



Technical documentation

D1.2. Use Cases

Versions

Version	Date	Comment	Responsible
0		Initial document structure	ST
1	2016-10-24	Added use top level use case, actors list and first version of use cases.	AV

Table of Contents

1	Introduction.....	2
1.1	Background.....	2
1.2	Scope.....	3
1.3	Audience.....	3
1.4	Applicable documents.....	3
2	Top level use case.....	3
3	Actors.....	4
3.1	Data Consumer.....	4
3.2	Data Producer.....	4
3.3	Data Manager.....	4
3.4	Service Manager.....	4
4	Use Cases.....	5

Index of Use Cases

Table 1:	Interactive data discovery.....	6
Table 2:	Specifying a personal user profile.....	7
Table 3:	Selection basket.....	8
Table 4:	Simple interactive data access.....	9
Table 5:	Advanced interactive data access.....	10
Table 6:	Simple subscription.....	11
Table 7:	Advanced subscription.....	12
Table 8:	Simple visualisation.....	13
Table 9:	Advanced visualisation.....	14
Table 10:	Transformation.....	15
Table 11:	Test dataset for conformance.....	16
Table 12:	Simple data upload.....	17
Table 13:	Advanced data upload.....	18
Table 14:	Data management.....	19

1 Introduction

1.1 Background

The NorDataNet project aims at *providing the scientific community with an integrated, cost-efficient and sustainable infrastructure following established standards for data documentation, archiving, search and exchange*. Focus is on coordination of efforts and requirements, enhancing interoperability and user interfaces to existing facilities, as well as development of toolboxes for data documentation in order to reduce technical and governance obstacles. The infrastructure must provide online access to data and facilitate long term preservation, in order to maximise the benefit of public funds invested in the datasets. The intention is to link existing institutional and discipline specific systems to promote science regardless of geographical and institutional location.

<Trykk og skriv>

1.2 Scope

Development of specific use cases will clarify the user roles, workflow and functional requirements of the system, with regard to data management and preservation, data publication (data exposure), data discovery, and data access. An initial version of the document will be distributed to the user community for feedback and further input to the design process.

1.3 Audience

<Trykk og skriv>

1.4 Applicable documents

- [1] Norwegian Scientific Data Network (NorDataNet) Project Plan, revision 19, NFR Contract 245967
- [2] NorDataNet Concepts and acronyms, Version 0.1
- [3] NorDataNet Use cases, Version 0.1
- [4] NorDataNet System requirements, Version 0.1
- [5] NorDataNet System design and interfaces, Version 0.1
- [6] NorDataNet, System implementation and integration plan, Version 0.1

2 Top level use case

A top level view of user operations the NorDataNet SDI is shown in Figure 1. The diagram uses Unified Modelling Language (UML) notation, where the “stick” figures indicate an “actor”, a role held by a group of users or an external system, and the “ovals” indicate a use case, a user level operation in the system.

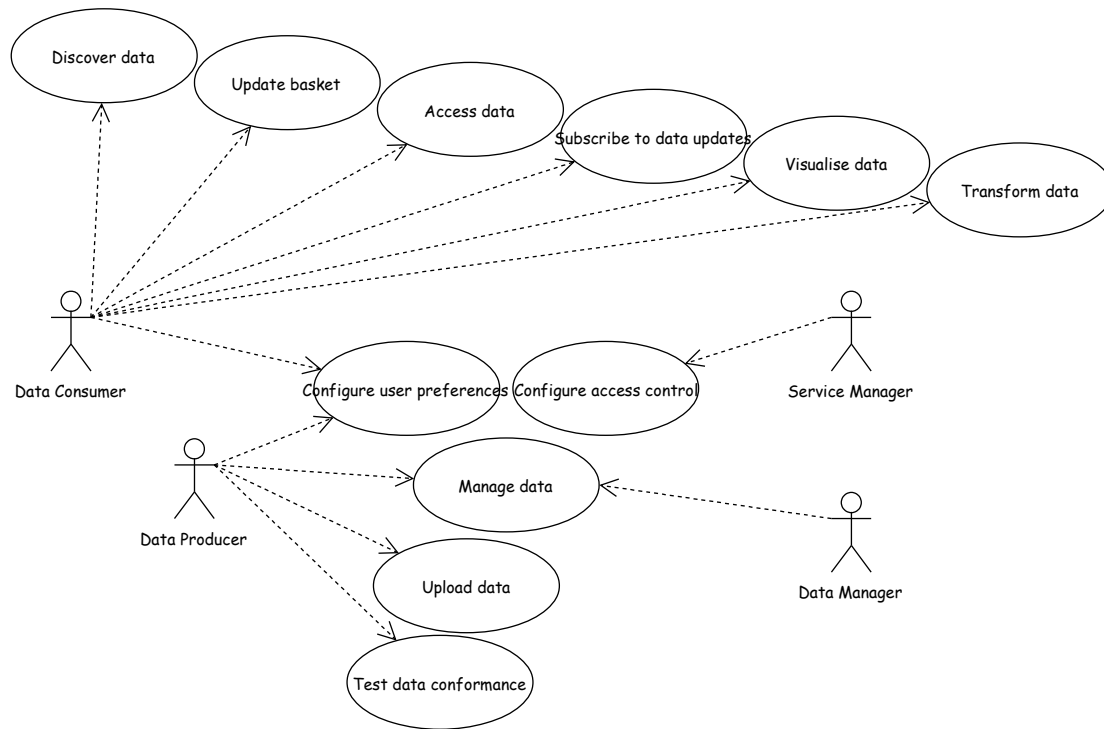


Figure 1 Use case diagram for the NorDataNet SDI.

3 Actors

The main actors using the NorDataNet SDI are described below.

3.1 Data Consumer

The Data Consumer may be a scientist or student (internally to the consortium or external), employee of a governmental agency, consultant or some other external person with a professional or personal interest in a discipline for which NorDataNet offers data access. This actor is utilising most of the use cases defined.

3.2 Data Producer

The Data Producer is generating datasets managed by the NorDataNet SDI. Within the NorDataNet project, data producers are always internal to the consortium (i.e. project partners). Data producers should be able to maintain datasets they have committed.

3.3 Data Manager

The Data Manager has the overall responsibility for the datasets managed by the NorDataNet SDI and for keeping the system in a consistent state. The Data Manager should be able to track datasets and provide extended help (uploading, amending, deleting, ...) to data providers that has trouble managing datasets they are responsible for, as well as being able to generate statistics of e.g. the number of datasets of relevance to a specific project.

3.4 Service Manager

The Service Manager is responsible for maintaining the other actors' access to the system and specifies authorisation levels for each actor.

4 Use Cases

This section describes important user operations in a precise and structured manner, using a language that is easy to read and understand for all users of the NorDataNet SDI. The focus is on specifying what a user needs/wants to do, leaving out..

Table 1: Discover data.

Use Case Name	Discover data
Use Case Goal	To enable users to interactively find information about relevant data and/or products.
Actors	Data Consumer
Pre-Conditions	<ol style="list-style-type: none"> 1. An existing Metadata Catalogue is accessible for browsing or searching. 2. Metadata are synchronised between the contributing nodes.
Post-Conditions	The user receives the information needed to select and download relevant data or products.
Normal Flow	<ol style="list-style-type: none"> 1. The Data Consumer composes a search request using concepts like scientific keywords, geographical and temporal constraints. 2. The search request is forwarded to the Metadata Catalogue. 3. The catalogue responds with an ordered list describing the relevant datasets and products including online reference to the datasets. 4. The Data Consumer browses the retrieved list of metadata for relevant datasets and products, and selects those of interest for later use.
Notes and Issues	1. Interfaces and vocabularies should be consistent with SeaDataNet, GCMD, WIS and INSPIRE ¹ .
Last Updated	2016-07-05
Last Updated By	Torill Hamre

¹ When adequately developed.

Table 2: Configure user preferences.

Use Case Name	Configure user preferences
Use Case Goal	To enable a personal system interface and configuration of personal details, e.g. email, name, etc.
Actors	Data Consumer
Pre-Conditions	The user is authenticated ² .
Post-Conditions	The Data Consumer has personalised his interface and profile.
Normal Flow	1. The Data Consumer specifies personal details and preferences concerning viewing and access mechanisms.
Notes and Issues	The personalised interface is reflected in the products listed and not in the user interface.
Last Updated	2016-10-25
Last Updated By	Aleksander Vines
	Should a Service Manager be able to specify this on behalf of users?

² Probably required to be able to offer higher order services which require extensive server side handling.

Table 3: Configure access control

Use Case Name	Configure access control
Use Case Goal	To enable access of users to different service levels.
Actors	Service Manager
Pre-Conditions	<ol style="list-style-type: none"> 1. Data are available and documented in the metadata catalogue. 2. The user is authenticated³ and authorised to give access to specific products. 3. At least one Data Consumer is registered in the database.
Post-Conditions	The Data Consumer is authorised to access products in accordance with the authorisation level.
Normal Flow	<ol style="list-style-type: none"> 1. The Service Manager specifies the service level for the Data Consumer and the various services he/she has access to. 2. The Service Manager identifies classes of products and separate products the Data Consumer shall have access to.
Notes and Issues	
Last Updated	2016-10-25
Last Updated By	Aleksander Vines
	Should a data manager also have access to this?

³ Probably required to be able to offer higher order services which require extensive server side handling.

Table 4: Update basket.

Use Case Name	Update basket
Use Case Goal	To enable users to select multiple datasets for further processing.
Actors	Data Consumer
Pre-Conditions	1. Data are available and documented in the catalogue. 2. The user is authenticated ⁴ .
Post-Conditions	The user has a selection of products available in the basket and can select further services ⁵ to be applied on these.
Normal Flow	1. The user has found a selection of products using the discovery interface. 2. Each item of interest in the discovery interface is tagged for addition to the basket. 3. The basket contains a list of products that are prepared for further handling using higher order services within the system.
Notes and Issues	
Last Updated	2016-10-25
Last Updated By	Aleksander Vines

⁴ Probably required to be able to offer higher order services which require extensive server side handling.

⁵ E.g. visualisation, download, subscription, transformation.

Table 5: Access data – simple.

Use Case Name	Access data – simple
Use Case Goal	To serve users with full datasets.
Actors	Data Consumer
Pre-Conditions	<ol style="list-style-type: none"> 1. The desired data or product has been identified by the user using a catalogue discovery interface leaving the user with an URL for the requested dataset. 2. The user has been authenticated and authorised to access the requested product⁶. 3. Delivery is achievable through one of the supported data access interfaces.
Post-Conditions	The user has received the data requested.
Normal Flow	<ol style="list-style-type: none"> 1. The user requests a dataset or a product on a one-time basis. 2. Direct access to the product is provided through a standardised interface to the data repository.
Notes and Issues	<ol style="list-style-type: none"> 1. This use case focus on delivering a full product, no subsetting or tailoring of the product to user needs is done. 2. Data are delivered using HTTP, FTP⁷, OpeNDAP, OGC WCS⁸ and OGC WFS as appropriate. In the current situation OGC technologies are not widely used within the scientific community except for visualisation. 3. If restrictions apply to a product, the user is requested to authenticate, otherwise products are freely available and no authentication/authorisation is required.
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⁶ Generally products will be freely available.

⁷ If requested by user community.

⁸ If requested by user community and mature technology concerning the type of data to be served.

Table 6: Access data – advanced.

Use Case Name	Access data – advanced
Use Case Goal	To serve users with data that is tailored to the specific needs of the user.
Actors	Data Consumer
Pre-Conditions	<ol style="list-style-type: none"> 1. The desired data or product has been identified by the user using a catalogue discovery interface and added to the basket. 2. The user has been authenticated and authorised to access the requested product. 3. Delivery is achievable through one of the supported data access interfaces. 4. A data transformation capability is integrated in the interactive user interface.
Post-Conditions	The user has received the data requested in the form requested and for the subset requested.
Normal Flow	<ol style="list-style-type: none"> 1. The Data Consumer composes a data request identifying file format, map projection, geographical area, temporal time span, parameter subset, level subset etc. 2. The Data Consumer requests a dataset or a product on a one-time basis. 3. The data access interface forwards the request to the transformation service which performs the necessary processing. 4. The transformation service returns a transformed dataset fulfilling the requirements or a message on when the dataset will be available. 5. The data access interface returns proper information (either dataset or message) to the user. 6. Direct access to the product is provided through a standardised interface to the data repository.
Notes and Issues	<ol style="list-style-type: none"> 1. See relevant notes from Table 5. 2. This feature relates to Table 11:Transformation and Table 4: Basket.
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Last Updated By	Aleksander Vines

Table 7: *Subscribe to data updates – simple.*

Use Case Name	Subscribe to data updates – simple
Use Case Goal	To enable users to receive regular updates of a dataset or product.
Actors	Data Consumer
Pre-Conditions	<ol style="list-style-type: none"> 1. Data are available and documented in the catalogue. 2. Data are regularly updated. 3. The Data Consumer is authenticated and authorised for the action. 4. A service level agreement is available for delivery to external computers.
Post-Conditions	The Data Consumer receives updates of the requested dataset/product when it is available.
Normal Flow	<ol style="list-style-type: none"> 1. The Data Consumer identifies datasets/products that are requested for regular delivery using the data discovery interface. 2. The Data Consumer provides delivery information and acknowledges the appropriate service level agreement. 3. The products are scheduled for regular delivery to the Data Consumer.
Notes and Issues	<ol style="list-style-type: none"> 1. This use case focus on delivering a full dataset/product, no sub-setting or tailoring of the dataset/product to user needs is done. 2. Data should be delivered using both pull and push technology as requested by the user. E.g. the user may receive an e-mail containing a URL to the updated dataset/product when it is available or the user may request it to be delivered directly to a computer controlled by the user. 3. If data are to be delivered to external computers, clear service level agreements are needed to identify the responsibility of NorDataNet and the responsibility of the user as well as how delivery failures are handled. 4. This use case may be out of scope for NorDataNet as NorDataNet is considered to be a scientific tool.
Last Updated	2016-10-24
Last Updated By	Aleksander Vines

Table 8: *Subscribe to data updates – advanced.*

Use Case Name	Subscribe to data updates – advanced
Use Case Goal	To enable users to receive regular updates of a product in a tailored form.
Actors	Data Consumer
Pre-Conditions	<ol style="list-style-type: none"> 1. Data are available and documented in the catalogue. 2. Data are regularly updated. 3. The Data Consumer is authenticated and authorised for the action. 4. A transformation service is available.
Post-Conditions	<ol style="list-style-type: none"> 1. Data Consumer has received a personal copy of the requested dataset. 2. The product received is tailored to the specific needs of the user, i.e. has the file format, geographical and temporal coverage requested and only the content requested (not a full product). 3. A product subscription is stored in the system to allow the user to get regular updates of the products.
Normal Flow	<ol style="list-style-type: none"> 1. The Data Consumer identifies products which are requested for regular delivery using the data discovery interface. 2. The Data Consumer provides delivery information, including a full specification of the form the data is wanted in, and acknowledges the appropriate service level agreement. 3. The products are scheduled for regular delivery to the user.
Notes and Issues	<ol style="list-style-type: none"> 1. This use case focus on delivering a customised dataset/product, including sub-setting or tailoring to user needs. 2. Data should be delivered using both pull and push technology as requested by the user. E.g. the user may receive an email containing a URL to the updated product when a product is available or the user may request the dataset/product to be delivered directly to a computer controlled by the user. 3. If data are to be delivered to external computers, clear service level agreements are needed to identify the responsibility of NorDataNet and the responsibility of the user as well as how delivery failures are handled. 4. This use case may be out of scope for NorDataNet as NorDataNet is considered to be a scientific tool.
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Last Updated By	Aleksander Vines

Table 9: Visualise data – simple.

Use Case Name	Visualise data – simple
Use Case Goal	To enable simple visualisation of individual datasets.
Actors	Data Consumer
Pre-Conditions	<ol style="list-style-type: none"> 1. Data are available and documented in the catalogue. 2. A visualisation service is available. 3. The Data Consumer is authenticated and authorised for the action. 4. The user has found a dataset/product using the data discovery use case.
Post-Conditions	The user receives an image representation of the dataset requested within the integrated viewer.
Normal Flow	<ol style="list-style-type: none"> 1. The Data Consumer requests a visualisation of a dataset. 2. The system asks which parameters should be visualised and in which form. 3. The Data Consumer selects which parameters to visualise and visualisation form (2D map, 2D animation, XY-plot). 4. The system visualises the dataset/product according to the Data Consumer's choice.
Notes and Issues	<ol style="list-style-type: none"> 1. Datasets/Products can have any dimension. 2. Map view, time series view and profile view of a single dataset/product should be supported⁹. 3. This may be considered a simple case of the advanced visualisation, but most likely it is easier to implement a simple visualisation than the advanced visualisation described next, resulting in two different approaches. 4. OGC WMS is the preferred back-end service for maps and images, for time series, profiles etc. the technical solution is open.
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⁹ Depending on the type of dataset.

Table 10: Visualise data – advanced.

Use Case Name	Visualise data – advanced
Use Case Goal	To enable advanced visualisation of multiple datasets.
Actors	Data Consumer
Pre-Conditions	<ol style="list-style-type: none"> 1. Data are available and documented in the catalogue. 2. A visualisation service is available. 3. The Data Consumer is authenticated and authorised for the action. 4. The user has found a selection of products and placed them in the basket (using the data discovery use case and the update basket use case) and wants a graphical representation of elements from all datasets.
Post-Conditions	The user receives an image representation of the datasets requested within the integrated viewer.
Normal Flow	<ol style="list-style-type: none"> 1. The system displays the basket with the pre-selected datasets/products. 2. The Data Consumer marks those elements he wants to visualise from the multiple datasets in the basket. 3. The system asks which parameters of the marked datasets/products should be visualised and in which form. 4. The Data Consumer selects which parameters to visualise and visualisation form (2D map, 2D animation, XY-plot). 5. The system visualises the dataset/product according to the Data Consumer's choice.
Notes and Issues	<ol style="list-style-type: none"> 1. Products can have any dimension. 2. Map view, time series view and profile view of a single dataset should be supported¹⁰. 3. The simple visualisation may be a simplification of the advanced visualisation, but it is likely that this is implemented in two steps with at least a temporary solution for simple visualisation until an advanced visualisation is available. 4. OGC WMS is the preferred backend service for maps and images, for time series, profiles etc the technical solution is open.
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Note: Should this use case include transformation? (this can be handled in an alternative flow or by using the transformation use case)	

¹⁰ Depending on the type of dataset.

Table 11: Transform data.

Use Case Name	Transform data
Use Case Goal	To enable transformation of data upon users request.
Actors	Data Consumer
Pre-Conditions	<ol style="list-style-type: none"> 1. Data are available and documented in the catalogue. 2. Data are available in an online data repository in a format or through an interface supported by the system. 3. The Data Consumer is authenticated and authorised for the action. 3. The user has found one or more products which are listed within the discovery interface or the product basket.
Post-Conditions	The Data Consumer receives a transformed product in accordance with his specifications.
Normal Flow	<ol style="list-style-type: none"> 1. The Data Consumer selects among the predefined transformations that are supported. 2. The Data Consumer supplies sufficient information for the transformation to be undertaken. 3. The system responds to user with information on whether this can be done on the fly or has to be an offline service. 4. The system performs the requested transformation. 5. The Data Consumer is notified of the result. 6. The Data Consumer accesses the transformed dataset/product.
Notes and Issues	<ol style="list-style-type: none"> 1. By transformations are understood e.g. the actions FIMEX or GDAL can perform on a dataset (reformatting, re-projecting, sub-setting etc.). 2. In NorDataNet context, this would cover co-locating multiple datasets in the same grid as well. 3. The user receives a dataset/product, not a service.
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Last Updated By	Aleksander Vines

Table 12: Test data conformance.

Use Case Name	Test data conformance
Use Case Goal	To test datasets for conformance prior to upload to the system
Actors	Data Producer
Pre-Conditions	The user is authenticated and authorised for the action.
Post-Conditions	The user receives a message describing the conformance of the dataset.
Normal Flow	<ol style="list-style-type: none"> 1. A Data Producer wants to upload an individual dataset to the system. 2. The Data Producer wants to test conformance prior to upload to avoid problems in the upload process. 3. The Data Producer identifies the dataset to be tested and request upload. 4. The system analyses the received dataset and checks for compliance with formatting and documentation requirements. 5. The system provides feedback to the Data Producer whether the dataset is compliant with the system requirements.
Notes and Issues	<ol style="list-style-type: none"> 1. The number of file formats to support is not known, however the most important is NetCDF/CF with possible extensions to ODV, WMO GRIB, WMO BUFR, HDF-EOS2, HDF-EOS5, Shapefile, etc. Shapefile is believed to be more widely used within the user community than e.g. GML and KML, but this has to be checked. Preferably Shapefile is delivered to users through transformation as it is not suitable for long term data preservation. 2. For some formats, discovery metadata and additional information has to be provided in a separate document. 3. Feedback is provided through an HTML form. The feedback form is presented immediately in the browser if possible, else the user receives a message telling that offline test will be performed and notification of the availability of the form is provided through email. 4. Depending on the solution selected for NorDataNet, this may be out of context.
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Table 13: Upload data – simple.

Use Case Name	Upload data – simple
Use Case Goal	To upload datasets to the system
Actors	Data producer
Pre-Conditions	1. The Data Producer is authenticated and authorised to perform the actions requested.
Post-Conditions	The new dataset is available in the catalogue and in the data repository.
Normal Flow	<ol style="list-style-type: none"> 1. A Data Producer wants to upload a one-time dataset to the system. 2. The Data Producer identifies a dataset and requests it to be uploaded. 3. The system analyses the uploaded dataset and checks for compliance as described in Table 12. 4. If it complies to the requirements, the dataset is stored in the data repository, discovery metadata extracted and inserted in the metadata catalogue, with access restrictions properly set and the dataset is scheduled for backup.
Notes and Issues	<ol style="list-style-type: none"> 1. The number of file formats to support is not known, however the most important is NetCDF/CF with possible extensions to ODV, WMO GRIB, WMO BUFR, HDF-EOS2, HDF-EOS5, Shapefile, etc. Shapefile is believed to be more widely used within the user community than e.g. GML and KML, but this has to be checked. Preferably Shapefile is delivered to users through transformation as it is not suitable for long term data preservation. 2. For some formats, discovery metadata and additional information has to be provided in a separate document. 3. Depending on the solution selected for NorDataNet, this may be out of context.
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Table 14: Data upload – advanced.

Use Case Goal	Data upload – advanced
Use Case Goal	To automate dataset upload for large datasets and regularly updated datasets.
Actors	Data Producer
Pre-Conditions	1. The Data Producer is authenticated and authorised to perform the actions requested.
Post-Conditions	The new dataset is available in the catalogue and in the data repository.
Normal Flow	<ol style="list-style-type: none"> 1. The Data Producer wants to automate dataset upload because manual upload will be impractical (the dataset is very large or it is updated on a regular basis). 2. The Data Producer identifies the product to be uploaded, and specifies additional information as needed (expected update frequency if applicable, needed storage space etc.). 3. The system provides a service level agreement. 4. The system provides a channel, open for the data producer upon proper user authentication, through which the Data Producer may upload the dataset using whatever automated method she/he deems best. 5. During an automated upload, the following occurs: <ol style="list-style-type: none"> a) The system analyses the received dataset and checks for compliance with formatting and documentation requirements. b) The system provides feedback to the Data Producer whether the dataset was accepted or rejected. c) If accepted, the dataset is stored in the data repository, discovery metadata extracted and inserted in the metadata catalogue, with access restrictions properly set and the dataset is scheduled for backup.
Notes and Issues	<ol style="list-style-type: none"> 1. The number of file formats to support is not known, however the most important is NetCDF/CF with possible extensions to ODV, WMO GRIB, WMO BUFR, HDF-EOS2, HDF-EOS5, Shapefile, etc. Shapefile is believed to be more widely used within the user community than e.g. GML and KML, but this has to be checked. Preferably Shapefile is delivered to users through transformation as it is not suitable for long term data preservation. 2. For some formats, discovery metadata and additional information has to be provided in a separate document. 3. Depending on the solution selected for NorDataNet, this may be out of context. 4. The test for conformance might require a different use case than Table 12.
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Table 15: Manage data.

Use Case Goal	Manage data
Use Case Goal	To manage datasets handled by the system
Actors	Data producer Data manager
Pre-Conditions	<ol style="list-style-type: none"> 1. Data are available and documented in the catalogue. 2. Data are available in the online data repository supported by the system. 3. The Actor is authenticated and authorised to perform the actions requested.
Post-Conditions	The configuration of the dataset is altered accordingly.
Normal Flow	<ol style="list-style-type: none"> 1. The Data Manager or Data Producer wants to change one or more properties of a single or multiple datasets. 2. The system provides an interface allowing the Data Manager to operate on single or multiple datasets. 3. The Data Manager applies the requested changes to the dataset. 4. The catalogue and datasets are updated accordingly.
Notes and Issues	<ol style="list-style-type: none"> 1. Properties that can be changed are e.g. distribution restrictions, contact details etc. 2. The Data Manager should, through the interface, be able to delete, hide or copy datasets. 3. If several copies of a dataset exist, the Data Manager should be able to determine whether all should be available (in either metadata or as datasets) or if some of them should be hidden, but kept to ensure traceability of the dataset. 4. It may be necessary to implement operations on the catalogue and on the dataset as two separate processes which are linked at a later time. 5. Depending on the solution selected for NorDataNet, this may be out of context.
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