Software Requirements Summary: National Geothermal Data System

based on Software Requirements Specification Version 2.7, dated 11/05/2012

Version History

|  |  |  |  |
| --- | --- | --- | --- |
| **Version** | **Author** | **Date** | **Reason** |
|  | Stephen Richard | 2014-01-30 | Cull use cases and requirement to create draft summary document. Highlight statements of requirement or use case in red if not achieved, green if achieved to some degree, yellow if not evaluated or there are other issues. |
|  |  |  |  |
|  |  |  |  |

Executive Summary

This document is based on v2.7 of NGDS software requirements as delivered by Siemens, dated 11/05/2012. Most of the explanatory and cover material is removed to reduce the document to a list of use cases and requirements for quick reference and review of progress on meeting requirements as of January 2014

**Purpose of NGDS**

In the following we list the five basic needs that need to be realized by NGDS:

1. NGDS shall enable data collectors to create and administrate a repository for geothermal data.
2. NGDS shall enable end users/data consumers to search geothermal data across a multitude of repositories
3. NGDS shall enable end users/data consumers to evaluate discovered data
4. NGDS shall enable end users/data consumers to acquire (i.e. download) selected data
5. NGDS shall enable the end users/data consumers to analyze selected data

Table Of Contents

[1 Introduction 6](#_Toc378852679)

[1.1 Vision & Goal 6](#_Toc378852680)

[1.2 Notation in this document 6](#_Toc378852681)

[1.3 User Communities and Roles 6](#_Toc378852682)

[1.3.1 Data Provider Community 7](#_Toc378852683)

[1.3.2 Data Consumer Community 8](#_Toc378852684)

[1.3.3 System Administrators 8](#_Toc378852685)

[1.3.4 Software Developer Community 8](#_Toc378852686)

[2 Overall system quality attributes 9](#_Toc378855122)

[2.1 Maintenance 9](#_Toc378855123)

[2.2 Usability & Accessibility 9](#_Toc378855126)

[2.3 Performance and Scalability 10](#_Toc378855127)

[2.4 Security 10](#_Toc378855128)

[2.5 Supportability 11](#_Toc378855130)

[2.6 Data Requirements 11](#_Toc378855132)

[2.7 Design Constraints 11](#_Toc378855133)

[2.8 Licensing Requirements 12](#_Toc378855135)

[2.9 Applicable Standards 12](#_Toc378855136)

[3 Node-in-a-box Software Package 12](#_Toc378855137)

[4 End-User/Data Consumer Software 14](#_Toc378855138)

[4.1 NGDS WebSite 14](#_Toc378855139)

[4.2 NGDS WebApp 14](#_Toc378855140)

[5 NGDS Data Access Protocols 14](#_Toc378855141)

[6 Use Case Models 15](#_Toc378855142)

[6.1 High-level Use Cases View 15](#_Toc378855143)

[6.2 Data Provider Use Cases 16](#_Toc378855144)

[6.2.1 Data Submitter 16](#_Toc378855145)

[6.2.1.1.1 Upload new files 16](#_Toc378855146)

[6.2.1.1.2 Update uploaded file 17](#_Toc378855147)

[6.2.1.2.1 Process data file in NGDS content model template 18](#_Toc378855148)

[6.2.1.3.1 Create metadata record through a form 19](#_Toc378855149)

[6.2.1.3.2 Bulk upload metadata from metadata content template table 20](#_Toc378855150)

[6.2.1.3.3 Browse and manage resource directory and collections 21](#_Toc378855151)

[6.2.1.3.4 Bulk update metadata records 22](#_Toc378855152)

[6.2.2 Data Steward 22](#_Toc378855153)

[6.2.2.1.1 View resource submission and update logs 22](#_Toc378855154)

[6.2.2.2.1 View catalog audit log?? 24](#_Toc378855155)

[6.2.2.2.2 View quality assurance reports 24](#_Toc378855156)

[6.2.2.2.3 Flag resource quality issue 25](#_Toc378855157)

[6.2.2.2.4 Browse flagged data catalog entries 25](#_Toc378855158)

[6.2.2.2.5 Perform manual error correction 26](#_Toc378855159)

[6.2.2.2.6 Clear quality flag 26](#_Toc378855160)

[6.2.2.2.7 Catalog cleanup 27](#_Toc378855161)

[6.2.2.2.8 Notify data submitter of data or metadata problem 28](#_Toc378855162)

[6.2.2.3.4 Make resource public 28](#_Toc378855163)

[6.2.3 Node Administrator 29](#_Toc378855164)

[6.2.3.1.1 Administer users 29](#_Toc378855165)

[6.2.3.1.2 Enrollment 30](#_Toc378855166)

[6.2.3.1.3 Add users 31](#_Toc378855167)

[6.2.3.1.4 Delete users 31](#_Toc378855168)

[6.2.3.1.5 Administer user roles 32](#_Toc378855169)

[6.2.3.1.6 Backup 32](#_Toc378855170)

[6.2.3.1.7 Restore 33](#_Toc378855171)

[6.2.3.2.4 Register node 33](#_Toc378855172)

[3.2.3.3.1 e-mail (NGDS or node-in-a-box) administrator 34](#_Toc378855173)

[6.2.3.3.4 Upgrade node-in-the-box application 34](#_Toc378855174)

[6.3 Software Developer Use Cases 35](#_Toc378855175)

[6.3.1 Develop Applications 35](#_Toc378855176)

[6.3.1.1.1 Develop apps using NGDS standard protocols (needs reformulating) 35](#_Toc378855177)

[6.3.2 Register New Application with NGDS 36](#_Toc378855178)

[6.3.2.1.1 Contact NGDS admin to provide link to application 36](#_Toc378855179)

[6.4 End-User Use Cases 37](#_Toc378855180)

[6.4.1 Discover and Gather Data 39](#_Toc378855181)

[6.4.1.1.1 Map-based search 39](#_Toc378855182)

[6.4.1.1.2 Landmark-based search 40](#_Toc378855183)

[6.4.1.1.3 Coordinate-based search 40](#_Toc378855184)

[6.4.1.2.1 Keyword content-based search 41](#_Toc378855185)

[6.4.1.3.1 Filter results by type 41](#_Toc378855186)

[6.4.1.3.2 Filter results by metadata attributes 42](#_Toc378855187)

[6.4.1.3.3 Filter results [geographically] on map 42](#_Toc378855188)

[6.4.2 Validate and Evaluate Data 43](#_Toc378855189)

[6.4.2.1.1 Browse/view metadata search results 43](#_Toc378855190)

[6.4.2.2.1 View metadata record 44](#_Toc378855191)

[6.4.2.2.2 Provide peer ratings 44](#_Toc378855192)

[6.4.2.3.1 Triangulate with other sources 45](#_Toc378855193)

[6.4.2.4.1 View data content 46](#_Toc378855194)

[6.4.2.4.2 Save selected search criteria 47](#_Toc378855195)

[6.4.2.4.3 Load previous search criteria 47](#_Toc378855196)

[6.4.2.4.4 e-mail metadata record URI to third party users 48](#_Toc378855197)

[6.4.2.4.5 Subscribe to new data 48](#_Toc378855198)

[6.4.3 Analyze and Visualize Data 49](#_Toc378855199)

[6.4.3.1.1 Export metadata 50](#_Toc378855200)

[6.5 System Administrator Use Cases 51](#_Toc378855201)

[6.5.1.1.1 Register new nodes into NGDS 51](#_Toc378855202)

[6.5.1.1.2 Delete nodes from NGDS network 52](#_Toc378855203)

[6.5.1.1.3 Communicate with the Node-in-a-box admin 52](#_Toc378855204)

[6.5.1.1.4 Manage NGDS user accounts 53](#_Toc378855205)

[6.6 Use cases common to all users 53](#_Toc378855206)

[6.6.1.1.1 Login 53](#_Toc378855207)

[6.6.1.1.2 Logout 54](#_Toc378855208)

[7 Acronyms, and Abbreviations 54](#_Toc378855209)

# Introduction

This Software Requirements Specification (SRS) collects, organizes and describes requirements for the NGDS software system captured through use-case models, and from natural language requirements statements from a sample of system users. These include functional requirements, non-functional requirements (NFR), design constraints, and other factors needed to provide a comprehensive picture of the software’s operation.

## Vision & Goal

The ultimate goal of the National Geothermal Data System (NGDS) is to support the discovery of geothermal sources of energy. The NGDS will provide online access to important geothermal-related data from a network of data providers in order to:

1. Increase the efficiency of exploration, development and usage of geothermal energy by providing a basis for financial risk analysis of potential sites
2. Assist state and federal agencies in making land and resource management assessments
3. Foster the discovery of new geothermal resources by supporting ongoing and future geothermal-related research
4. Increase public awareness of geothermal energy

## Notation in this document

[Comments from SMR 2014-01-30 are in brackets]

Red highlight -- not done or not working

Green highlight -- working to some degree

Yellow highlight -- other considerations, or SMR can't evaluate

## User Communities and Roles

User groups include the three main target groups defined in the System Vision document, and Administrators who are responsible for maintenance of the searchable catalog and entry-point web-application, as well coordinating management of system-wide standards and protocols. User groups or roles and their relationships are illustrated in Figure 2.

In Figure 2 we also outline the three main target user communities – Data Provider, Software Developer, and End User. These communities are discussed in general terms, with more detailed descriptions of their respective use cases outlined in the next section.



Figure 2 Main user roles and their relationships

The National Geothermal Data System will be a network consisting of four linked communities:

* **Data providers** who will expose information to the system through standardized, internet-accessible interfaces and interchange formats
* **Data consumers** who will utilize the software and information provided by the system in order to understand and develop geothermal resources.
* **Administrators** who are responsible for administrating and monitoring the system. Typical tasks are installation and configuration, user management, node monitoring, or system backup.
* **Software developers** who will build applications that utilize the data in the system, and make it easier for end-users to interact with the system.

### Data Provider Community

Data providers represent the collection of users who will work together to publicize information to NGDS through standardized, internet-accessible interfaces using one of the supported interchange formats. This community of users can be further broken down into several distinct roles.

* **Data Submitter**: the user who uses the NGDS protocols and services to publish a piece of data
* **Data Steward**: the user who maintains the quality of a piece of published data
* **Data Originator:** the person that created a piece of data, e.g. a publication. The data originator is not an active actor in any of the use cases involved in the NGDS: as soon as the originator wishes to contribute to NGDS, they take on the role of Data Submitter
* **Node-in-a-Box (or simply Node) Administrator**: the user who is responsible for operating and maintaining an organization’s data repository and insures that the data is provided according to NGDS standards and protocols

#### Data Submitter Role

Data submitters will publish geothermal related data to NGDS.

#### Data Steward Role

The data steward user role will verify and maintain the quality of published data. The data steward will have write access to data under his or her responsibility.

#### Node Administrator Role

The node administrator is responsible for the administration of one of the data repositories, or nodes, in the system.

### Data Consumer Community

Data consumer will utilize the software and information provided by the system in order to understand and develop geothermal resources.

Specifically, Data Consumers will:

* Search for the entire NGDS system utilizing the federated NGDS catalog service either via the NGDS WebApp application, or potentially any other catalog search application that operates with NGDS search protocols and metadata interchange formats.
* Visualize and explore data in map, text, or other graphic presentations (as prioritized by user research findings).
* Select and acquire data via service interfaces using NGDS interchange formats
* Access files in NGDS data repositories
* Save and re-load search queries
* Set filters to be notified as new data of interest is available via the system

### System Administrators

The system administrator is responsible for the administration of system components. Node administrators are responsible for their own node (repository, WebApp and catalog), while the NGDS administrator is responsible for the whole NGDS set of nodes, and the federated catalog service. The system administrator is also responsible for coordinating review and adoption of system protocols and interchange formats and for the registration of new interchange formats and associated schema.

### Software Developer Community

Software developers may build applications that access NGDS resources using the protocols and standards outlined as part of the system architecture.

# Overall system quality attributes

In this section, we discuss overall system quality attributes that further describe the conditions on which the system will function.

## Maintenance

For those components that are designed within the project we require unit tests to be available that test at least the minimum functionality. In addition system integration tests are recommended but due to the high costs of designing a system test toolkit this might not be possible with the given time and resources.

**NFR001** All project-developed source code shall have comments at least on a per-class level.

**NFR002** The System’s architecture shall be documented. [document exists, needs maintenance]

**NFR003** The System’s configuration parameters shall be documented.

**NFR004** The System’s source code shall be covered by unit tests to at least 50% of coverage. Regression tests will be run as part of the software process. [?]

## Usability & Accessibility

**NFR005a** The System shall provide a reasonably simple to use installation tool: The tool shall install all required components (potentially with the exception for Java and/ or Python) and guide the administrator through the initial configuration steps.

**NFR005** The system shall be cloud-ready: It must be available as an archived Virtual Machine (or VM) that is ready to use after a few configuration steps. Our main target is EX2(from Amazon) and other providers that are able to boot a VM image)

**NFR006** The system shall include detailed instructions that guide the user through the process of installation of one node and joining a grid. [Document exists]

**NFR008** The project-developed graphical user interfaces shall use a uniform look-and-feel for web applications, defined by the UX team. Minor customizations will be possible by adjusting Cascading Style Sheets, for example.

**NFR009** The project-developed applications shall provide online help explaining how to perform user-related functions. [some help is available, not context sensitive, no tooltips]

**NFR010** The project-developed applications shall present the user with clear, understandable and accurate information explaining each task that can be performed using the software.

**NFR011** The project-developed applications shall present the user with human understandable error messages explaining the errors that occur during user interactions. [many error messages are not helpful]

**NFR012** The key data import operations should be transactional. i.e.The user shall be able to abort operations before completion, without any negative consequences. [?]

**NFR013** The project-developed applications shall provide a status indicator showing the progress towards completion of user triggered processing, search queries, exports and downloads.

**NFR013b** The system shall comply with the section 508 Amendment to the Rehabilitation Act of 1973 section related to Web-based Intranet and Internet Information and Applications. [not tested]

**NFR013c** The system shall comply with the ISO/TS 16071, “Ergonomics of human-system interaction – Guidance on accessibility for human-computer interfaces. [not tested]

## Performance and Scalability

We assume the system will be designed to support universities and data providers within USA, with a maximum of 1000 concurrent users.

**NFR014** Each data provider node must be capable to maintain a list of at least 100 other NGDS nodes for harvest or distributed search.

**NFR015** Each data provider node shall indicate it has taken action in response to all user operations within 2 (two) seconds.

**NFR016** Each data provider node shall be capable of supporting up to 50 simultaneous authenticated, logged-in users.

**NFR017** Each data provider node shall be capable of handling at least 50 (fifty) HTTP requests every 1 (one) minute.

**NFR018** Each data provider node shall respond to every request from the NGDS in no more than 10 (ten) seconds.

**NFR019** The System shall be able to handle the import of data files up to 2GB in size.

**NFR020** The System shall be able to handle the import of up to 1000 data files in any one import operation.

**NFR021** The System shall support the storing of up to 100000 data files in the import directory of each data provider.

**NFR022** The System shall support the storing of up to 500GBs of data files in the import directory of each data provider.

## Security

**NFR024** The System shall embody a security plan and process to ensure that unauthorized users are denied access.

**NFR025** Valid login authentication is required for all data submitter, steward, and administrator functions.

**NFR026** The System shall only allow users access to write data they have permissions to write

**NFR027** The System shall only allow users access to download data files they have permissions to download

**NFR028** The System shall only allow the data steward for a resource permission to delete it.

**NFR029** The communication between end-users and the services of the system will be encrypted using HTTPS protocol.

**NFR030** Data communications between the External Systems and NGDS applications shall be secured by message authentication where applicable/necessary.

**NFR031** A data provider node shall only transmit data to clients when the data is published by an authenticated data submitter or steward for access by that client’s permission group.

**NFR032** The data provider node shall maintain the integrity and availability of all data stored in its local data store.

**NFR033** The data provider node shall maintain the integrity of all files stored in the node’s local file repository.

**NFR034** The data provider node shall maintain a log of activities for auditing purposes. [Data submission, updates to metadata are logged, not clear if anything else is logged]

**NFR035** NGDS applications shall be developed considering good security coding practices, thus minimizing vulnerability to attacks. In particular, it should comply with FIPS (Federal Information Processing Standards)

## Supportability

Here follows the requirements that enhance the supportability and maintainability of NGDS project-developed software.

**NFR036** NGDS software shall be written using the standard coding style for the used programming languages. For example, Oracle Java Coding Styles, if Java turns out to be the selected language.

**NFR038** NGDS software shall be designed utilizing the concept of encapsulation. Components shall be created that encapsulate related functionality within them, and nothing else.

**NFR039** All software shall be modular to minimize the time and complexity involved in maintaining and extending the platform and application. [needs refactoring]

**NFR040** NGDS software shall not contain any statically detectable dead code. [Adrian reports significant dead code; no static detection tests run]

## Data Requirements

The Data Assessment Team will inventory additional data to be submitted by project subcontractors, and project management will prioritize datasets for delivery based on recommendations from the Domain Steering Committee and User-Centered design team. A prioritized list of important geothermal data types will be ascertained and used as the basis for populating NGDS data assets. See the Data Requirements Specification [/P02/](#P02_GTDA_Data_Requirements_Spec), for a description of data categories and attributes that will be stored in the System’s database.

## Design Constraints

The follow requirements are derived from design decisions that represent constraints that are mandated and must be adhered to.

**NFR041** The NGDS components shall interface to NGDS data provider nodes via NGDS web services. [CKAN API is used between web application and server]

**NFR042** The NGDS components shall use the API provided by NGDS web services for data functions, for example WCS, WFS. [Data browse and view from WFS and WMS is supported, uses CKAN API for tabular (csv) datasets]

**NFR043** The NGDS participants shall use a data abstraction layer for access to databases used for metadata management and management of data in NGDS content models. [Unclear how this is to be tested]

**NFR044** The system components shall use web services for communication with NGDS client software and other NGDS nodes.

**NFR045** The NGDS components shall use web services to send data to NGDS client applications, including the NGDS portal application. [CKAN API?]

**NFR046** The NGDS components shall use web services for the querying of data from NGDS nodes.

**NFR047** The system shall provide requested metadata to the NGDS as XML files [transactions from web portal to server use CKAN JSON??]

**NFR048** NGDS metadata catalog services shall provide metadata search results using the USIGN ISO XML encoding profile in response to CSW 2.0.2 protocol. [need to test CKAN csw more]

**NFR049** The software shall be designed with Linux as its main target platform. However, as much as possible, it shall utilize portable technologies such as Java, that will facilitate its porting to other operating systems and platforms.

**NFR050** Under no condition should the failure of one node be capable of crippling or rendering the entire NGDS system useless. The system must be capable of adding or removing nodes while maintaining normal operations.

## Licensing Requirements

The software system being developed as part of the project shall have an open source license variant. The license will include provisions to allow users to copy, distribute and transmit the software, to adapt the software for other applications, and to make commercial use of the software, under the condition that the following attribution for the source of the software is included in any copy or derived work:

In order to preserve the original NGDS licensing terms, the use of third party libraries and application servers that violate these terms will be vetted.

The data provided by the data providers will not be made available to the public domain until it is released and published through the “publish” feature of the System. Other access control constraints may be applied by individual nodes at their discretion.

## Applicable Standards

See the WSS [**/P05/**](#P05_GTDA_Web_Services_Specification) for the details of the web services standards to be applied.

# Node-in-a-box Software Package

A redistributable, node-in-a-box, free/open-source software package will be developed (composed of an NGDS repository, an NGDS catalog and an NGDS Desktop as shown in Figure 13).

The SCR development team will deliver the NGDS node-in-a-box software stack (WepAPP, NGDS Repository and NGDS catalog) to BSU project management team for deployment, testing and acceptance on a server of their choice, in accordance to the project’s schedule.

The NGDS node-in-a-box software **will be delivered** as an installable application to BSU project management for deployment, testing and acceptance on a server of their choice, in accordance to the project’s schedule.

The software package **will include** an installation program in the form of a shell script of an apt package for Ubuntu Linux.

This node-in-a-box software application will

1. give data providers a simple way to register data sources, load data and expose those data as a node in the NGDS network
2. support batch import and upload of shared datasets in supported formats adhering to standard content models
3. WebApp, user interface will be provided to help users upload data to the system.

In this arrangement, different node-in-a-box instances can co-exist in the system. This requires their catalogs to be synchronized via a federation service or some sort of aggregating catalog.



Figure 13 NGDS Data Provider Software Package

NGDS will

1. Facilitate publication, visualization and discovery of geothermal data using services and applications.
2. Provide a catalog, a web top UI and a data repository application.
3. NGDS System Administrator can install and manage data providers, granting them the ability to publish data to the system

# End-User/Data Consumer Software

The project will implement two primary access points: a NGDS website and a NGDS WebApp application. As much as possible, these will be integrated in order to appear to the end-user as a single web-based experience. The primary access point to the system will be the NGDS WebApp application.

## NGDS WebSite

The website will be designed to

1. provide information about all the NGDS participants
2. serve as gateway to the system to discover data and applications that utilize NGDS resources
3. include information on the project’s progress, NGDS specifications, access to the map-centric search application, other software applications utilizing NGDS services, NGDS presentations, documentation and tutorials, a link to the catalog of NGDS nodes, and any other results as they become available.

## NGDS WebApp

A user-friendly, web-based application will be created in order to support

1. finding, visualizing, mapping, and acquisition of data by end-users/data consumers
2. provide a user interface that allows end-users/data consumers to discover and access resources made available across all NGDS nodes
3. search for data across the system based on topic, location, time or other criteria
4. provide the user with the information necessary to determine the utility of that dataset for their purposes.
5. visualize Geographic datasets through a map interface that will also allow users to inspect the details of individual data points (e.g. wells, temperature measurements, etc.) from properly formatted datasets.
6. provide a user interface for node-in-a-box data providers to publish data to their NGDS data repositories.

Note that the map UI is not intended for analysis and comparison of different data layers. It works only as a graphical way for searching data in the map and inspecting individual elements metadata.

# NGDS Data Access Protocols

The OGC Catalog Service for the Web (CSW 2.0.2) will be used to enable catalog search via a Web API. Data services will be implemented using OGC WMS, WFS, NetCDF services, as well as other services adopted by the technical and steering committee as the system evolves. File-based resources will be accessed using standard HTTP GET requests.

# Use Case Models

In general, the use cases for NGDS system are organized by user category as follows.

* Data Provider Use Cases
* End-user/Data Consumer Use cases
* System administration Use Cases
* Software Developer Use Cases

When certain tasks or workflows require multiple users to collaborate, they will be represented as workflow use cases, such as Quality Assurance Workflow.

## High-level Use Cases View



Figure 3: High-level Use Case View

## Data Provider Use Cases



Figure 4 : Data Entry and Submission Use Case View

### Data Submitter

#### File Uploads

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_001a** |
| Use Case Name | | Upload new files |
| **Short Description** | | The goal of this use case is to allow data submitters to upload one or more files to be stored in the NGDS data repository. After the upload, the submitter will also update the metadata record of that file, thus allowing it to be cataloged.  We assume the file is opaque, i.e. stored as is, with no further content parsing. |
| **Actors** | | Data submitter |
| Pre-Conditions | | Data submitter is properly authenticated; |
| Success End Conditions | | The files are successfully uploaded and stored in the NGDS repository  The metadata record for the provided file is successfully created  The metadata remains “private”, waiting to be made public by a data steward |
| Data | | Metadata attributes for the specific data type as input to the form  Files to be uploaded  Geographical location of files |
| Functions | | * Upload files * Form-based metadata input for specific data type * Auto-complete of user contact information * metadata validation * URI creation * Metadata duplicate detection * Tagging of metadata with geographical information * Converting non-standard location coordinates into latitude/longitude and shapes. * Log changes to metadata log file |
| Variants | | |
| Step | Actor | Description |
| 7b | NGDS System | In case of duplicates, or incomplete information in the form, the system will provide a failure notification message, indicating the type of error.  The user-provided metadata form will be presented to the Data Submitter for correction |
| 7c | Data Submitter | Will correct the form data and resubmit for validation or will quit the import procedure. |
| Exceptions | | |
| Step | Actor | Description |
|  | NGDS System | In case of internal file upload/metadata record creation failure, the system will roll back all existing transactions, returning to its previous state. |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |
| ID | Issue Description | |
| 1 | Can't it be assumed that the submitter is working in cahoots with the data steward? Can the approval step be short circuited by assigning both submitter and steward roles to an individual? Yes, it is possible. | |
| 2 | IN step 9, perhaps the data steward should be notified that there is a new record to be approved? This could be done by the NGDS system once the data submitter confirms the upload is completed? | |

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_001b** |
| Use Case Name | | Update uploaded file |
| **Short Description** | | The goal of this use case is to allow data submitters to update a file that has been uploaded. This process includes the update of the metadata record of the file.  We assume the file is opaque, i.e. stored as is, with no further content parsing. |
| **Actors** | | Data submitter |
| Pre-Conditions | | Data submitter is properly authenticated; |
| Success End Conditions | | The file is successfully updated and new content stored in the NGDS repository  The metadata record for the provided file is successfully updated  The entry for the new file is also propagated & updated in the NGDS catalog. |
| Data | | Possible new metadata record changes  Files to be uploaded |
| Functions | | * Upload files * update metadata * replace existing file. * Log changes to metadata log file |
| Variants | | |
| Step | Actor | Description |
| 4b | NGDS System | In case of duplicates, or incomplete information in the form, the system will provide a failure notification message, indicating the type of error.  The user-provided metadata form will be presented to the Data Submitter for correction |
| 4c | Data Submitter | Will correct the form data and resubmit for validation or will quit the import procedure. |
| Exceptions | | |
| Step | Actor | Description |
|  | NGDS System | In case of internal file upload/metadata record update failure, the system will roll back all existing transactions, returning to a valid state. |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |
| ID | Issue Description | |
| 1 | What happens to the old file? Is it deleted in the database or DOEs it remain there? Is a history of all metadata changes kept?  DN: This is a good question and one that probably has no right answer for everyone. Does the new item get a new UUID or is it a revision (version X++) of the existing item? Earlier in the document there is a statement that says “all” node interactions are logged. This might require that the old version stay there. Probably best to ask domain experts. | |

#### Data Processing

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_006** |
| Use Case Name | | Process data file in NGDS content model template |
| **Short Description** | | This allows data submitter to process (upload/parse) a file to NGDS data provider nodes.  The difference between the upload/update file use cases is that the file here is formatted according to an existing template, and therefore, can be parsed and checked for correctness. Processing will include validation of data schema, loading data into a data store on the provider node. |
| **Actors** | | Data Submitter |
| Pre-Conditions | | Requires authentication, access permission to edit metadata records.  File must be formatted according to one of the NGDS content model templates (See /P02/ data specification from Arizona State University, for supported file formats and content models |
| Success End Conditions | | File is submitted to a repository, being accessible through a valid URI |
| Data | | Files properly formatted according to NGDS supported formats |
| Functions | | * import data files * Validate data file content & formats * Log changes to metadata log file |
| Variants | | |
| Step | Actor | Description |
| 3b | Data Submitter | Is notified of suboptimal data content  Chooses to submit the data anyways |
| 3c | NGDS system | Accepts the file, flags the problems with content or metadata  Hand file over to the data steward |
| Exceptions | | |
| Step | Actor | Description |
|  | NGDS System | In case of internal import failure, the system will roll back the existing transaction, returning to a valid previous state. |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |

#### Metadata Generation

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_003** |
| Use Case Name | | Create metadata record through a form |
| **Short Description** | | The goal of this use case is to allow data submitters to create a metadata record describing a resource (tier1, tier2 data) by input of information manually through a form interface for inclusion in the NGDS catalog. |
| **Actors** | | Data submitter |
| Pre-Conditions | | Data submitter is properly authenticated;  Data is available through one of the NGDS data repositories, and is identified through a valid URI.  Metadata includes the geological location of the geological feature associated to the data. |
| Success End Conditions | | The meta-data for the provided geological feature is successfully imported into the NGDS catalog  The data remains “private”, waiting to be made public by a data steward |
| Data | | Metadata attributes for the specific data type as input to the form |
| Functions | | * Form-based metadata input for specific data type * metadata validation * URI validation * Metadata duplicate detection * Tagging of metadata with geographical information * Converting non-standard location coordinates into latitude/longitude and shapes. * Log changes to metadata log file |
| Variants | | |
| Step | Actor | Description |
| 7b | NGDS System | In case of duplicates, invalid URIs or incomplete information in the form, the system will provide a failure notification message, indicating the type of error.  The original metadata form will be presented to the Data Submitter for correction |
| 7c | Data Submitter | Will correct the form data and resubmit for validation or will quit the import procedure. |
| Exceptions | | |
| Step | Actor | Description |
|  | NGDS System | In case of internal import failure, the system will roll back all existing transactions, returning to a valid state. |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |
| ID | Issue Description | |
| 2 | In case of duplicates, which one is the most important the new instance of the data or the existing version of it? How to resolve these conflicts?  DN: The domain experts said if records are overlapping, they would want both. If they are truly identical, it doesn’t really matter does it (from a pure logic perspective anyways). | |
| 3 | What if the user DOEs not provide a geo-location to the data?  DN: Given the UCD feedback, a geospatial reference is mandatory for every record for map based searching. | |

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_004a** |
| Use Case Name | | Bulk upload metadata from metadata content template table |
| **Short Description** | | The goal of this use case is to allow data submitters to import a CSV file containing metadata into the NGDS catalog.  New records will be marked ‘submitted’; Data Steward will then have option to review metadata through forms interface; records will become visible to public when marked ‘published’. Metadata will be validated for content completeness, URLs checked for http 200 responses, and new metadata record will be run through a duplicate-detection process to identify existing metadata that may already describe the resource. |
| **Actors** | | Data Submitter |
| Pre-Conditions | | Data submitter is properly authenticated;  Individual data items, referenced to in the CSV file are available through one of the NGDS data repositories, and is identified through a URI.  Metadata includes the geological location of the feature associated to the data.  CSV file containing metadata in table form according to the NGDS Compilation template Metadata Excel workbook |
| Success End Conditions | | The meta-data for the provided geological feature is successfully imported into the NGDS catalog.  The imported data remains private, waiting for the Data Steward to make it public. |
| Data | | CSV file containing resources metadata, formatted according to the NGDS compilation template metadata excel workbook. |
| Functions | | * process NGDS metadata compilation template csv file to produce individual metadata records * metadata validation * URI validation * Metadata duplicate detection * Converting non-standard location coordinates into latitude/longitude and shapes. * Log changes to metadata change log file |
| Variants | | |
| Step | Actor | Description |
| 11b | NGDS System | Rejects data based on invalid records |
| Exceptions | | |
| Step | Actor | Description |
|  | NGDS System | In case of internal import failure, the system will roll back the transaction, returning to a previous valid state. |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |
| ID | Issue Description | |
| 1 | SMR 2014-01-30 the bulk uploader does not use the NGDS metadata compilation template; the functions in the original 'requirements' document were copied from other metadata use cases, not specific to processing bulk metadata listing. | |

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_008** |
| Use Case Name | | Browse and manage resource directory and collections |
| **Short Description** | | Allows the User to view & manage all of the resources (or datasets) under their stewardship (data steward) or that they have submitted (Data submitter), based on metadata describing the resources. The resource listing will be presented to the User in a tree view directory structure.  Users can define collections (folders, subdirectories) to organize the listing according their needs. A resource may be assigned to multiple collections. Access control may be assigned at the collection level. The display should indicate clearly any resources that have quality issue flags attached |
| **Actors** | | Data submitter, Data Steward |
| Pre-Conditions | | Requires authentication, access permission to view & edit individual user metadata records & datasets. |
| Success End Conditions | | Users can adequately manage (create, rename, delete) resources  Users can assign resources to collections (updating metadata)  Users can delete existing resources (and their associated metadata)  Metadata is kept in synchrony with changes in the collection |
| Data | | Resources: metadata records or files |
| Functions | | * Visualize flagged resources with quality issues * Create, delete, reorganize resource collections * delete resources * Visualize resources & collections |
| Variants | | |
| Exceptions | | |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |
| ID | Issue Description | |
| 1 | It seems to me that, in this view, the only operation that users can do with resources is delete. (Importing and modification of resources must be done in other views). Is it correct? | |
| 2 | Missing requirements: tree-view portrayal of resource hierarchy. More clarity required as to who can create collections and sub-collections at what levels in the hierarchy. [Data steward assigns permissions to create public collections; perhaps allow authenticate users to define personal collections that they persist in a user workspace to use between sessions]. How do permissions work if metadata can belong to more than one collection? [Metadata record has only one owner; do we need a use case for reassigning ownership of a metadata record?] If a record is part of one collection and I have edit privileges to that collection, but it is also included in another collection to which I do not have privilege, what are my options? [Looks like assigning access control at collection level won’t work; work access control through users and group membership, with permissions at group level to share edit capabilities] | |
|  | SMR 2014-01-30. Only part of this implemented is to see list of resources for a given account and to delete metadata (not tested--does uploaded file or deployed service get deleted?) and edit metadata. No collection/group functionality implemented. Add 'and collections' to title; that should be a separate use case but is bundled in here. | |

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_005** |
| Use Case Name | | Bulk update metadata records |
| **Short Description** | | Metadata records may be selected based on a content-based filter query based on fields as contact information or linkage URIs. Once selected, those records can be replaced using regular expressions. User selects metadata content item to update, value to replace, and new value to use. |
| **Actors** | | Data submitter, Data steward, System administrator |
| Pre-Conditions | | Requires authentication, access permission to edit metadata records. |
| Success End Conditions | | All relevant metadata record attributes that match the search criteria are replaced with the new value defined by the user |
| Data | | Specific fields of metadata records: contact information and URIs |
| Functions | | * Search & replace of metadata record attributes based on simple regular expressions * Log changes to metadata log file |
| Variants | | |
| Exceptions | | |
| Step | Actor | Description |
|  | NGDS System | In case of internal import failure, the system will roll back all existing transactions, returning to a valid state. |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |
| ID | Issue Description | |
| 1 | How interactive should be the process of search & replace? | |

### Data Steward

#### Activity Logs

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_007 & UC\_046** |
| Use Case Name | | View resource submission and update logs |
| **Short Description** | | Allows authorized users to view the logs for metadata record creation, file uploads to file repository, and processing of NGDS files that conform to valid content model templates.  These logs are created during any data submission or update activity. |
| **Actors** | | Data submitter, Data Steward, System administrator |
| Pre-Conditions | | Requires authentication, access permission view metadata records import logs.  These logs are created during any data submission or update activity, so at least one data submission must have occurred. |
| Success End Conditions | | Successful and correct visualization of data submission logs.  No missing logs |
| Data | | Data submission logs containing details such as time of activity, actions taken, data submitter, Data Steward, size of data, submitter comments, etc |
| Functions | | * Submission log capture * Submission log visualization |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |
| ID | Issue Description | |
| 1 | Missing requirements detailing the logs and their creation. What exactly is logged? Also, how is the log portrayed to the user, or is that too much in the realm of design? | |
|  | SMR 2014-01-30 currently see list of create and update events via the dashboard when logged in; this is working in at least a rudimentary way. | |

#### Validation and Quality Assurance Logs



Figure 5 Quality Assurance Use Case View

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_046** |
| Use Case Name | | View catalog audit log?? |
| **Short Description** | | At every change the system creates a log for a given catalog item. This use case allows authorized users to view the log of all changes made to a data or metadata record, changes made both manually and automatically. |
| **Actors** | | Administrator, Data Steward |
| Pre-Conditions | | An audit log of catalog changes has been created and actively updated by the system |
| Success End Conditions | | Users are able to visualize the change logs for a given record |
| Data | | Catalog audit log |
| Functions | | * View catalog audit log |
| Variants | | |
| Exceptions | | |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |
| ID | Issue Description | |
| 1 | Missing requirements detailing the validation and generation of the validation log. Here are two, but where are ones about URL checking? Syntax? Is the validation log attached to the activity log for a particular resource? | |
| 2 | DN: I am also confused if this is happening at the node or NGDS system level? If another node change must be recorded in every other node, this could get quite messy fast (math suggests that it would be equal to ((N \* (N2 – 1) \* R) \* MR) where N is the number of nodes, R is the number of records and MR is the number of metadata records and that is assuming a 1:1 relationship between instances or R and MR. | |
|  | SMR 2014-01-30 I can't tell what this is supposed to be about, and how its different from **UC\_007 & UC\_046 (3.2.2.1.1)** | |

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_042** |
| Use Case Name | | View quality assurance reports |
| **Short Description** | | Allows the Data submitter or Data Steward to view quality assurance reports for resources they submit or maintain.  Quality assurance can be automatic or manual. As an automated process, it is performed by NGDs during import, flagging possible typos and simple input errors in the metadata being managed by the system  As a manual process, it involves users that see possible issues and flag them in the data records. |
| **Actors** | | Data Submitter, Data Steward, End User/Data Consumer |
| Pre-Conditions | | The metadata record has been imported into NGDS catalog and a set of quality assurance functions were automatically ran in those records. As a result, the metadata records were flagged for possible errors.  Users have write access to the data i.e. they are either submitters or stewards of that data |
| Success End Conditions | | Users are able to identify the flagged errors in the metadata they provide or maintain |
| Data | | Metadata records, Quality Report |
| Functions | | * Visualize quality assurance report |
| Variants | | |
| Exceptions | | |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |
| ID | Issue Description | |
| 1 | Should consumers be able to see QA reports? If they are not addressed, it seems like it would serve as a good "warning" to analysts.  The Quality Report is for steward and submitter consumption, with lots of details that may not be relevant to End Users, e.g. wrong measures, duplicated fields. We assume the steward will fix them before making the data public. However, some stewards may want to make that data public anyway, in that case, consumers could benefit from this information. | |

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_043** |
| Use Case Name | | Flag resource quality issue |
| **Short Description** | | Allows authorized & authenticated End-User/Data Consumer to create a flag, indicating that some issue exists with the quality of a data or metadata record. The process creates an annotation record documenting the dataset, URI for the resource in question, identity of the user raising the flag, timestamp. The annotation record should also include notes on resolution process, who, when, what. Flagged resources should be clearly marked |
| **Actors** | | Data Steward. End User/Data Consumer |
| Pre-Conditions | | The metadata record has been imported into NGDS catalog.  Metadata QA records can be modified by any user in the system |
| Success End Conditions | | Users are able visualize metadata records, and to provide quality assurance feedback to these records as they see fit. |
| Data | | Metadata records (read only)  Metadata QA (quality attribute) records (read/write)  User information |
| Functions | | * Manually flag resource quality issues |
| Variants | | |
| Step | Actor | Description |
| 1b | End User/Data Consumer | End user can flag data records directly on the metadata visualization page, without going to the quality assurance page. |
| Exceptions | | |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |

|  |  |
| --- | --- |
| Use Case ID | **UC\_046c** |
| Use Case Name | Browse flagged data catalog entries |
| **Short Description** | Allows Users to navigate through the catalog of resources that have had their quality flagged for correction. A special view of the resource browse list, filtered for records that have quality flags raised from those that do not have them |
| **Actors** | Data Steward, Data Submitter |
| Pre-Conditions | a list of metadata resources is available, allowing filtering by quality attribute flag |
| Success End Conditions | Users are able to identify flagged entries in the metadata catalog |
| Data | Metadata record |
| Functions | * Browse data catalog entries * Filter catalog entries by flagged attribute |
| Main Sequence | |
| Variants | |
| Exceptions | |
| Open Issues (Please use this field to indicate questions/comments on the use case) | |

|  |  |
| --- | --- |
| Use Case ID | **UC\_044** |
| Use Case Name | Perform manual error correction |
| **Short Description** | Allows a Data submitter or Data Steward to manually address issues present in a data or metadata record that has been flagged for having quality issues. Note that this process may require resubmission of data files.  Quality check and error editing will be built into the data submission process, but will require the steward to access the data in the appropriate environment for quality issues recognized after a submission is complete. The process will require the reviewer to make a note that is recorded as annotation on the record, along with the identity of the reviewer and a time stamp. |
| **Actors** | Data Submitter, Data Steward, Administrator |
| Pre-Conditions | The metadata record has been imported into NGDS catalog. |
| Success End Conditions | Users are able visualize metadata records, and to provide quality assurance feedback to these records as they see fit. |
| Data | Metadata records (read/write)  Metadata quality attribute records (read/write)  User information |
| Functions | * Edit metadata record * Edit data * Log metadata record change |
| Variants | |
| Exceptions | |
| Open Issues (Please use this field to indicate questions/comments on the use case) | |

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_045** |
| Use Case Name | | Clear quality flag |
| **Short Description** | | Allows authorized User to clear a quality flag on a data or metadata record. This will occur when the User believes that the flagged issue is actually valid in the context of that record. The process will require the reviewer to make a note that is recorded with the flag, along with the identity of the reviewer and a time stamp. |
| **Actors** | | Administrator, Data Steward |
| Pre-Conditions | | Metadata records having quality flag attributes are available in the system  The users have corrected the quality attribute issues, especially those that are automatically detected. |
| Success End Conditions | | Users are able to remove data quality attribute flags |
| Data | | Metadata quality attribute records (read/write) |
| Functions | | * Remove quality issue flag * Log metadata record change |
| Variants | | |
| Step | Actor | Description |
| 3 | NGDS System | If some quality attribute is found, the metadata record flag is turned back on and the user is notified of the issue. |
| Exceptions | | |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |
| ID | Issue Description | |
| 1 | DN: Who has ultimate authority to determine the true data in the event of a dispute? | |

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_004b Catalog cleanup** |
| Use Case Name | | Catalog cleanup |
| **Short Description** | | The NGDS catalog will periodically and automatically verify the liveliness of the data sources referenced in its metadata catalog. That information will be used to mark the “unreachable”, or “non-public” data items in the metadata catalog.  The data steward can use that information to delete metadata records that are invalid, or to fix those records with valid URIs. |
| **Actors** | | Data Steward |
| Pre-Conditions | | Requires authentication, access permission to edit metadata records.  The catalog has metadata records for which URIs that will be checked for liveliness  There is also a predetermined threshold time period above which the metadata record will be marked as having “broken links”  There is also a period of time parameter used by the NGDS catalog to periodically sweep the catalog, looking for those links |
| Success End Conditions | | The NGDS catalog is cleared up from metadata records that have invalid URIs or those records have their URIs fixed. |
| Data | | All metadata records of the NGDS catalog |
| Functions | | * Automatic verification of broken links * Automatic verification of “private links” from third party repositories * Automatic tagging of broken metadata records * Deletion of catalog metadata records based on broken link attributes |
| Variants | | |
| Exceptions | | |
| Step | Actor | Description |
|  | NGDS System | In case of internal import failure, the system will roll back all existing transactions, returning to a valid state. |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |
| ID | Issue Description | |
| 1 | Is there any undo capability? All deletions are final?  DN: I would defer this question to the domain experts. IN some cases, I would imagine that knowing there once was a record might be useful if it can be tracked down via other means (or if they want to talk to the data submitter directly). Good question | |
| 2 | Before any data can be deleted or removed (potentially via the duplicate detection process) the node must ensure that there are no metadata records existing for it. | |

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_004c** |
| Use Case Name | | Notify data submitter of data or metadata problem |
| **Short Description** | | The goal of this use case is to allow the system to notify data submitters whenever other users other than the submitter herself, detect problems in the data or metadata. |
| **Actors** | | Data Submitter, Data Steward, End User |
| Pre-Conditions | | The metadata record has been imported into NGDS catalog. |
| Success End Conditions | | The data submitter receives e-mail notifications with quality issues detected by other users. |
| Data | | Metadata records (read/write)  Metadata QA (quality attribute) records (read only)  Data submitter information: e-mail |
| Functions | | * Send e-mail to data submitter with metadata and data issues |
| Variants | | |
| Exceptions | | |
| Step | Actor | Description |
|  | NGDS System | Bounding of e-mail may occur if the data submitter e-mail is invalid |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |

#### Resource Publication

|  |  |
| --- | --- |
| Use Case ID | **UC\_009** |
| Use Case Name | Make resource public |
| **Short Description** | This allows Data Steward to indicate that a resource is available for public discovery and access once they are satisfied with the data quality. |
| **Actors** | Data Steward |
| Pre-Conditions | Metadata record is properly created in the catalog, waiting to be made public by a data steward  Data is properly uploaded to a data repository, waiting to me made public. |
| Success End Conditions | The metadata record is publicized  AND the data is made available through a public URI. |
| Data | Metadata records in the catalog or files in the repository |
| Functions | * Make data public though a URI * Make metadata record public |
| Variants | |
| Exceptions | |
| Open Issues (Please use this field to indicate questions/comments on the use case) | |

### Node Administrator



Figure 6 Administration Use Case View

#### User Account Management

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_029a** |
| Use Case Name | | Administer users |
| **Short Description** | | Allows the system administrator to manage data provider node users. This will allow the system administrator to add and remove users on the administered node, and assign user roles and group membership. |
| **Actors** | | Node-in-box administrator |
| Pre-Conditions | | Node-in-the box is properly installed and configured |
| Success End Conditions | | The administrator is able to perform the main administration operations |
| Data | | User records |
| Functions | | * Add user * Delete user * Modify user permissions and roles |
| Variants | | |
| Exceptions | | |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |
| ID | Issue Description | |
| 1 | DN: Within this requirement, it will be necessary to perform a check to ensure that a user being deleted does not have custody of any records otherwise we may end up with orphaned records (unless they default to the node administrator). Just a though that came to mind. | |
| 2 | DN: A user should only be deleted once all their records (data and metadata) is transferred to another user. Otherwise there will be orphaned data and metadata. | |
|  | SMR 2014-01-30 can't add or remove users from user Management page, only change roles; no way to do stuff like reset passwords. | |

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_029b** |
| Use Case Name | | Enrollment |
| **Short Description** | | Allow users to self enroll. i.e. to create their account in the NGDS system for the purpose of supporting NGDS data import/export and exploration activities. |
| **Actors** | | End User/Data Consumer, Data Submitter |
| Pre-Conditions | | Node-in-the box is properly installed and configured |
| Success End Conditions | | The users have their accounts created, and their user data and credentials accessible throughout the system |
| Data | | User records |
| Functions | | * Enroll user * Un-enroll user |
| Variants | | |
| Step | Actor | Description |
| 1b | User | Navigates to the enrollment screen of the system  Requests deletion of her profile -> un-enrolment |
| 2b | NGDS System | Responds by:  Deleting the user record and its credentials  Includes <<delete user>> use case |
| Exceptions | | |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |
| ID | Issue Description | |
| 1 | Do we really want to allow users to self enroll as data providers?  DN: My answer would be yes since the system has been designed with the data steward as a failsafe against publishing bad data. The less human involvement the better. | |
| 2 | DN: Same caveat here WRT orphaned data and metadata. Do not allow a user to remove themselves if they have data submitted until the ownership of the data is re-assigned or the data is removed. | |
|  | SMR 2014-01-30 user who creates self is not assigned a role; admin should get notification of new user. | |

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_030** |
| Use Case Name | | Add users |
| **Short Description** | | Creates a new user account in the system, allowing the storage of important user information such as e-mail, name, login, password, address, and enabling features such as subscription and search saving, and auto complete. |
| **Actors** | | Node-in-box administrator, Users |
| Pre-Conditions | | Node-in-the box is properly installed and configured |
| Success End Conditions | | A new user account is created |
| Data | | User records |
| Functions | | * Add user * Add users via invitation |
| Variants | | |
| Step | Actor | Description |
| 1b | Administrator | Navigates to user management screen  Starts new user creation  Inputs user information  Send invitation to user |
| 2b | NGDS System | Responds by checking for repeated user credentials and if positive, send invitation to user |
| 3 | User | Responds by accepting or rejecting invitation |
| 4 | NGDS System | Creates user account or does nothing if the invitation was rejected |
| Exceptions | | |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_031** |
| Use Case Name | | Delete users |
| **Short Description** | | Removes a user, its credentials and associated information from the system |
| **Actors** | | Node-in-box administrator |
| Pre-Conditions | | Node-in-the box is properly installed and configured |
| Success End Conditions | | A new user account is deleted, together with its data including subscriptions, saved searches, history, etc. |
| Data | | User records |
| Functions | | * remove user |
| Variants | | |
| Exceptions | | |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |
| ID | Issue Description | |
| 1 | What happens if a user that is a data steward is deleted? Are her metadata records unpublished, assigned to a system pseudo user? | |
| 2 | DN: QUESTION: Should the system remove the associated information or should certain info persist (logs, metadata etc)? | |

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_032** |
| Use Case Name | | Administer user roles |
| **Short Description** | | The goal of this use case is to allow the administrator to assign different roles to users. These roles control the users’ abilities to publish data in the system or to administer system functions. |
| **Actors** | | Node-in-box administrator |
| Pre-Conditions | | Node-in-the box is properly installed and configured |
| Success End Conditions | | User role assignment is updated according to administrator needs |
| Data | | User records |
| Functions | | * assign role to user * remove use role |
| Variants | | |
| Exceptions | | |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |
| ID | Issue Description | |
| 1 | Are users federated across nodes?  RSSF: Stewards and submitters are local users, end user/consumers are global users. | |
| 2 | DN: DERIVED REQUIREMENT: Every Node must have at least one administrator, one steward correct? | |

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_032b** |
| Use Case Name | | Backup |
| **Short Description** | | The goal of this use case is to allow node administrators to backup the data and meta-data being stored in the system. |
| **Actors** | | Node-in-box administrator |
| Pre-Conditions | | Node-in-the box is properly installed and configured |
| Success End Conditions | | The data, metadata and indexes of a node-in-a-box is successfully backed up |
| Data | | User records  Metadata records  Data  indexes |
| Functions | | * manual backup NGDS node * automatic backup of NGDS node |
| Variants | | |
| Step | Actor | Description |
| 1 | Administrator | Navigates to user management screen  Selects backup option  Set ups automatic backup option by providing a destination and a day of week/time |
| 2 | NGDS System | Responds by backing up node data to the assigned repository at the given day of week/time |
| Exceptions | | |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |

|  |  |
| --- | --- |
| Use Case ID | **UC\_032b** |
| Use Case Name | Restore |
| **Short Description** | The goal of this use case is to allow node administrators to restore the backed up data and meta-data being stored in the system. |
| **Actors** | Node-in-box administrator |
| Pre-Conditions | Node-in-the box is properly installed and configured |
| Success End Conditions | The data, metadata and indexes of a node-in-a-box is successfully backed up |
| Data | Backed up blob with important node data |
| Functions | * restore NGDS node |
| Variants | |
| Exceptions | |
| Open Issues (Please use this field to indicate questions/comments on the use case) | |

#### System Management (Meet NGDS System Requirements)

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_034** |
| Use Case Name | | Register node |
| **Short Description** | | The goal of this use case is to allow new nodes to be added to the NGDS grid. These nodes can be of different types included “node-in-a-box” installations, or third party data provider repositories. |
| **Actors** | | Node-in-a-box Administrator, NGDS Administrator |
| Pre-Conditions | | Node-in-the box properly installed as a NGDS node management hub  Client node-in the box properly installed but not yet registered |
| Success End Conditions | | A new node is registered in the NGDS network, and the data it provides becomes available to the other nodes, and searchable through the by the NGDS catalog |
| Data | | e-mails, node credentials |
| Functions | | * add new node * index new node |
| Variants | | |
| Exceptions | | |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |
| ID | Issue Description | |
| 1 | Who manages the grid?  Is the grid configured centrally?  NGDS Administrator in a special user in a node elected to be the main node. | |
|  | SMR 2014-01-30 Any aggregator may register any publisher, so the network is defined by which aggregators register which publishers. What is missing is any kind of 'self' declaration manifest by a node that would allow it to be discoverable. See 'How to be an NGDS node' design document. We haven't implemented a process as part of deploying a node that would request the manager of the new node to contact one or more aggregators to request harvesting, or any kind of 'registry' of known nodes that can be harvested from or are actively aggregating. | |

#### Routine Maintenance

The node administrator must also perform routine maintenance tasks pertaining to their node. These include upgrading software and responding to user questions and requests.

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_033** |
| Use Case Name | | e-mail (NGDS or node-in-a-box) administrator |
| **Short Description** | | The goal of this use case is to allow users to send e-mail to administrators of the system to handle matters such as granting of especial access rights, or to register new nodes in the NGDS network, or other issues.  There are two types of administrators: node-in-a-box administrators, and NGDS administrators. |
| **Actors** | | All users, Administrators |
| Pre-Conditions | | Node-in-the box is properly installed and configured  Administrator has registered her e-mail information |
| Success End Conditions | | Users can communicate their needs/issues with the node-in-a-box administrator |
| Data | | e-mails |
| Functions | | * send email to administrator |
| Variants | | |
| Exceptions | | |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |
|  | SMR 2014-01-30 I don't see any 'contact administrator' path from the current publisher node or aggregator node--just stuff for generic contact NGDS. Contact link in LL of page doesn't seem to work, and looks like it will send to ngdsweb@geothermaldata.org. | |

|  |  |
| --- | --- |
| Use Case ID | **UC\_035** |
| Use Case Name | Upgrade node-in-the-box application |
| **Short Description** | The goal of this use case is to upgrade the software that implements the node-in-the-box application. This can potentially include the data repository, the catalog service, and the WebApp application |
| **Actors** | Node-in-a-box administrator |
| Pre-Conditions | Node-in-the box is properly installed |
| Success End Conditions | The software components(s) of the node are updated without data loss and will minimum impact on other nodes of the NGDS network |
| Data | Possibly all the data stored in the data repository and index |
| Functions | * update software components * shutdown node * restart node |
| Variants | |
| Exceptions | |
| Open Issues (Please use this field to indicate questions/comments on the use case) | |

## Software Developer Use Cases



Figure 7 Software developer use cases

### Develop Applications

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_040** |
| Use Case Name | | Develop apps using NGDS standard protocols (needs reformulating) |
| **Short Description** | | Through the use of web protocols, in particular: CSW, WFS and HTTP, software developers can build applications that utilize the data and meta-data stored in NGDS. They can also use NGDS to locate referenced data (data that is not stored in NGDS components but is referenced by the NGDS catalog). They can, for example, develop applications that display that information on maps, perform data analysis and discover geological information of geothermal sites within US |
| **Actors** | | Software developer |
| Pre-Conditions | | NGDS data repositories and catalogs are available and accessible through standard internet protocols.  Software developers may need an account to interact with the system if their application involves the updating of information in repositories and catalog, or if they utilize services such as posting of reviews. |
| Success End Conditions | | Software developers can successfully build applications that utilize the NGDS system resources |
| Data | | Data models, metadata schemas, key system URIs, e.g. catalog service main URI, protocol and data model documentation |
| Functions | | * Standard protocols * Ability to interact with NGDS via APIs * Logging of API usage statistics and accesses |
| Main Sequence | | |
| Variants | | |
| Exceptions | | |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |
| ID | Issue Description | |
| 1 | DN: It might be a good idea to issue API keys to control the number of queries and use of data or at least have a metric to understand who is using it and for what.  DN: Discussion about developer API keys. Not critical but something to keep in mind. Given there are not concrete plans on how to pay for maintenance after the system is up and running, providing unlimited API access might not be something that can be afforded. | |
|  | SMR 2014-01-30 pretty marginal here-- there is a CSW but hasn't been tested much, also the CKAN API is available, but there isn't much to help the user know this… this use case is not really actionable. Need more specifics on the API functionality that needs to be exposed. | |

### Register New Application with NGDS

Furthermore, the software developer will wish to register their new application with the NGDS in order to promote its use throughout the system.

|  |  |
| --- | --- |
| Use Case ID | **UC\_041** |
| Use Case Name | Contact NGDS admin to provide link to application |
| **Short Description** | The goal of this use case is to capture the need for a way to software developers request the inclusion of application links in the NGDS web site. They will do so via a public e-mail address or via a form that allow them to submit this information. |
| **Actors** | Software developer, NGDS administrator |
| Pre-Conditions | NGDS website is available and its URI is know by the software developer |
| Success End Conditions | NGDS software developers can provide a link to their applications and this information is incorporated in the list of applications hosted in the NGDS website |
| Data | URIs from software developers  e-mail or URI to website location where developers can post those requests |
| Functions | * Publish new application links via the NGDS system |
| Variants | |
| Exceptions | |
| Open Issues (Please use this field to indicate questions/comments on the use case) | |

## End-User Use Cases



Figure 8 End-user use cases overview

### Discover and Gather Data



Figure 9 Data gathering supporting use cases

#### Map-Based Search

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_014** |
| Use Case Name | | Map-based search |
| **Short Description** | | The goal of this use case is to support users discovery of metadata by using maps. Map-based search consist in zooming, panning and selecting a region in a map. This search method can be used together with other search methods, to narrow down the data in a search. |
| **Actors** | | End User/Data Consumer |
| Pre-Conditions | | System is correctly installed and operational |
| Success End Conditions | | The user can visualize a result of a search as layers in a map. |
| Data | | Metadata features shown as layers (WFS protocol), metadata summary of selected data items on map (when users click on a data point in the map) |
| Functions | | * Map navigation capability: panning, zooming, selecting sub-regions * Retrieve metadata record for selected elements in a map |
| Variants | | |
| Step | Actor | Description |
| 1a |  | Include other types of search as landmark-based, coordinate-based, content-based, etc. |
| Exceptions | | |
| Step | Actor | Description |
|  | NGDS System | In case of failure to display layers due to network errors, for example, the system should notify user of the situation |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_013** |
| Use Case Name | | Landmark-based search |
| **Short Description** | | The goal of this use case is to allow users to utilize landmarks (state, city, county, district, known geothermal sites) to narrow down the search in the catalog. This search method can be used together with other search methods, to narrow down the data in a search. |
| **Actors** | | End User/ Data Consumer |
| Pre-Conditions | | A database of landmarks and their geo-locations must be available for search |
| Success End Conditions | | The user finds information based on landmarks |
| Data | | Landmark name |
| Functions | | * Find landmark * Retrieve landmark geo-location |
| Variants | | |
| Exceptions | | |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |
| ID | Issue Description | |
| 1 | As noted by one of the monitors this needs to be clarified with Antro-tech. what is a landmark? What are examples of landmarks? How difficult would it be to support landmark-based search in our approach? Can we reuse functionality from search engines as Google map services to do this?  DN: Agree. I think pushing that off to the map vendor is a good approach as funding is limited within NGDS. Still, a request from Anthro-tech for clarification would be good. | |
|  | SMR 2014-01-30 doesn't seem to work | |

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_015** |
| Use Case Name | | Coordinate-based search |
| **Short Description** | | The goal of this use case is to allow users to utilize geographical coordinates to narrow down the search in the catalog. |
| **Actors** | | End User/Data Consumer |
| Pre-Conditions | |  |
| Success End Conditions | | The user finds information based on geographical coordinates |
| Data | | Geographical coordinates |
| Functions | | * Validate coordinates * Retrieve data from the system based on proximity or containment within geographical coordinates |
| Variants | | |
| Exceptions | | |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |
| ID | Issue Description | |
| 1 | As noted by one of the monitors this needs to be clarified with Antro-tech. do the users need to type coordinates? Is there a UI-based way to support this search without requiring users to type those coordinates, for example, by drawing a box in a map?  I think the onus should be on the end user to figure out where the landmark is and locate it on the map. It is very unclear what the landmark means. | |

#### Keyword-Based Search

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_016** |
| Use Case Name | | Keyword content-based search |
| **Short Description** | | The goal of this use case is to allow users to search data by its metadata content registered in the catalog.  If data comes in tier 3 format, it includes its indexed content; if it comes in Tier1 and Tier2 formats, the search is based on whatever could be extracted/converted/indexed into data or meta-data. |
| **Actors** | | End User/Data Consumer |
| Pre-Conditions | | There is metadata in the catalog |
| Success End Conditions | | The user finds information based on metadata content |
| Data | | All metadata stored in the NGDS catalog |
| Functions | | * Content-based search of metadata records * Content-based search of data content |
| Variants | | |
| Exceptions | | |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |
| ID | Issue Description | |
| 1 | DN: There may be a need for a basic thesaurus but hard to make with a limited budget. | |
|  | SMR 2014-01-30: uploaded content is not indexed. Search is entirely based on metadata content, which includes tagging by data providers. Resources are not consistently keyword from a controlled vocabulary; such a vocabulary was developed fall 2013, and tags in State geothermal data were mapped to the keywords and metaedata updated to begin move to formal keyword, but it is incomplete and needs additional curation work. | |

#### Refining Results and Faceted Search

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_019** |
| Use Case Name | | Filter results by type |
| **Short Description** | | The user can also narrow down its search results by specifying certain data types of interest, thus ruling out all other data that do not belong to these types from the returned list of search results. |
| **Actors** | | End User/Data Consumer |
| Pre-Conditions | | A search was performed and a subset of the metadata from the catalog was retrieved by the NGDS catalog.  The search result is displayed as a list of metadata records |
| Success End Conditions | | The user can narrow down the search results |
| Data | | A subset of metadata obtained by a search  A list of metadata types present in the subset of metadata under consideration |
| Functions | | * Filter metadata set by type |
| Variants | | |
| Exceptions | | |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |
|  | SMR 2014-01-30: works best on user defined tag processing built into CKAN; doesn't work for category/facet based filters, generally doesn't return results. | |

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_020** |
| Use Case Name | | Filter results by metadata attributes |
| **Short Description** | | Different content models prescribe different attributes to different types of data, these attributes can be used to further refine the search result, for example, excluding data points for which their metadata record do not have certain attribute content values. |
| **Actors** | | End User/Data Consumer |
| Pre-Conditions | | A search was performed and a subset of the metadata from the catalog was retrieved by the NGDS catalog.  The search result is displayed as points in a map and as a list of metadata records |
| Success End Conditions | | The user can narrow down the search results |
| Data | | A subset of metadata obtained by a search  A list of metadata types present in the subset of metadata under consideration |
| Functions | | * Filter metadata set by attribute content |
| Variants | | |
| Exceptions | | |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |
| ID | Issue Description | |
| 1 | Missing Filters: by location terms, geothermal thematic terms, source organization, publication date, popularity and user ratings. Requirements need to clearly indicate that these vocabularies will exist on which such faceted filtering can be performed.  ND: This should be a requirement for the metadata team | |
|  | SMR 2014-01-30 this only works if the user knows the index field names and the Lucene syntax to use.. There is no 'refine search' function that allows fielded or free text filter restrictions. | |

|  |  |
| --- | --- |
| Use Case ID | **UC\_018** |
| Use Case Name | Filter results [geographically] on map |
| **Short Description** | Once a search is made and search results is displayed as points on a map, the user can narrow down its search by selecting a sub-area in the map, thus filtering out all data points that are outside that geographical region. |
| **Actors** | End User/Data Consumer |
| Pre-Conditions | A search was performed and a subset of the metadata from the catalog was retrieved by the NGDS catalog.  The search result is displayed as points in a map |
| Success End Conditions | The user can narrow down the search results |
| Data | A subset of metadata obtained by a search |
| Functions | * Select region in a map * Filter search results based on a bounding box on a map |
| Variants | |
| Exceptions | |
| Open Issues (Please use this field to indicate questions/comments on the use case) | |

### Validate and Evaluate Data



Figure 10 Data validation supporting use cases

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_017** |
| Use Case Name | | Browse/view metadata search results |
| **Short Description** | | The goal of this use case is to allow users to visualize the results of a search and inspect its content.  This visualization is supported by metadata lists and maps. |
| **Actors** | | End User/Data Consumer |
| Pre-Conditions | | A search was performed and a subset of the metadata from the catalog was retrieved by the NGDS catalog. |
| Success End Conditions | | The user can find what he/she is looking for |
| Data | | A subset of metadata obtained by a search |
| Functions | | * Browse search results * Inspect elements in a map ?? |
| Variants | | |
| Exceptions | | |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |
|  | SMR 2014-01-30 see center points of bounding boxes, clidking on result shows BB for that result. Can display WMS for data offered through services, and CKAN provides some simple graphing function for CSV files. This use case is too poorly described to be actionable. | |

#### Metadata Evaluation

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_026** |
| Use Case Name | | View metadata record |
| **Short Description** | | After locating a piece of metadata in the catalog, the user inspects the metadata record in more detail, for example, to decide if it refers to the data she is looking for. |
| **Actors** | | End User/Data Consumer |
| Pre-Conditions | | A search was performed and a metadata record was selected for further inspection |
| Success End Conditions | | The user is able to access and view the contents of the metadata |
| Data | | Documents and structured records stored in GTDA repository or third party repositories. The data is located through a URI |
| Functions | | * Retrieve metadata record * Visualize metadata record |
| Variants | | |
| Exceptions | | |
| Step | Actor | Description |
|  | User | In case the URI pointed by the metadata record becomes unavailable during the execution of this procedure, the system must provide an error message. The metadata record may be marked as invalid. |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |
| ID | Issue Description | |
| 1 | Missing requirements for other “views” of metadata, for example as human-readable HTML, or as an ATOM entry. These are just low-hanging fruit. | |
|  | SMR 2014-01-30 display of metadata is very poor presentation; the HTML needs A LOT of work | |

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_024** |
| Use Case Name | | Provide peer ratings |
| **Short Description** | | By inspecting data reviews posted by other users, a user can gauge the accuracy and validity of data. Peer ratings can include textual description, star ratings or both.  This UC captures the fact that the system must provide support for peer ratings.  As part of this use case, users can also post peer ratings. There is no restriction of who can post those ratings. The user log-in information is used to identify the peer rating poster |
| **Actors** | | End User/Data Consumer |
| Pre-Conditions | | The existence of ratings posted by other peers for the case of review  None if the user will be the first to post a rate |
| Success End Conditions | | The user is able to view peer ratings text and star ratings in the metadata posted in the NGDS catalog. |
| Data | | Peer ratings and their textual description that are attached to metadata in features of the map and the search results list |
| Functions | | * Provide peer ratings star rating and text for a given metadata record * Post a peer rating * Store peer reviews |
| Variants | | |
| Step | Actor | Description |
| 2b | User | Include use case <<view metadata content>>, <<view document content>>  Post a peer rating |
| Exceptions | | |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |
| ID | Issue Description | |
| 1 | This feature leads me to suggest that optional user profile fields indicating who a reviewer is (e.g Steve Richard of AZGS rates this 3 stars) | |

#### Data Comparison

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_022** |
| Use Case Name | | Triangulate with other sources |
| **Short Description** | | Users may compare the metadata returned by the system with external data layers, provided by external WFS sources such as demographics, topological, weather, and so on, thus helping them to make inference on the quality of the information. These use cases can also be performed by third party applications that consume the data published in NGDS |
| **Actors** | | End User/Data Consumer |
| Pre-Conditions | | A search was performed and a subset of the metadata from the catalog was retrieved by the NGDS catalog. |
| Success End Conditions | | The user compares the returned metadata with third party data sources and comes to a conclusion |
| Data | | External data sources as WFS providers for map layers  Metadata from the system |
| Functions | | * Download data * Export data via standard protocols to third party applications |
| 5 | User | Compares the data manually with their own, or with the help of a CAD tool. |
| Variants | | |
| Step | Actor | Description |
| 3b | User | Uses CAD tool, via WFS to read NGDS repository data |
| 4b | NGDS System | Exports data via WFS for third party CAD tool. |
| Exceptions | | |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |
| ID | Issue Description | |
| 1 | It is not clear if the scope of the system includes the mashing up of information with external data sources. This seems to be an advanced feature that may be better achieved by utilizing third party CAD tools.  DN: Agree! | |
|  | RC: The general idea is that you compare the data in a particular dataset to some other known data. This should be fleshed out as requirements for accessibility and download of data. | |
|  | MM: There is an opportunity here to enable crowd sourced information about resources via this use case. | |

#### Storing and Sharing Search Results

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_025** |
| Use Case Name | | View data content |
| **Short Description** | | After locating a piece of data, the user inspects the data content by URI element that the metadata refers to. |
| **Actors** | | End User/Data Consumer |
| Pre-Conditions | | A search was performed and a metadata record was selected for further inspection |
| Success End Conditions | | The user is able to access the data pointed by the metadata record |
| Data | | Documents and structured records stored in NGDS repository or third party repositories. The data is located through a URI |
| Functions | | * Retrieve URI document * Open and display document content to user |
| Variants | | |
| Exceptions | | |
| Step | Actor | Description |
|  | User | In case the URI pointed by the metadata record becomes unavailable during the execution of this procedure, the system must provide an error message. The metadata record may be marked as invalid. |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |
| ID | Issue Description | |
| 1 | WMS can be shown on map. WFS, CSV data can be displayed in tabular view. This provides rudimentary data browse/evaluate capability.DN: Long URLs can be aliased via a URL shortener. This may be better as it does not require the system to preserve the state of a specific search yet allows the search to be shared. A discussion to have. Rather than save the search criteria, maybe it should just provide a URL encoded string that can be used to represent the same state. This is less expensive from a systems perspective. Example - https://www.google.ca/search?q=NGDS&oq=ngds &sugexp= chrome, mod=0 &sourceid=chrome&ie=UTF-8 | |

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_010** |
| Use Case Name | | Save selected search criteria |
| **Short Description** | | The goal of this use case is to allow users to save searches, to be reused in a later time, and for setting up subscriptions to content changes.  In this use case, after the user performs a search, she saves that search parameters for further use. This search then can be used to subscribe to new data, and to continue a previous discovery activity. Searches are saved on the end-user accounts, for their private use. In the future they may be shared among other users.  When saving a search, users can opt to make search public so others can reuse it. |
| **Actors** | | End User/Data Consumer |
| Pre-Conditions | | In order to allow saving and retrieval, the user must be identifiable; hence, there is a need for users (in particular the end user) to be logged in using their unique account. |
| Success End Conditions | | The search criteria is properly validated and saved into the system under a given name. |
| Data | | Search criteria |
| Functions | | * Save search criteria * Validate search criteria * Record search parameters by monitoring user input * Make search public to other users |
| Main Sequence | | |
| Variants | | |
| Step | Actor | Description |
| 1b | Users | Input search criteria in a separate content-based search form, instead of using the included use cases |
| 2b | NGDS System | Uses form-based search as criteria |
| Exceptions | | |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |
| ID | Issue Description | |
| 1 | Should the system support form-based search only or should it record data as shown above? Which option is better?  DN: I would adhere to the architectural principles known as REST. A URI represents the state of a specific resource etc. | |
| 2 | Should the saved searches from one user be visible to other users as Antro-tech indicated that searching is a collaborative process?  Maybe searches are not saved under a use id but treated as a resource. They could then be saved under the resource name (URI) and the (anonymous) user could create a bookmark to access the search later. This bookmark/URL can also be shared with other users.  DN: Agree. | |

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_012** |
| Use Case Name | | Load previous search criteria |
| **Short Description** | | The goal of this use case is to support users in loading previously saved search criteria. They do so by browsing through their list of saved searches. |
| **Actors** | | End User/Data Consumer |
| Pre-Conditions | | In order to allow saving and retrieval, the user must be identifiable; hence, there is a need for users (in particular the end user) to be logged in using their unique account. |
| Success End Conditions | | The loaded search criteria is loaded and executed, displaying results in the system |
| Data | | Saved search criteria |
| Functions | | * Load saved search criteria |
| Variants | | |
| Exceptions | | |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |
| ID | Issue Description | |
| 1 | DN: Again, about the need to authentication in order to save a search, this is possibly not true. A saved search can be represented by a URI. Who made it is not relevant. | |

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_023** |
| Use Case Name | | e-mail metadata record URI to third party users |
| **Short Description** | | After a search, users can also choose to e-mail the metadata set URI to other users in order to collect opinions on the quality of the metadata and possibly the data also. |
| **Actors** | | End User/Data Consumer |
| Pre-Conditions | | A search was performed and a subset of the metadata from the catalog was retrieved by the NGDS catalog. |
| Success End Conditions | | An e-mail is sent out to a recipient with a URI to the report on the current metadata set obtained through the system |
| Data | | URI to Metadata from the system  Search information |
| Functions | | * E-mail metadata report * Build metadata report |
| Variants | | |
| Step | Actor | Description |
| 1b | NGDS System | Runs periodic subscription query  Goes to step 4 |
| Exceptions | | |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |
| ID | Issue Description | |
| 1 | This ought to include not only email, but RSS, Facebook, Twitter, Google+ and maybe Reddit and/or Yammer? | |
| 2 | DN: DERIVED REQUIREMENT: If you do this, you must also add in mechanisms to prevent this system from being used to spam people or abuse it in other ways. | |
|  | SMR 2014-01-30 allows posting to Google+, Facebook, Twitter, but not e-mail to specific address. This is out of box CKAN function I think. | |

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_011** |
| Use Case Name | | Subscribe to new data |
| **Short Description** | | The goal of this use case is to allow users to utilize saved search criteria as subscriptions to new content published in the catalog that matches specific criteria.  Users will be notified via e-mail, when new data that has been input in the system, matching that subscription criteria was published |
| **Actors** | | End User/Data Consumer |
| Pre-Conditions | | In order to allow subscriptions and notifications to occur, the user must be identifiable; hence, there is a need for users (in particular the end user) to be logged in using their unique account.  The search criteria used in the subscription is properly validated and saved into the system under a given name |
| Success End Conditions | | A subscription is successfully performed |
| Data | | saved search/subscription criteria,  user e-mail obtained from user profile  subscription name |
| Functions | | * Load search criteria * Subscribe to search criteria * System notification service that periodically notifies users of matched searches |
| Variants | | |
| Exceptions | | |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |
| ID | Issue Description | |
| 1 | DN: Is it possible this can be done without using saved search criteria? | |

### Analyze and Visualize Data



Figure 11 Data analysis

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_027** |
| Use Case Name | | Export metadata |
| **Short Description** | | Users can export metadata records for different purposes, for example, to integrate them into their reports and spreadsheets, to further analyze these records with a CAD system, etc. |
| **Actors** | | End User/Data Consumer |
| Pre-Conditions | | Metadata was gathered and filtered |
| Success End Conditions | | The user is able to save the metadata records |
| Data | | Metadata records managed by GTDA |
| Functions | | * Retrieve metadata records * Visualize metadata records |
| Variants | | |
| Exceptions | | |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |
| ID | Issue Description | |
| 1 | If there is more than one metadata record type, how the user would like to have the report? One CSV file per metadata type? | |
| 2 | It is beyond the scope of this project the development of tools or providing support for detailed analysis of data. Hence, the need for exporting the data for further analysis. | |
| 3 | DN: Is CSV the only option here? Would it be possible that some users want JSON or XML?  Would suggest yes. JSON is probably the most useful but it depends on the data models (content models). I would hate to try and represent complex binary data as CSV. | |
|  | SMR 2014-01-30 Typical Siemens confusion of data and metadata that plagued project development. Metadata can be harvested and tabular data can be accessed using CKAN API, but that's not tested or documented; I think the idea here is the kind of functionality implemented by the NGDS data explorer. | |

## System Administrator Use Cases



Figure 12 NGDS Administration use cases

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_036** |
| Use Case Name | | Register new nodes into NGDS |
| **Short Description** | | The goal of this use case is to allow NGDS administrators to respond to new node requests. The administrator should evaluate the validity of the request, accepting, or rejecting it. |
| **Actors** | | NGDS administrator |
| Pre-Conditions | | Node-in-the box properly installed as a NGDS node management hub  Client node-in the box properly installed but not yet registered  The new node must have at least one unique data or metadata record not currently in the system. |
| Success End Conditions | | A new node is registered in the network, and the data it provides becomes searchable in the by the NGDS catalog |
| Data | | e-mails, NGDS nodes registry |
| Functions | | * add new node * index new node |
| Variants | | |
| Step | Actor | Description |
| 2b | NGDS Administrator | Rejects request based on external criteria |
| Exceptions | | |
| Step | Actor | Description |
| 1 | NGDS System | Raise exception in case of incompatible/invalid protocols.  Unless they support the common standards and protocols that they cannot join. |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |
|  | SMR 2014-01-30 Since we have no registry of nodes, there is nothing to register nodes into…Setting up a harvest from another node is about as close as it gets. | |

|  |  |
| --- | --- |
| Use Case ID | **UC\_038** |
| Use Case Name | Delete nodes from NGDS network |
| **Short Description** | The goal of this use case is to allow NGDS administrators to respond to remove previously registered nodes from the system. |
| **Actors** | NGDS administrator |
| Pre-Conditions | Node-in-the box properly installed as a NGDS node management hub  The node to be removed is currently registered |
| Success End Conditions | A currently registered node is removed from the network, and the metadata records referencing this node are removed from the NGDS catalog |
| Data | NGDS nodes registry, NGDS catalog data |
| Functions | * Remove existing node * Remove index for node |
| Variants | |
| Exceptions | |
| Open Issues (Please use this field to indicate questions/comments on the use case) | |

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_039** |
| Use Case Name | | Communicate with the Node-in-a-box admin |
| **Short Description** | | The goal of this use case is to allow node-in-a-box admins and NGDS admins to communicate in the handling of administration issues such as request node removal, check node registration information, etc. |
| **Actors** | | NGDS administrator, node-in-a-box administrator |
| Pre-Conditions | | Node-in-the box is properly installed and configured  Administrator has registered her e-mail information |
| Success End Conditions | | Administrators can communicate with each other |
| Data | | e-mails |
| Functions | | * send email to administrator |
| Variants | | |
| Exceptions | | |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |
| ID | Issue Description | |
| 1 | DN: I would rank the implementation of this use case as a low priority. This can be done by simply placing a mailto:xxx@xxx.com link on a page and letting the users own email client handle it. This seems a bit much to build into the system. | |

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_037** |
| Use Case Name | | Manage NGDS user accounts |
| **Short Description** | | Allows the system administrator to manage NGDS users. This will allow the system administrator to add and remove users on the administered node, and assign user roles and group membership. |
| **Actors** | | NGDS administrator |
| Pre-Conditions | | NGDS network is properly installed and configured |
| Success End Conditions | | The administrator is able to perform the main administration operations |
| Data | | User records |
| Functions | | * Add user * Delete user * Modify user permissions and roles |
| Variants | | |
| Exceptions | | |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |
| ID | Issue Description | |
| 1 | DN: Not sure if this is a use case I agree with. I think it would be better to delegate this to node administrators. If there is a user that the NGDS super admin wants removed, he or she can communicate that to the node admin perhaps? The worry is that the super NGDS admin would have to understand the metadata and data that the user is associated with before deleting to ensure no data or metadata is left orphaned. The decision is not mine but I encouraged discussion on this point. | |

## Use cases common to all users

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_001** |
| Use Case Name | | Login |
| **Priority [1-3] higher is more important** | | 3 |
| **Reason for priority** | | User authentication is a basic activity that is a pre-condition for many other use cases. Failing to implement it is a show-stopper. |
| **Short Description** | | The goal of this use case is to uniquely identify and authenticate a user, allowing the system to enforce access policies, and to use the user information to automatically fill in forms data, save searches and subscriptions, identify comments, etc. |
| **Actors** | | Data Submitter, End User, Data Steward, System Administrator |
| Pre-Conditions | | The user is logged out of the system |
| Success End Conditions | | The user is logged in and authenticated with the system |
| Data | | User login and password, or credentials collected in a third party authentication service |
| Functions | | * Authenticate user using system credentials * Authenticate user using third party services, for example: Facebook, Gmail, and others |
| Variants | | |
| Step | Actor | Description |
|  |  | 1. User forgets password but remembers username 2. User forgets username but remembers password 3. User forgets both username and password 4. User forgets username/password and the email they used to register. |
| Exceptions | | |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |
| ID | Issue Description | |
| 1 | DN: Password recovery tools could be added. Depending on the level of sophistication, enforcing a inimum set of standards for password might also be prudent. | |

|  |  |  |
| --- | --- | --- |
| Use Case ID | | **UC\_002** |
| Use Case Name | | Logout |
| **Priority [1-3] higher is more important** | | 3 |
| **Reason for priority** | | User authentication is a basic activity that is a pre-condition for many other use cases. Failing to implement it is a show-stopper. |
| **Short Description** | | This allows a logged-in user to gracefully end and close their session |
| **Actors** | | Data Submitter, End User, Data Steward, System Administrator |
| Pre-Conditions | | The user is logged in the system |
| Success End Conditions | | The user is logged out with no negative side effects to the system |
| Data | | Current user section and credentials |
| Functions | | * Logout user |
| Variants | | |
| Exceptions | | |
| Open Issues (Please use this field to indicate questions/comments on the use case) | | |
| ID | Issue Description | |
| 1 | DN: This implies session management. If that is the case, it is not noted as a requirement. Otherwise the user would not need to end a session. They could just close the browser window and walk away. | |

# Acronyms, and Abbreviations

The following table lists the abbreviations used in this document, in order to promote their unique and unambiguous usage throughout the document and the Project.

|  |  |
| --- | --- |
| **Abbreviations** | **Definition** |
| DOE | Department of Energy |
| NGDS | National Geothermal Data System |
| SDD | Software Design Description |
| DIS | Data Import Schema |
| OGC | Open Geospatial Consortium |
| WSS | Web Services Specification |
| ORM | Object-Relational Mapping |
| WMS | Web Map Service |
| WFS | Web Feature Service |
| CSW | Catalogue Service for the Web |
| WCS | Web Coverage Service |
| NetCDF | Network Common Data Form |
| API | Application Programming Interface |
| CSV | Comma-Separated file format |
| URI | Uniform Resource Identifier |
| URL | Uniform Resource Locator |
| OAI-PMH | Open Archives Initiative – Protocol for Metadata Harvesting |
| UTM | Universal Transverse Mercator coordinate system |

Table 1: Abbreviations