	Federation Interactive Network for Discovery, ESIP
GCMD	Global Change Master Directory
GEOSS	Global Earth Observation System of Systems
GSFC	Goddard Space Flight Center
IDN	International Directory Network, CEOS
IPY	International Polar Year
ISO	International Organization for Standardization
JCADM	Joint Committee on Antarctic Data Management
MLA	Modern Language Association of America
NASA	National Aeronautics and Space Administration
NSF	National Science Foundation
NSIDC	National Snow and Ice Data Center
OGC	Open Geospatial Consortium
SERF	Service Entry Resource Format

USWG User Services Working Group