

# Strategy for the continuation of the CycleDataHub

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# 1. Introduction

In relation to work package 4 of the BITS project three reports are written to secure and disseminate useful information:

1. Strategy for the continuation of the CycleDataHub (hence CDH),
2. A report with a final set of recommendations to help stakeholders overcome regulatory barriers
3. Literature report about the integration with non-cycling data systems and services.

This report, the Strategy for the continuation of the CycleDataHub, is written to ensure the continuity, the legacy of the CDH.

Firstly, it aims to ensure the continuation of the CDH as part of the BITS project. This can be used to support the BITS vision to promote cycling by ITS integration and to the sustainable development goals, in particular “green mobility”. The CDH serves as a reference to existing smart mobility and data solutions, involving cycling. It can be used as a European reference for the cycling related datalinks for the National Access Points (NAPs), to encourage standards in cycling ITS, transnational and multimodal. Therefore, a **vision** on overall **policy** and **communication** aims for the CDH is essential.

Secondly, the CDH is also an online tool, that needs to be maintained, promoted, and continuously developed. Further automation processes may be desirable. Therefore, a **strategy for the technical development**, including a functional analysis, a description, and the potential for further development are also part of this report.

Thirdly, **the promotion of open standards** should be equally encouraged, although the BITS consortium has recognised that it is beyond the BITS scope (INTERREG is not really the framework for open standard definition, nor are the BITS partners sufficiently experienced to create open standards). With respect to the open data standards, we have experienced the need for these standards, while at the same time we felt that this is really the responsibility of

1. NAPCORE to encourage the definition of these standards
2. individual NAPs to encourage the promotion of these standards to the data producers
3. the data producers/owners to collaborate with NAPs and conform to these standards

## 2. Strategy on vision, policy and communication

In this section we describe some of the main topics encountered in terms of importance of communication, embedding the CDH in the wider European data initiatives, future governance structure and geographic scope. For each topic, we conclude with our proposed direction for the continuation of the CDH.

### 2.1 The importance of communication

For the CDH to be successful, the platform has to be promoted in two directions: data suppliers and data users. The platform becomes more attractive to data users if there are more suppliers and suppliers prefer to share data on platforms with enough users. In terms of the current BITS project, two communication campaigns have been set up by CIE (Cycling Industries Europe) and the Province of Antwerp to promote the CDH. The aims of these campaigns are to attract more input, more datalinks, a more representative datalink distribution over the North Sea Region, and over Europe.

In the continuation of the CDH, communication remains vital. An outdated data library is not useful to anyone and the CDH still has a lot more potential. Also, the use of the CDH should be encouraged as a tool for further development, innovation and a starting point for the formulation of data standards in bicycle ITS.

→ Ensure a continuous communications effort towards both data suppliers and potential users. This applies to both public and private parties.

### 2.2 CDH within wider developments

A closer collaboration between BITS and other European open data initiatives (such as [data.europe.eu](https://data.europe.eu)) may also be a track to be considered to increase the impact of BITS on e.g. the NAPs, NAPCORE and the European mobility data space. Other national and European open data initiatives can be actively encouraged to collaborate with the BITS partners and make use of the CDH to remain informed of the existing tracks, datatypes, initiatives and innovations.

→ Maintain and strengthen cooperation with European and national open data initiatives, like NAPCORE.

### 2.3 Governance

In the past four years of the BITS project, Province of Antwerp was responsible for the development and maintenance of the CycleDataHub, which was partly (50%) funded by the Interreg North Sea Region programme. BITS project partners and external parties contributed to the CycleDataHub with the provision of data.

It is foreseen that from 2023 – 2025 Province of Antwerp will continue its role in the further development and maintenance of the CycleDataHub, now as part of the MegaBITS project. The

MegaBITS Expression of Interest was approved by the NSR programme in June 2022, and a Full Application will be submitted by the MegaBITS consortium in November 2023. If successful, the MegaBITS project can start in spring 2023 and will continue until end of 2025/early 2026. Again, the MegaBITS partners will contribute their cycling data to the CDH, and increasingly also other parties, both business and public authorities, will be stimulated to provide their cycling data.

It is a bit early to discuss the continuity of the CycleDataHub after 2025, but already at least three possible scenarios can be seen for the continuity after 2025:

1. Continue as is, whereby Province of Antwerp will continue to further develop and maintain the CycleDataHub.
2. A European cycling organisation (e.g. CIE, ECF) will adopt the CDH and will continue its further development and maintenance.
3. Some form of cooperation will be established with the European NAPCORE project, the coordinated platform of National Access Points in Europe.

Initial talks about these future scenarios are foreseen in the second half of the MegaBITS project.

→ Realize a sustainable governance structure that facilitates further development of the CDH.

## 2.4 Geographic scope

The geographic scope of the CDH is now roughly confined to datalinks in the North Sea Region, with several ad hoc additions of datalinks that can be located outside the strict EU North Sea Region. As such, e.g. we have a datalink to See.sense data from Dublin, The National Cycle Network of the UK, and many datalinks in the wider German area. If awarded, the geographic scope in MegaBITS would definitely increase with datalinks from the new partners and from the added North Sea Region areas. Potentially also outside the North Sea Region a more active collaboration on data exchange with the other EU regions and countries could fall within scope.

→ Enlarge the geographic scope of the CDH.

## 2.5 Scale and structure

Data from the data suppliers come in different forms. From small spreadsheets to data portals like NDW Dexter. Doing justice to these different levels of scale is challenging. This is closely related to the types of data, of information that come out of the BITS pilots and how the deliverables of the CDH were defined. Issues that still need further contemplation are:

- How do we define a dataset? Should this be defined per type of data? The reason we did not want to be too restrictive in formats or types, was to not limit the innovative field to fit into an existing frame. This is a delicate balance, that may change over time.
- What type of data is valuable to the CDH? The number of datalinks is less relevant to the purpose of the CDH than the variability of different formats. More local, experimental datasets of a single short-term experiment may well be limited in size and number, but they are at least as relevant to BITS as a large number of bicycle count datasets in the same format, when we want to display

the variability of existing cycle-related data and technology. On the other side, a large number of bicycle counts in one format is also relevant, since it displays the geographic distribution of a more standardised datatype, and it is ideal material to work towards a standard.

- How do we allow external contributors a certain level of freedom so that links to new types of data can be added, while at the same time we ensure that entered datalinks are guided through a process to properly categorize them.
- Uploaded datalinks now can be either an external website with further links to datasets, background information, etc., or a link directly to a dataset that is immediately downloaded when clicked. A better dataflow can improve the quality of datalinks.

→ Continuously evaluate and improve the user experience of the CDH.

### 3. Strategy on potential technical developments and maintenance

In this section we first give a technical introduction to the CDH, followed by a description of the strategic considerations with respect to the potential technical developments and maintenance.

#### 3.1 Technical introduction

First, the CycleDataHub is created with ESRI ArcGIS Online Hub technology. This is an easy-to-configure cloud platform that allows the overall organisation and management of data, datalinks, services, tools, maps, dashboard, etc. The configurable environment can be shared amongst ArcGIS online licence holders. This means that if the CDH needs to be transferred from the province of Antwerp to another partner, the new partner will need to have the required ArcGIS Online licences and the necessary rights for editing.

The CDH exists in two copies or environments, called [ArcGIS Hub-sites](#)

- **Production ArcGIS Hub site** this is the live hub site that all can consult and use. <https://cycle-data-hub-provincieantwerpen.hub.arcgis.com/>

Two short and understandable URLs that forward to this Hub site were acquired at [easyhost.be](#), namely [cycledatahub.eu](#) and [cyclingdatahub.eu](#). In case of a transfer to another partner this hosting may also have to be transferred. To access or transfer the hosting platform, which may be useful for managing the URLs, the username and password can be acquired from [bits@provincieantwerpen.be](#).

- **Test ArcGIS Hub-site** this is a copy that can be used to safely develop and test new features and visualisations without impacting the live Hub site. This site is only accessible for developers, not for public. <https://cycle-data-hub-1-provincieantwerpen.hub.arcgis.com/>

These sites contain the configuration, the look and feel of the CDH, not the content. Content is stored in the Content Group, and is linked to both Hub Sites. Since the Test site is basically a copy of the production site, all following paragraphs are based on the production ArcGIS Hub site.

The ArcGIS Online Hub technology was selected over open source systems like CKAN, DCAT, DCAT-AP, because EU agencies such as the European Environment Agency themselves also use ArcGIS, much like the province of Antwerp itself, the city of Antwerp, the city of Zwolle (one of the other BITS partners, who assisted the Province of Antwerp in the development of the CDH). Furthermore, the use of ArcGIS Hub requires far less programming skills than the CKAN and variants require, and it has a global commercial backup support. The user-friendly environment, much like the professional backup support are both essential for an efficient follow up and management of the CDH for the CDH Team of the province of Antwerp, because a much better acquaintance with online data hub management systems would be required for the other systems. Last but not least, the ArcGIS Hub environment is compatible with the open data systems.

Each Hub-site has an assigned [Core team](#) for development and maintenance. If the hubs need to be transferred, the Core teams of these hubs will need to be edited as well. To edit any Hub one needs to be defined as a Hub Manager (in the current case we have established a CDH Team that holds managing rights to the CDH) in the ArcGIS Hub Core Team.

For the purpose of managing the CycleDataHub, entering content, and managing the dashboard, a general BITS\_ProvincieAntwerpen (arcgisonline account – AGOL) was created, and linked to a jointly used email address [bits@provincieantwerpen.be](mailto:bits@provincieantwerpen.be) (the CDH Team). In case of transfer, it is advisable to create a similar setup, with a shared responsibility.

The Hub itself exists of three principal elements:

- A [survey to enter new datalinks](#)
- A group of datalinks ([Content CycleDataHub](#))
- A [dashboard](#) to visualise the datalinks both geographically and statistically.

### 3.2 Data entry by Survey



All datalinks that are added through the survey are [first manually validated](#) and added to the CycleDataHub in order to visualise them in the Hub (Content, Dashboard and statistics). When a new datalink is entered in the survey, a mail is also automatically sent to both the “sender” and the CDH Team ([bits@provincieantwerpen.be](mailto:bits@provincieantwerpen.be) at this moment).

#### Validation:

The entry needs to be validated and when valid, the field “status” needs to be changed to “1”. The survey-entries also are the source for further visualisation in the CDH (content, dashboard and statistics). They are basically a filtered list of all the answers on the survey that feed the information for the dashboard. For each data-entry in the survey, a new and separate item under the ArcGIS content of the CDH Team’s ArcGIS Online account needs to be created, and then shared in the [content group "Content CycleDataHub"](#).

This new item can be a feature layer, an application, a locator, a URL (and online document referenced with a URL, an ArcGIS Server web service, KML, OGC WFS, OGC WMS, OGC WMTS or GeoJSON) or a Tile layer. Most commonly we use **the URL for the survey entries**, although some of the already compatible webservices could be more flexibly shared with the Hub by selecting any of the available other URL options. Important elements entered in the survey need to be copied to the item in the content group such as: the URL itself, the title, credit, obligatory tags and all other tags (such as: [CycleUse](#), [Environment](#), [EnvironmentEmissions](#), [AirQuality](#), [Speed](#), [OtherDataDetails](#), [Routekeuze](#), [Route Selection](#), [Experience](#), [Monitoring](#), [API](#), [MobileDevice](#), [PDDL](#))



Missing or additional information can be completed in Summary, Description, Credits (owner of the data= the organization), Terms of use (the applied License). The credits are quite important so that data-producers can easily trace back their own data, and of course, it also allows to filter on data-producer.

#### Duplication:

If more than one of the obligatory tags applies, the entire item should be duplicated both in the content group and in the survey and each of the items should be attributed to only one of the obligatory tags each. The duplicate should then also have a status 2, 3 or more, so that only the items with status "1" are counted and the statistics in the dashboard remain accurate.

Duplicating items (especially useful when bulk data is shared/mailed) is easiest done with the ArcGIS Online Assistant: <https://ago-assistant.esri.com/#>

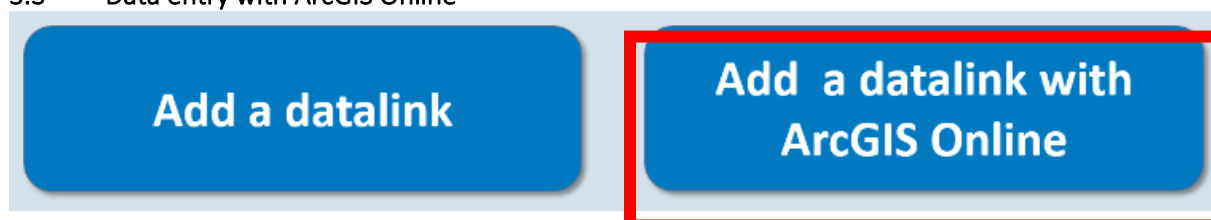
#### Sharing:

Finally, the sharing level of the item should be changed to public and it should be shared with the [content group "Content CycleDataHub"](#).

Once this is done, a feedback (template) email can be sent to the contributor of the datalink, confirming the addition of their datalink to the CDH.

→ Automate the copying of survey entries to separate items in the content group, but still allow for the manual validation process, which also has its merits in that the entries and/or tagging can be edited, complemented, added, and most of all verified/validated.

### 3.3 Data entry with ArcGIS Online



#### Validation:

When ArcGIS Online content is shared directly in the [content group "Content CycleDataHub"](#) by ArcGIS online users, the validation process works in the opposite direction. Users with an ArcGIS account can request membership to the [content group "Content CycleDataHub"](#) by clicking on the 'Join this group' button (or the same in the language of your WINDOWS system) on this page. Once joined these ArcGIS online users can directly share their own selection of content with the [content group "Content CycleDataHub"](#). However, these items are not automatically synchronised in the survey and therefore not visualised on the main page, the dashboard or in the dashboard's statistics. So contrary to the **Data entry by Survey**, the details of the ArcGIS online item need to be added and validated in the survey. In essence, this is a feature layer, feeding the dashboard and the statistics in the dashboard. This can be done by simply filling in the survey and editing the [dataview of the survey](#). Following details are essential:

- Title (as on content page)
- a weblink (the shortened arcgis url e.g. <https://arcg.is/15e9Pr1> is ideal)
- obligatory tags

#### Duplication:

Again: when more than one obligatory tag applies, the entry needs to be duplicated in the survey as well and the status of double entries need to be put on "2" (or anything but "1"), in order for the statistics on the dashboard to remain accurate.

#### Sharing:

Does not need any additional work, except that the sharing status of the original item (in the owner's Content) should also be 'public', otherwise other users cannot see it. In the [content group "Content CycleDataHub"](#), all of the necessary steps to be checked for proper sharing are clearly explained, as follows:

"All content of the CycleDataHub is inventorised here. Shared items can also be displayed in search results. Users with an ArcGIS account can request membership to this group by **clicking on the 'Join this group' button** on this page.

Once we have accepted your request, you can directly share your own content (items).

To do that, change the sharing level of your item(s) to "**Public**" if this was not yet the case and change the group sharing to sharing with this group "**Content CycleDataHub**".

In order for links to your items/content to be located on the **CycleDataHub**, please use at least one of the pre-set tags/categories, so others can discover your data more easily and efficiently in the CycleDataHub. These are "**Cycle Use**", "**Cycle Infrastructure**", "**Environment**" or "**Emissions**", "**Bicycle Business Performance**", "**Health**" and/or "**Safety**".

Your data will then also appear under these categories on the home page of the **CycleDataHub**. More tags/labels are also helpful as they make your content easier to be found. For inspiration check the **labels/tags** suggested on this page.

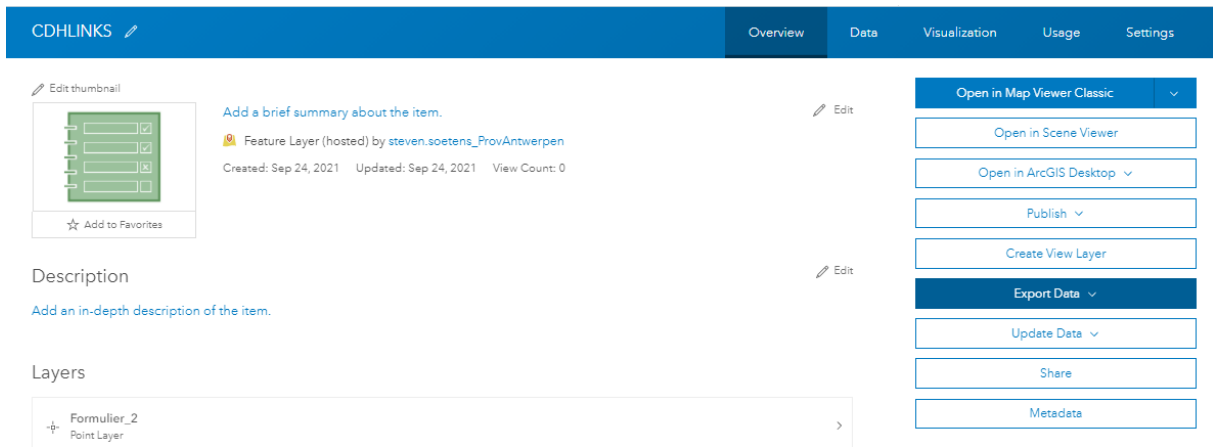
Also, make sure to complete the **Credits/Attribution** under the properties on the content of your datasets, so that the ownership of your data is clear, visible and searchable in the **CycleDataHub**. Be aware that "owner" is not the same as credits/attribution. "Owner" refers to the creator of the datalink, which may often not be the owner of the data itself.

If you would like to contribute with a large number of datalinks, please get in touch with us on [bits@provincieantwerpen.be](mailto:bits@provincieantwerpen.be)."

➔ Automate the creation of survey entries from new ArcGIS items that were added by other ArcGIS users. This will improve the efficiency by automation, although here too, the manual validation process has its merits in that the entries and/or tagging can be edited, complemented, added, and most of all validated by an actual person, at present the CDH Team of the Province of Antwerp.

### 3.4 Bulk Upload/Data Management

If a data-producer/provider wants to share a large number of datalinks, with many field that can just be duplicated, or if the CDH Team wants to clean up, correct, further update the existing datalinks, the easiest way is to work on a direct export of the hosted feature layer of the survey123 form (currently CDH datalinks).



The CDH Team can then either update or append the cleaned data to the existing hosted feature class. For a proper append it may be practical to include the objectId in the excel export. This way, existing datalinks that have been updated are not added as additional new datalinks, but as additions to existing records. Also you may have to adjust or ignore the XY fields. The Province of Antwerpen can provide a macro-enhanced excel file BulkUpload template (“BULK\_CDHLINKS.xlsm”) in which the survey can be filled in, making use of the same choice lists as the survey itself. Since this is an excel file, one can easily copy, select and pull a selection for any number of rows needed. This file can then be shared with the CDH Team who can append the online list, validate and follow the same procedure as **Data entry by Survey**.

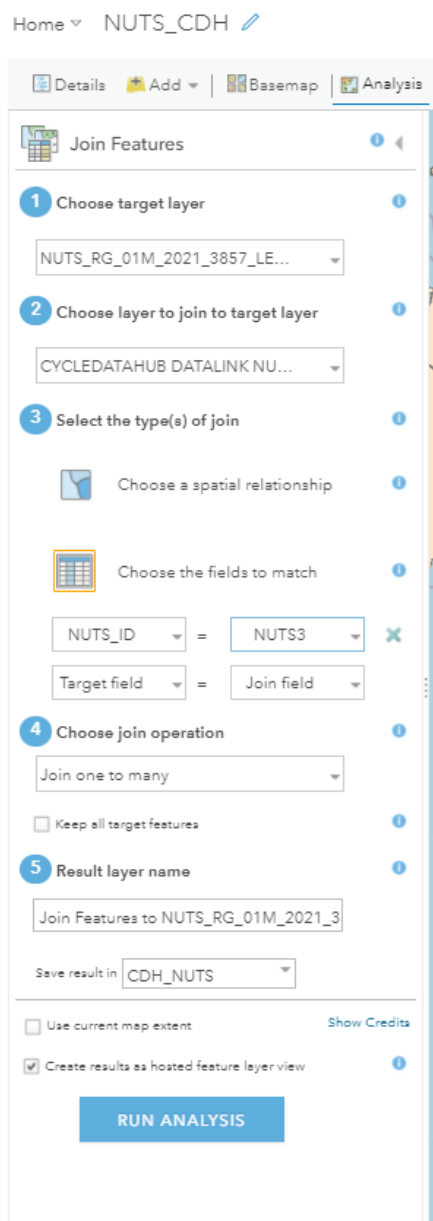
➔ Improve the procedure to allow a bulk upload of datalinks to the CDH.

### 3.5 Dashboard and webmap

Since the ArcGISHub is a modular system, the [dashboard](#), which is a separate ArcGIS online tool with integrated Webmap, has its own separate settings and can be manipulated as well. Logged in as an administrator, one can edit the dashboard and all of its components. The CDH dashboard consists in a webmap, where the survey results are joined to the NUTS and LAU categories on the fly. The essence of this dashboard are the survey results. All visualised elements have to be filtered on status “1”, so that only single and validated datalinks become visible in the dashboard. All of these can also be filtered on the main categories ‘Cycle Infrastructure’, ‘Cycle Use’, etc., Country, Major Region (NUTS1), Basic Region (NUTS2), Small Region (NUTS3), and local administrative unit (LAU). All dashboard elements (the webmap, the other filters, the total number of selected links, the pie chart) are joined and when a filter is applied to any of these, the filter is applied to all of the other elements as well.

The joining of the collected survey entries to the NUTS and LAU polygons in the map is done automatically. The visible feature layer is therefore also a “feature layer generated from Join Features”. This basically means that the analysis of joining the survey entries to the EU regions is done online, directly and automatically. For example, the country\_datalinks are really a joining of the CDH\_datalink feature layer and the NUTS\_RG\_01M\_2021\_3035\_LEVLO\_shp feature layer (country-polygons). This joining operation, when reprogramming is in order (if the NUTS regions are

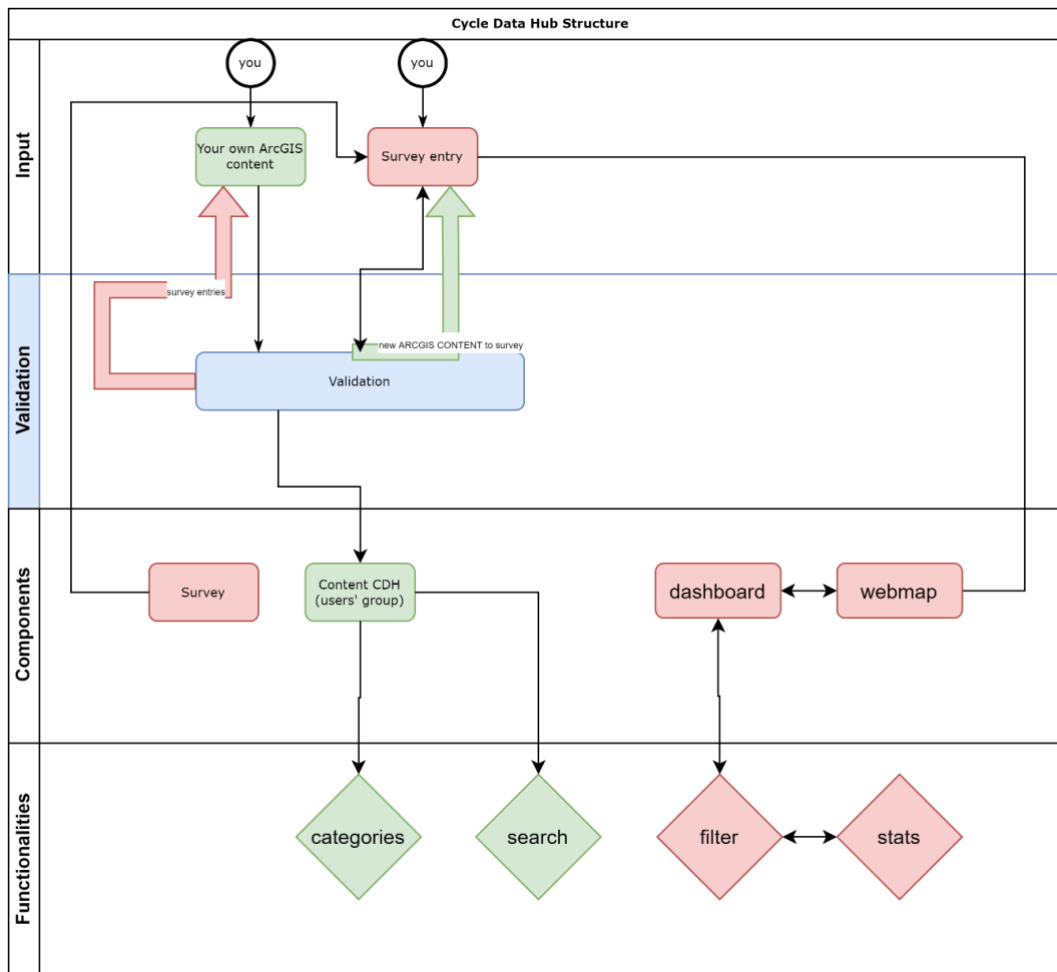
reorganised...) can be done online in the WebMap, by using the Analysis tool, Join Features, select the Country – datalinks as a target feature, the CDH datalinks as the layer to join to the target feature and perform a join based on matching fields (can be both the country code or the NUTS\_NAME). This should then be repeated for all of the NUTS categories.



➔ Improve the dashboard for a continued increase of users and datalinks. Make the CDH more user-friendly.

### 3.6 Dataflow

Summarized, data come in from two channels and feed a number of functionalities (see following figure).



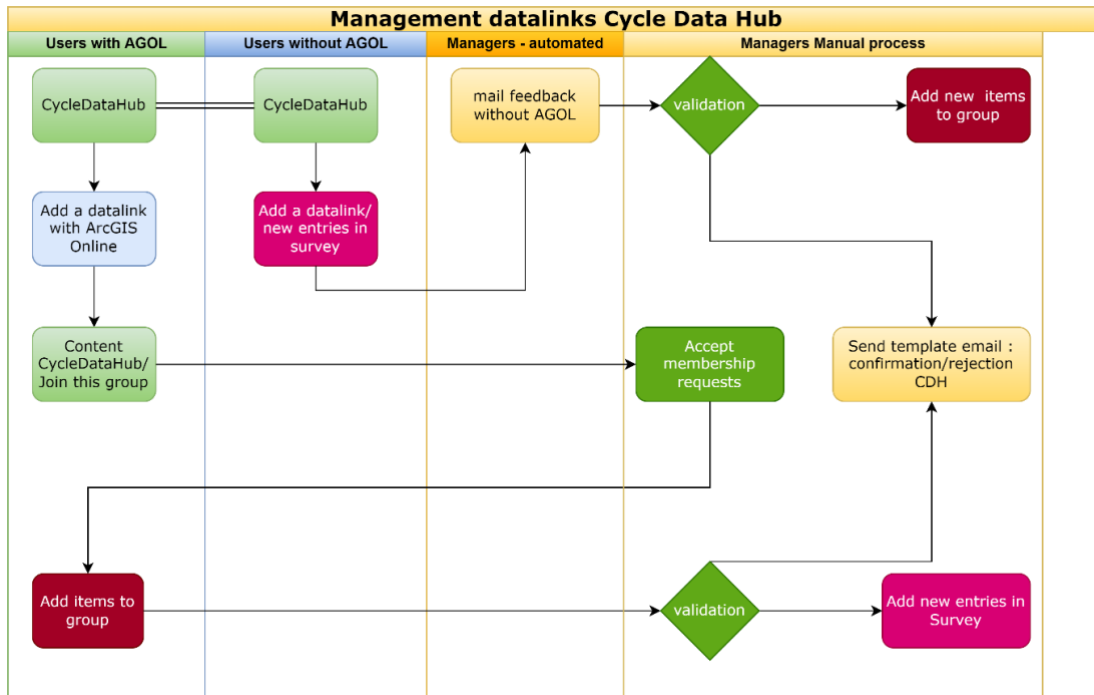
*The Data flow for different types of users, automated processing, managing and feedback process.*

Parallel to the validation, both data streams also need to be synchronised. This synchronisation process is not automated and may be a future improvement. The survey feeds the webmap, which is visualised in the dashboard with associated statistics on the home page of the CDH Hub Site. The [content group "Content CycleDataHub"](#) can be searched or filtered on the main categories. The dashboard itself can also be filtered which is reflected in both map and stats. The content group is not filtered automatically when a filter is applied in the dashboard of the CDH home page. This could be an element for improvement in future development.

➔ Automation and further improvement of the synchronisation process of the data streams.

### 3.7 Automatic Mailing

At this moment the feedback loop from survey or adding items directly to the content group by email from the CDH – BITS team is partially automated (see figure below).



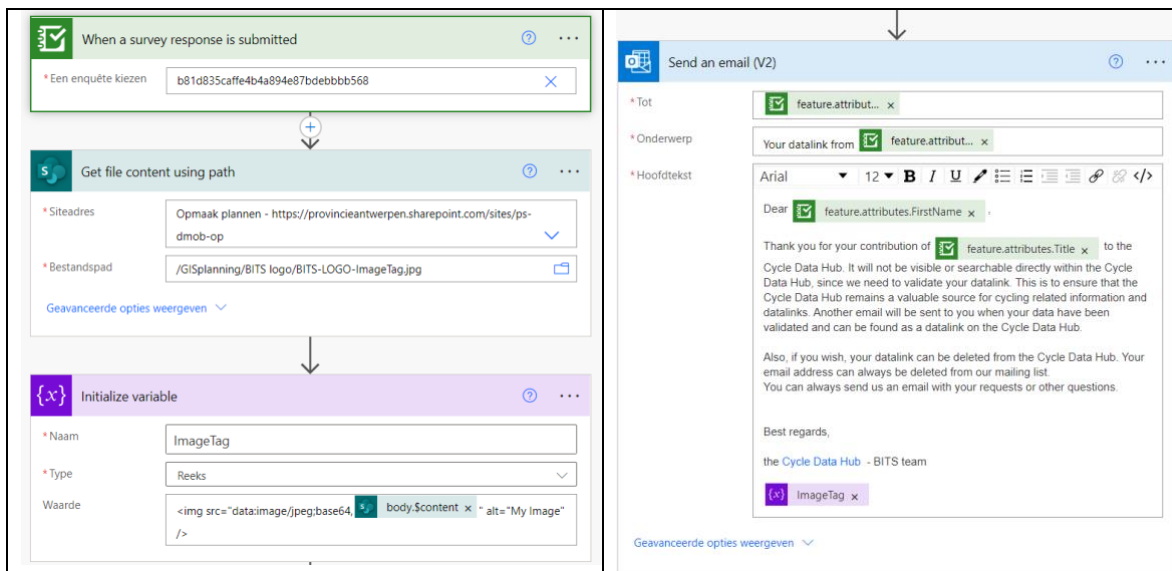
When a survey is completed, an automatic email is sent to both the person who filled in the survey and the CDH- BITS team. At this moment, this is the [bits@provincieantwerpen.be](mailto:bits@provincieantwerpen.be) email address. This automation process is now programmed in Power Automate, but could easily be transferred to another system, since the Power Automate flow can be exported as zip and/or json file.

**Power Automate:**

Following steps form the automated mailing system:

1. When a survey response is submitted, it triggers the automated process
2. It picks up the BITS –logo from a SharePoint path.
3. It initializes a variable that defines this image as an ImageTag
4. It sends the predefined email to both the survey submitter and [bits@provincieantwerpen.be](mailto:bits@provincieantwerpen.be)

See flow below:



The confirmation or rejection of a validation is not sent automatically, but templates facilitate this step of the manual validation process.


**Confirmation of validation:**

In the case of a positive validation the user will receive the following message:

From : [bits@provincieantwerpen.be](mailto:bits@provincieantwerpen.be)  
 Subject: confirmation of a datalink validated and added to the CycleDataHub  
 Dear xxxxx,  
 Thank you again for your contribution. Your datalink has now been validated and can be found in the CycleDataHub.  
 Updates and permanence of the content behind the link to your data remain your responsibility.  
 Also, if you so wish, your datalink can always be deleted from the CycleDataHub.  
 Your email address can also be deleted from our mailing list.  
 Just reply to this email with your requests.

Best regards,

the [CycleDataHub](#) - BITS team



**Rejection of validation:**

In the case of rejection the user will receive the following message:

From : [bits@provincieantwerpen.be](mailto:bits@provincieantwerpen.be)  
 Subject: Rejection of a datalink for the CycleDataHub  
 Dear xxxxx,  
 Thank you for your contribution. Unfortunately your datalink has been identified as not relevant to the CycleDataHub.

It will therefore not be added. You are kindly invited to get in touch if this is unjustified or to go through the [survey](#) again.

Your email address can always be deleted from our mailing list.

Just reply to this email with your requests.

Best regards,

the [CycleDataHub](#) - BITS team



### Sharing someone else's datalink to the CDH:

When browsing the web for data, it is possible that one encounters open data sets that are not in the CDH, and that are not owned by the person browsing the web. However, since they may be a valuable addition to the CDH and since it is an open data set, we share these data as a link to the CDH and inform the owner or at least the data-publisher.

To inform the owner/data-publisher that their dataset has been added and that they are free to interfere with this, a template is also prepared to mail to the owners/producers of these datasets. For the ArcGIS online content, the mail below can be copied to the comments' section of the specific ArcGIS item, thus informing the owner again of their dataset being linked. We also ask them to check their own data entry for tags and ownership, so that they can be more easily picked up, filtered in the CDH.

Hello xxxxx,

We just shared your content to the CycleDataHub (hence CDH - [cycledatahub.eu](#)), since it is bicycle data related. This hub was created with the support of the European BITS project, co-funded by the European Regional Development Fund through the Interreg VB North Sea Region Programme with equivalent match funding from the partners involved. In order for links to your items/content to be more easily and efficiently discovered on the CDH, please add one of the pre-set tags/categories to your own content. These are "Cycle Use", "Cycle Infrastructure", "Environment" or "Emissions", "Bicycle Business Performance", "Health" and/or "Safety". Your data will then also appear under these categories on the home page of the CDH. More tags/labels are also helpful as they make your content easier to be found. Also, make sure to complete the Credits/Attribution under the properties on the content of your datasets, so that the ownership of your data is clear, visible and searchable in the CDH. Be aware that "owner" is not the same as credits/attribution. "Owner" refers to the creator of the datalink, which may often not be the owner of the data itself. If you don't want to share your data, just unshare your content from the Content CycleDataHub Group or reply to this email with your requests. If you have other questions on the CDH or the BITS project, please get in touch with us on [bits@provincieantwerpen.be](mailto:bits@provincieantwerpen.be).

Your email address can always be deleted from our mailing list.

Just reply to this email with your requests.

Best regards,

the [CycleDataHub](#) - BITS team





→ Further improvement/automation of mailing and feedback loops.

### 3.8 Integrating and further develop the BITS web environments

In a continued phase a reinforced (perhaps automated) interlinking between the different web environments may be interesting, with hyperlinks from CDH, to the <https://www.bicycle-data.de>, which exist already today, new datahubs and the [BITS directory](#), which may be further developed.

This linking of websites should lead to:

- the collection of innovators' datalinks (CDH)
- reshaping algorithms to open formats and
- developing useful KPI's
- visualisations
- participating businesses can showcase their products (BITS directory).

In a continued strategy of the CDH, a current status of standards for bicycle data on the different data types and categories may be an important added value for BITS to NAPCORE as a clear overview of the European use of bicycle data standards.

→ Further integrate the different BITS web environments.

## 4. The promotion of open standards for cycling data

Given the fact that the BITS partners mainly are local and regional authorities (cities, regions), from the start of the project it was clear that the BITS project is not in a position to define open standards for bicycle and cycling data. Furthermore, it was recognized that the Interreg NSR programme is not really the framework for open standards definition. This is more the role for CEN and ISO, possibly supported by the Horizon Europe programme and its projects.

Nevertheless, the BITS project, and from 2023 onwards its possible successor MegaBITS, can contribute to the standardisation process in signalling the need for standards, sharing knowledge on already existing standards, using existing standards, etc.:

- From the BITS project input is provided to various national and European initiatives, such as the NAPCORE project, TISA, NDW, etc.
- During the tendering phase of the ITS applications the cities and regions have been made aware of the fact that in the tendering process they should clearly specify that possible data should be delivered in standardised format, e.g. DATEX II, GBFS, etc.
- In the CDH data are available in various open standards.

Within the European NAPCORE project the National Access Points are collaborating to harmonise the National Access Points in Europe and to facilitate data exchange. Part of the work is done in WG4, where data standards are created and managed for example for road traffic (including cycling), for multimodal transport (including (shared) bicycles), map updates (TN-ITS) and metadata.

→ Continue to contribute to the standardisation process of cycling and cycling infrastructure data through signalling the need for standards, sharing knowledge on already existing standards, using existing standards.

## 5. Summary and conclusions

This report, the Strategy for the continuation of the CycleDataHub, is written to ensure the continuity, the legacy of the CDH.

The report distinguished three different aspects to ensure the continuation of the CycleDataHub:

- A vision on overall policy and communication aims for the CDH is essential.
- A strategy for the technical development, including a functional analysis, a description, and the potential for further development
- The promotion of open standards, although the BITS consortium has recognised that it is outside the scope of the BITS project.

For each of these aspects further activities have been formulated which are needed to ensure the continuation of the CycleDataHub.

### **Overall policy and communication:**

- ➔ Ensure a continuous communications effort towards both data suppliers and potential users. This applies to both public and private parties
- ➔ Maintain and strengthen cooperation with European and national open data initiatives, like NAPCORE
- ➔ Realize a sustainable governance structure that facilitates further development of the CDH
- ➔ Enlarge the geographic scope of the CDH
- ➔ Continuously evaluate and improve the user experience of the CDH

### **Technical development:**

- ➔ Automate the copying of survey entries to separate items in the content group, but still allow for the manual validation process, which also has its merits in that the entries and/or tagging can be edited, complemented, added, and most of all verified/validated.
- ➔ Automate the creation of survey entries from new ArcGIS items that were added by other ArcGIS users. This will improve the efficiency by automation, although here too, the manual validation process has its merits in that the entries and/or tagging can be edited, complemented, added, and most of all validated by an actual person, at present the CDH Team of the Province of Antwerp.
- ➔ Improve the procedure to allow a bulk upload of datalinks to the CDH.
- ➔ Improve the dashboard for a continued increase of users and datalinks. Make the CDH more user-friendly.
- ➔ Automation and further improvement of the synchronisation process of the data streams.
- ➔ Further improvement/automation of mailing and feedback loops.
- ➔ Further integrate the different BITS web environments.

### **Standardisation:**

- ➔ Continue to contribute to the standardisation process of cycling and cycling infrastructure data through signalling the need for standards, sharing knowledge on already existing standards, using existing standards.

