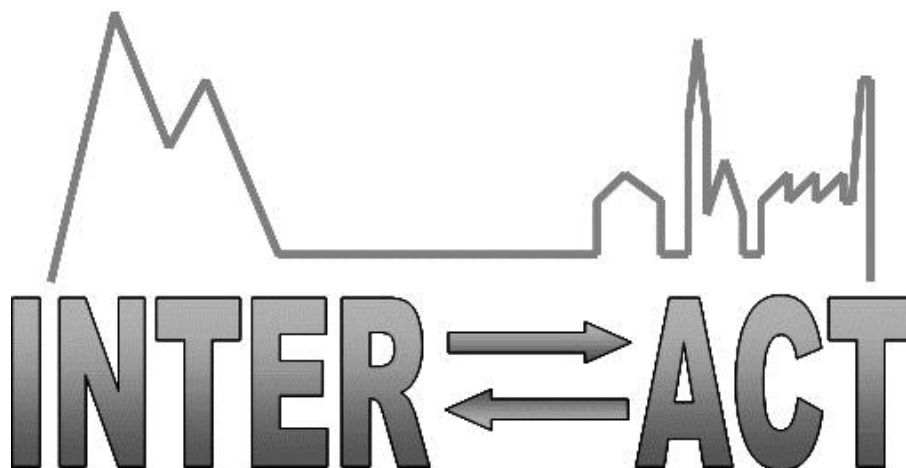# Combination of CP & CSA

D7.9 – Rationale for sampling document

Project No.262693– INTERACT

FP7-INFRASTRUCTURES-2010-1

Start date of project: 2011/01/01   Duration: 60 months

Due date of deliverable: 2014/12/31   Actual Submission date: 2014/12/31

Lead partner for deliverable: SLU

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Dissemination Level		
PU	Public	X
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the Consortium (including the Commission Services)	
CO	Confidential, only for members of the Consortium (including the Commission Services)	

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Publishable Executive Summary

A web-based platform for sharing data and services across field stations has been developed under the auspices of INTERACT WP7 on Data Management. This platform is, in its generic form, called NordGIS (www.nordgis.org) and hosts an information system tailored to meet the specifications of the INTERACT organisation (the INTERACT GIS). These specifications are summarised in the INTERACT Deliverables Report D7.8: INTERACT GIS – Standards and Specifications. The present document focuses on the heart of NordGIS/INTERACT GIS, its central system database. It will provide the Data Model of the current version of NordGIS and, based thereupon, a rationale for how the database may be queried (sampled) via the user interface of NordGIS/INTERACT GIS.

1. Introduction

At the heart of NordGIS/INTERACT GIS lies its database, reflecting the exact nature of the environment where its functionalities and services are operating. Apart from graphical solutions of display and representation, much of the details captured with system specification and usability tests are boiled down in the data model. The data model reflects everything from the exact variables required to describe station activities and administrative routines, through the various levels of system administration required to handle the hierarchy from top-level system administrators to public spectators, to the hierarchy through organisations, stations, and activities. With the ability of querying the NordGIS/INTERACT GIS database across stations and organisations perhaps being the prime incentive for building the NordGIS/INTERACT GIS information system, it cannot be queried by any other means than those permitted by the data model. It is therefore standard procedure to pay the data model particular attention when the information system is publically described, which is the reason for the present report. We'll subdivide the description into the three levels of an overall flow diagram (the Physical Data Model – PDM), the PDM broken down into its constituents, and a brief description of the sampling characteristics permitted by the PDM constituents.

2.   The NordGIS/INTERACT GIS Physical Data Model

In order to understand the structure of the NordGIS/INTERACT GIS information system, particularly when different administrative roles are considered, the physical database model provided in Figure 2 should be combined with the Window Flow Diagram provided in Figure 1. Based on these figures, the following points of description apply to the NordGIS/INTERACT GIS Physical Data Model:

a. Residing at the top of the NordGIS/INTERACT GIS Physical Data Model provided in Figure 2, the Database Table (DT) "Authorizations" contains a list of the station personnel authorized to administrate the DT's associated with their respective stations. These persons are provided their admin privileges by a top-level system administrator not accounted for in Figure 2.

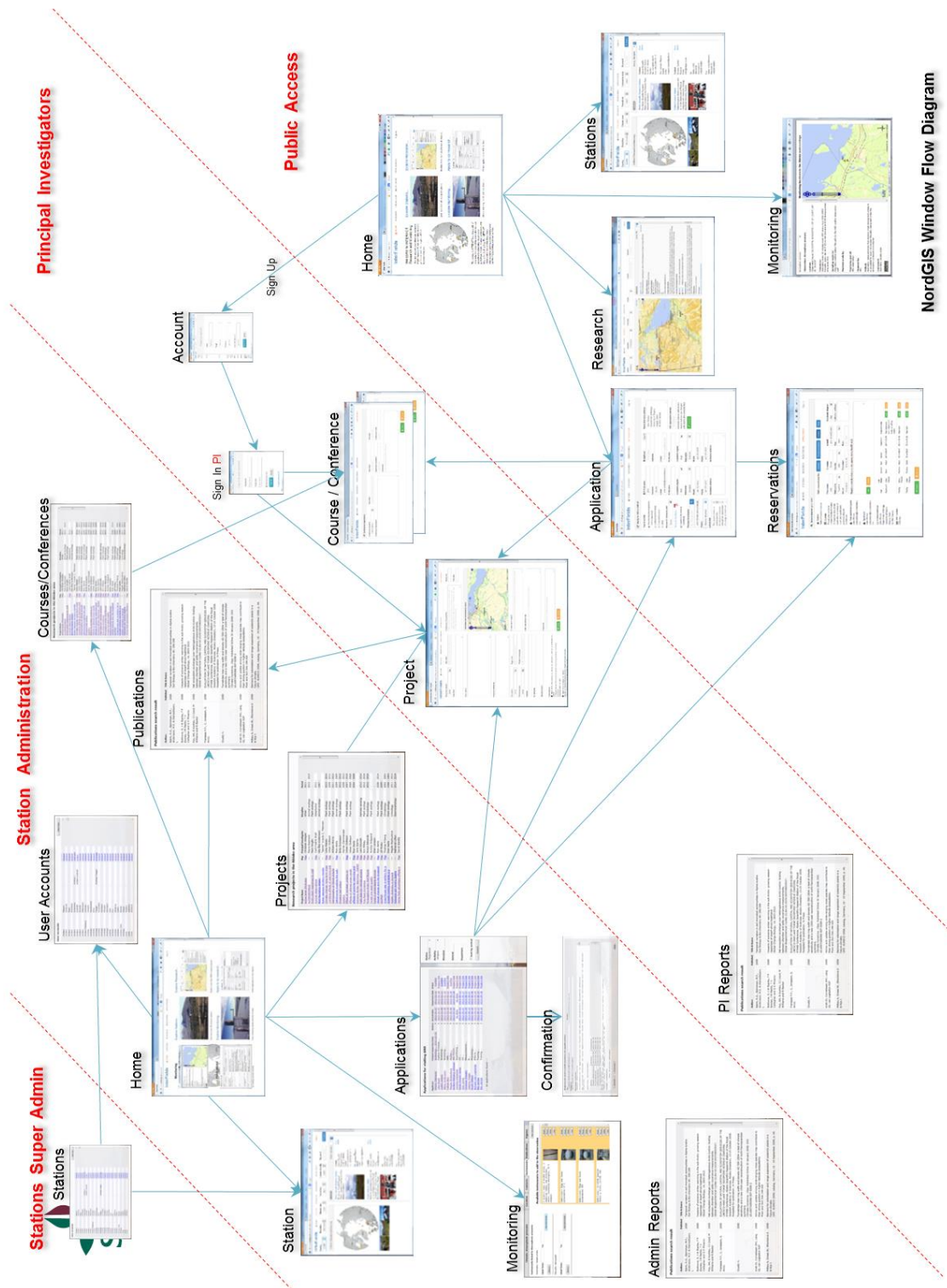b. Individual stations are listed and described in DT "Stations".

Figure 1. A preliminary Window Flow Diagram of NordGIS/INTERACT GIS with functionalities subdivided by administrator rights (in red).
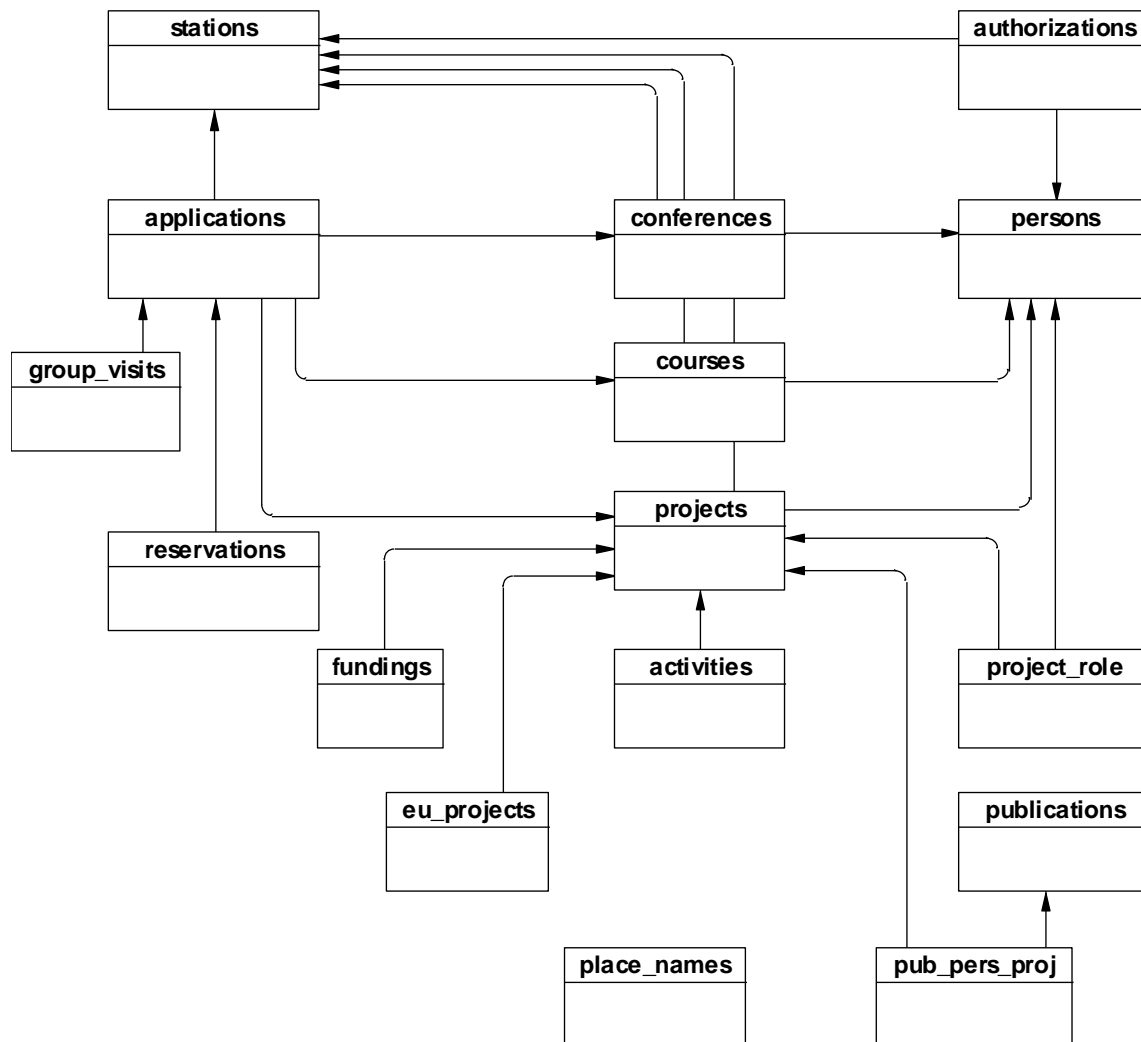
Figure 2. The NordGIS/INTERACT GIS Physical Data Model. The level of "Organisations" will be added atop the existing structure.

c. At the level of individual projects, the system administrators associated with individual stations have the privilege of delegating admin rights to the project principles (PI's) listed in DT "Persons".

d. PI's, in their role of administering projects, have the privilege of defining projects (DT "Projects") and project members (DT "Project role").

e. The system administrators of individual stations have the privilege of evaluating the applications for station activities (DT "Applications") submitted by PI's (or by delegated persons – DT "Project role"), whether these applications concern conferences (DT "Conferences"), courses (DT "Courses"), or projects (DT "Projects").

f. Based on the applications submitted by PI's (DT "Persons"), or by their delegated associates (DT "Project role"), the system administrators associated with individual stations can make the necessary reservations (DT "Reservations") whether they concern individuals or groups (DT "Group visits").

g. The system administrators associated with individual stations and PI's share the privilege of keeping a publication database (DT "Publications") updated, where co-authors are referred to in DT "Pub_pers_proj" in cases where they haven't applied to visit a station (DT "Project role").

h. Publications (DT "Publications") are linked to projects (DT "projects") with text-based metadata as well as with geographic references. In cases where place-names are preferred to exact geo-references, a geo-referenced list of place-names is provided in DT "Place names" and linked to the geographical representation of station activities.

i. Projects (DT "Projects") may be subdivided into activities (DT "Activities") performed at different geographic and/or temporal locations and, particularly, tagged in accordance with source of funding whether it is a non-EU project (DT "Funding") or a EU project (DT "EU projects").

The NordGIS/INTERACT GIS Physical Data Model provided in Figure 2 depicts the information system "as is" at the end of the original INTERACT period (Dec 31, 2014), which is when the present report is being written. The system will be further developed under the auspices of the Swedish national infrastructure project SITES. This will add considerably to the NordGIS/INTERACT GIS PDM, with new functionalities and services, as well as with a new top-level DT containing organisations of field stations.

3.   Database Tables of the NordGIS/INTERACT GIS Data Model

3.1   Authorizations

The NordGIS/INTERACT GIS Database Table (DT) "Authorizations" (Table 1) keeps a record of the system administrators associated with individual field stations, subdivided by their respective administrative roles and privileges (see also Figure 1).

Table 1. The NordGIS/INTERACT GIS Database Table "Authorizations". The attribute identities are relatively informative, with the left column reflecting attribute usage and the right column reflecting attribute characteristics.

authorizations	
station_id	INTEGER
person_id	INTEGER
role_id	INTEGER
role	CHARACTER VARYING(20)

3.2   Stations

The NordGIS/INTERACT GIS Database Table (DT) "Stations" (Table 2) keeps a record of field stations.

Table 2. The NordGIS/INTERACT GIS Database Table "Stations". The attribute identities are relatively informative, with the left column reflecting attribute usage and the right column reflecting attribute characteristics.

stations	
station_id	INTEGER
station_name	CHARACTER VARYING(254)
contact	TEXT
website	CHARACTER VARYING(254)
geom	geometry
location	CHARACTER VARYING(255)
email	CHARACTER VARYING(50)
admin_id	INTEGER
terms	CHARACTER VARYING(50)
acronym	CHARACTER VARYING(20)
confirm	TEXT
reject	TEXT

3.3   Persons

The NordGIS/INTERACT GIS Database Table (DT) "Persons" (Table 3) keeps a record of project principals (PI's).

Table 3. The NordGIS/INTERACT GIS Database Table "Persons". The attribute identities are relatively informative, with the left column reflecting attribute usage and the right column reflecting attribute characteristics.

persons	
person_id	INTEGER
first_name	CHARACTER VARYING(255)
surname	CHARACTER VARYING(255)
nationality	CHARACTER VARYING(255)
academic_degree	CHARACTER VARYING(255)
profession	CHARACTER VARYING(255)
institution	CHARACTER VARYING(500)
address	CHARACTER VARYING(255)
telephone	CHARACTER VARYING(255)
mobile	CHARACTER VARYING(255)
email	CHARACTER VARYING(255)
born	INTEGER
username	CHARACTER VARYING(50)
password	CHARACTER(32)
displayname	CHARACTER VARYING(50)
access	INTEGER
created	DATE
last_changed	DATE
last_login	timestamp
comment	CHARACTER VARYING(255)
status	CHARACTER VARYING(255)
source_id	INTEGER
source_table	CHARACTER VARYING(255)
publishing_agreement	boolean
dev_comment	CHARACTER VARYING(255)
pwdhash	CHARACTER(60)

3.4 Projects

The NordGIS/INTERACT GIS Database Table (DT) "Projects" (Table 4) keeps a record of project activities (within stations).

Table 4. The NordGIS/INTERACT GIS Database Table "Projects". The attribute identities are relatively informative, with the left column reflecting attribute usage and the right column reflecting attribute characteristics.

projects	
project_id	INTEGER
parent_project_id	INTEGER
short_title	CHARACTER VARYING(50)
long_title	TEXT
project_details	TEXT
discipline	CHARACTER VARYING(50)
subdiscipline	CHARACTER VARYING(150)
subsubdiscipline	CHARACTER VARYING(50)
keywords	CHARACTER VARYING(500)
start_year	CHARACTER VARYING(10)
end_year	CHARACTER VARYING(10)
link_eu_projects	CHARACTER VARYING(400)
link_other_projects	CHARACTER VARYING(400)
investigation_area	CHARACTER VARYING(500)
coordinate_x	DOUBLE PRECISION
coordinate_y	DOUBLE PRECISION
activity_details	TEXT
homepage_url	CHARACTER VARYING(200)
research_methods	TEXT
status	INTEGER
expected_impact	TEXT
restoration_plan	TEXT
funding	CHARACTER VARYING(300)
publishing_agreement	boolean
publications	CHARACTER VARYING(500)
data_publishing_plan	TEXT
postseason_report	TEXT
security	TEXT
programs	CHARACTER VARYING(150)
created	timestamp
last_changed	timestamp
inspected	DATE
last_mail	DATE
comment	TEXT
status_details	CHARACTER VARYING(300)
dev_comment	CHARACTER VARYING(300)
source_id	INTEGER
source_table	CHARACTER VARYING(300)
pi_id	INTEGER
station_id	INTEGER
geom	geometry
reference_system	INTEGER

3.5   Project role

The NordGIS/INTERACT GIS Database Table (DT) "Project role" (Table 5) keeps a record of project members other than PI's.

Table 5. The NordGIS/INTERACT GIS Database Table "Project role". The attribute identities are relatively informative, with the left column reflecting attribute usage and the right column reflecting attribute characteristics.

project_role	
person_id	INTEGER
project_id	INTEGER
role	CHARACTER VARYING(50)
dev_comment	CHARACTER VARYING(100)

3.6 Applications

The NordGIS/INTERACT GIS Database Table (DT) "Applications" (Table 6) keeps a record of applications for stations activities (submitted by PI's).

Table 6. The NordGIS/INTERACT GIS Database Table "Applications". The attribute identities are relatively informative, with the left column reflecting attribute usage and the right column reflecting attribute characteristics.

applications	
application_id	INTEGER
application_type	CHARACTER VARYING(20)
status	CHARACTER VARYING(20)
confirmdate	DATE
activity_title	TEXT
date_received	CHARACTER VARYING(30)
invoice_address	TEXT
vat_regnr	CHARACTER VARYING(50)
visitors_total	INTEGER
ap_academic_degree	CHARACTER VARYING(50)
ap_born	INTEGER
ap_email	CHARACTER VARYING(100)
ap_first_name	CHARACTER VARYING(30)
ap_institution	TEXT
ap_institution_address	TEXT
ap_nationality	CHARACTER VARYING(50)
ap_profession	CHARACTER VARYING(100)
ap_surname	CHARACTER VARYING(50)
ap_telephone	CHARACTER VARYING(40)
ap_mobile	CHARACTER VARYING(40)
pi_academic_degree	CHARACTER VARYING(50)
pi_born	INTEGER
pi_email	CHARACTER VARYING(100)
pi_first_name	CHARACTER VARYING(30)
pi_institution	TEXT
pi_institution_address	TEXT
pi_nationality	CHARACTER VARYING(30)
pi_profession	CHARACTER VARYING(50)
pi_surname	CHARACTER VARYING(50)
pi_telephone	CHARACTER VARYING(40)
pi_mobile	CHARACTER VARYING(40)
project_id	INTEGER
ap_notes	TEXT
admin_notes	TEXT
inspected	DATE
publishing_agreement	boolean
cost_all	boolean
cost_accomodation	boolean
cost_transport	boolean
cost_consumables	boolean
cost_other	boolean
cost_other_specified	CHARACTER VARYING(50)
reason_no_invoice	TEXT
date_invoice_sent	CHARACTER VARYING(30)
date_payment_received	CHARACTER VARYING(30)
station_id	INTEGER
course_id	INTEGER
conference_id	INTEGER

3.7 Conferences

The NordGIS/INTERACT GIS Database Table (DT) "Conferences" (Table 7) keeps a record of conferences applied for at stations.

Table 7. The NordGIS/INTERACT GIS Database Table "Conferences". The attribute identities are relatively informative, with the left column reflecting attribute usage and the right column reflecting attribute characteristics.

conferences	
conference_id	INTEGER
station_id	INTEGER
pi_id	INTEGER
title	CHARACTER VARYING(128)
description	TEXT
deadline	DATE
start_date	DATE
end_date	DATE
created	timestamp
last_changed	timestamp
comment	TEXT
status	INTEGER
code	CHARACTER VARYING(50)

3.8 Courses

The NordGIS/INTERACT GIS Database Table (DT) "Courses" (*Table 8*) keeps a record of courses applied to be held at stations.

Table 8. The NordGIS/INTERACT GIS Database Table "Courses". The attribute identities are relatively informative, with the left column reflecting attribute usage and the right column reflecting attribute characteristics.

courses	
course_id	INTEGER
pi_id	INTEGER
title	CHARACTER VARYING(128)
description	TEXT
deadline	DATE
start_date	DATE
end_date	DATE
comment	TEXT
status	INTEGER
code	CHARACTER VARYING(50)
created	timestamp
last_changed	timestamp
station_id	INTEGER

3.9 Reservations

The NordGIS/INTERACT GIS Database Table (DT) "Reservations" (*Table 9*) keeps a record of the station resources set aside for applied (and approved) activities.

Table 9. The NordGIS/INTERACT GIS Database Table "Reservations". The attribute identities are relatively informative, with the left column reflecting attribute usage and the right column reflecting attribute characteristics.

reservations	
reservation_id	INTEGER
role	CHARACTER VARYING(20)
first_name	CHARACTER VARYING(30)
surname	CHARACTER VARYING(50)
gender	CHARACTER VARYING(10)
age	CHARACTER VARYING(20)
nationality	CHARACTER VARYING(50)
email	CHARACTER VARYING(100)
academic_degree	CHARACTER VARYING(50)
institution	TEXT
arrival	DATE
departure	DATE
requirements	TEXT
admin_notes	TEXT
application_id	INTEGER

3.10 Group visits

The NordGIS/INTERACT GIS Database Table (DT) "Group visits" (Table 10) keeps a record of visitors per station activity occasion.

Table 10. The NordGIS/INTERACT GIS Database Table "Group visits". The attribute identities are relatively informative, with the left column reflecting attribute usage and the right column reflecting attribute characteristics.

group_visits	
group_visit_id	INTEGER
fullnames	TEXT
men_num	INTEGER
women_num	INTEGER
arrival	DATE
departure	DATE
requirements	TEXT
admin_notes	TEXT
application_id	INTEGER

3.11 Publications

The NordGIS/INTERACT GIS Database Table (DT) "Publications" (*Table 11*) keeps a record of publications in relation to station activities.

Table 11. The NordGIS/INTERACT GIS Database Table "Publications". The attribute identities are relatively informative, with the left column reflecting attribute usage and the right column reflecting attribute characteristics.

publications	
publication_id	INTEGER
reference_type	CHARACTER VARYING(30)
title	CHARACTER VARYING(500)
publication_year	CHARACTER VARYING(50)
year_l	INTEGER
abstract	CHARACTER VARYING(20000)
url	CHARACTER VARYING(200)
doi	CHARACTER VARYING(100)
discipline	CHARACTER VARYING(150)
subdiscipline	CHARACTER VARYING(100)
start_end_pages	CHARACTER VARYING(50)
total_pages	INTEGER
sab_classification	CHARACTER VARYING(30)
in_ans_library	boolean
journal_title	CHARACTER VARYING(100)
volume	CHARACTER VARYING(100)
issue_number	CHARACTER VARYING(100)
series_title	CHARACTER VARYING(100)
publisher	CHARACTER VARYING(100)
city	CHARACTER VARYING(100)
section_title	CHARACTER VARYING(100)
editor	CHARACTER VARYING(100)
collection_title	CHARACTER VARYING(100)
type_work	CHARACTER VARYING(100)
thesis_type	CHARACTER VARYING(100)
institution_or_university	CHARACTER VARYING(100)
academic_department	CHARACTER VARYING(100)
document_number	CHARACTER VARYING(100)
conference_location	CHARACTER VARYING(200)
reporter	CHARACTER VARYING(100)
newspaper	CHARACTER VARYING(100)
cartographer	CHARACTER VARYING(100)
scale	CHARACTER VARYING(50)
reference_system	CHARACTER VARYING(100)
date	DATE
issn	CHARACTER VARYING(100)
isbn	CHARACTER VARYING(100)
origin	CHARACTER VARYING(100)
created	DATE
last_changed	DATE
comment	CHARACTER VARYING(200)
dev_comment	CHARACTER VARYING(200)
authors	CHARACTER VARYING(500)
keywords	CHARACTER VARYING(500)
source	CHARACTER VARYING(500)
blob	TEXT

3.12 Pub_pers_proj (Authors)

The NordGIS/INTERACT GIS Database Table (DT) "Pub_pers_proj" (Table 12) keeps a record of publication co-authors in cases where they not have applied to visit a station (see also Table 5).

Table 12. The NordGIS/INTERACT GIS Database Table "Pub_pers_proj". The attribute identities are relatively informative, with the left column reflecting attribute usage and the right column reflecting attribute characteristics.

pub_pers_proj	
publication_id	INTEGER
person_id	INTEGER
project_id	INTEGER
id	INTEGER

3.13 Place-names

The NordGIS/INTERACT GIS Database Table (DT) "Place-names" (Table 13) keeps a record of geo-referenced place-names.

Table 13. The NordGIS/INTERACT GIS Database Table "Place-names". The attribute identities are relatively informative, with the left column reflecting attribute usage and the right column reflecting attribute characteristics.

place_names	
placename_id	INTEGER
sami_samispelling_name	CHARACTER VARYING(50)
sami_swedishspelling_name	CHARACTER VARYING(50)
swedish_name	CHARACTER VARYING(50)
english_name	CHARACTER VARYING(50)
alternate_name_1	CHARACTER VARYING(50)
alternate_name_2	CHARACTER VARYING(50)
alternate_name_3	CHARACTER VARYING(50)
placename_explanation	CHARACTER VARYING(300)
lokaltyp	CHARACTER VARYING(50)
lm_kkod	INTEGER
lm_kategori	CHARACTER VARYING(50)
preferred_spelling	CHARACTER VARYING(15)
showing_priority	INTEGER
used_in_projects	boolean
used_in_puiblications	boolean
dev_comment	CHARACTER VARYING(300)
source	CHARACTER VARYING(50)
created	DATE
last_changed	DATE
geom	geometry

3.14 Activities

The NordGIS/INTERACT GIS Database Table (DT) "Activities" (Table 14) keeps a record of project activities, broken down into sub-activities performed at different geographic and/or temporal locations (when applicable).

Table 14. The NordGIS/INTERACT GIS Database Table "Activities". The attribute identities are relatively informative, with the left column reflecting attribute usage and the right column reflecting attribute characteristics.

activities	
activity_id	INTEGER
start_date	DATE
end_date	DATE
activity_details	TEXT
location_description	CHARACTER VARYING(300)
expected_impact	CHARACTER VARYING(1000)
restoration_plan	CHARACTER VARYING(1000)
label	CHARACTER VARYING(20)
nature_of_activity	CHARACTER VARYING(100)
project_id	INTEGER
geom	geometry
coordinate_x	DOUBLE PRECISION
coordinate_y	DOUBLE PRECISION
reference_system	INTEGER
comment	CHARACTER VARYING(500)
created	timestamp
last_changed	timestamp
dev_comment	CHARACTER VARYING(500)
source	CHARACTER VARYING(100)

3.15 Funding

The NordGIS/INTERACT GIS Database Table (DT) "Funding" (Table 15) keeps a record of the funding sources of station activities.

Table 15. The NordGIS/INTERACT GIS Database Table "Funding". The attribute identities are relatively informative, with the left column reflecting attribute usage and the right column reflecting attribute characteristics.

fundings	
funding_id	INTEGER
funder	CHARACTER VARYING(254)
funding_details	CHARACTER VARYING(254)
grant_id	CHARACTER VARYING(64)
project_id	INTEGER

3.16 EU projects

The NordGIS/INTERACT GIS Database Table (DT) "EU projects" (Table 16) keeps a record of EU-funded station activities.

Table 16. The NordGIS/INTERACT GIS Database Table "EU projects". The attribute identities are relatively informative, with the left column reflecting attribute usage and the right column reflecting attribute characteristics.

eu_projects	
eu_project_id	INTEGER
eu_project_title	CHARACTER VARYING(254)
eu_project_grant_id	CHARACTER VARYING(50)
eu_project_details	CHARACTER VARYING(254)
project_id	INTEGER

4. Sampling characteristics of the NordGIS/INTERACT GIS information system

In the NordGIS/INTERACT GIS database tables (DT's) provided above, metadata is georeferenced whenever possible (coordinate_x, coordinate_y). By combining the strengths of PostgreSQL, PostGIS, and OpenLayers, this facilitates dynamic linkage across text- and map-based database entities. In NordGIS/INTERACT GIS, queries and database responses (to queries) are, therefore, always two-dimensional where the map- and text-based parts of the user interface have equal relevance. OpenLayers functionalities even facilitate queries with respects to the geographic location of any polygon to be interactively drawn at the client screen. In addition to the query functionalities offered by the public interface, station and system administrators may want to sample the system in order to retrieve information for standardised administrative tasks. These two approaches to the process of sampling/querying the NordGIS/INTERACT GIS will be briefly covered below.

4.1 Public query

Public query of the NordGIS/INTERCT GIS database may be performed regardless of administrative privilege, i.e. whether it is made by system/station administrators, PI's, or public spectators. In accordance with the above discussion, and in particular with the NordGIS/INTERACT GIS Data Model provided in Figure 2, such queries may concern any combination of Stations, Persons, Projects, Project role, Applications, Conferences, Courses, Reservations, Group visits, Publications, Authors (DT Pub_pers_proj), Place-names, Project activities (DT Activities), Funding, and/or EU projects. With the linkages across NordGIS/INTERACT GIS database tables being truly relational, the number of possible query combinations is proportional to the combinatory faculty of DT's.

When monitoring functionalities are added to the information system, monitoring data products as well as metadata concerning monitoring equipment and standards will be added to the list of DT's available for query. In addition, when the top-level DT of Organisation is added to the system, i.e. the organisations that administrate clusters of field-stations (INTERACT, SITES etc.), the entire hierarchy of DT's may be filtered with respect to Organisation.

As illustrated in Figure 3 and Figure 4, the parallel usage of maps and text characterises the public NordGIS/INTERACT GIS sampling/query process.

4.2 Administrative query

In the case of administrative query, the NordGIS/INTERCT GIS database tables may be combined into pre-disposed lists particularly tailored to meet the requirements of standardised administrative tasks. There are numerous examples of such tasks, like annual lists of publications, annual record of activities, annual number of occupied beds, etc., etc. As a matter of fact, the ability to create easily tailored lists is one of the major advantages offered to station administrations by the NordGIS/INTERACT GIS information system. Although standardised lists still are in the process of being specified and implemented (Jan. 2015), there is an interesting potential in developing the system further along these directions. As an example, the inclusion of the costs associated with station activities would facilitate lists tailored to reflect annual budget and economy. At the level of organisations, this would provide easy accessible comparisons across stations. Similarly, functionalities for assessing usage and costs regarding station equipment would provide an interesting potential. Seemingly, the list of potentially interesting functionalities for eventual addition to the NordGIS/INTERACT GIS information system is endless.
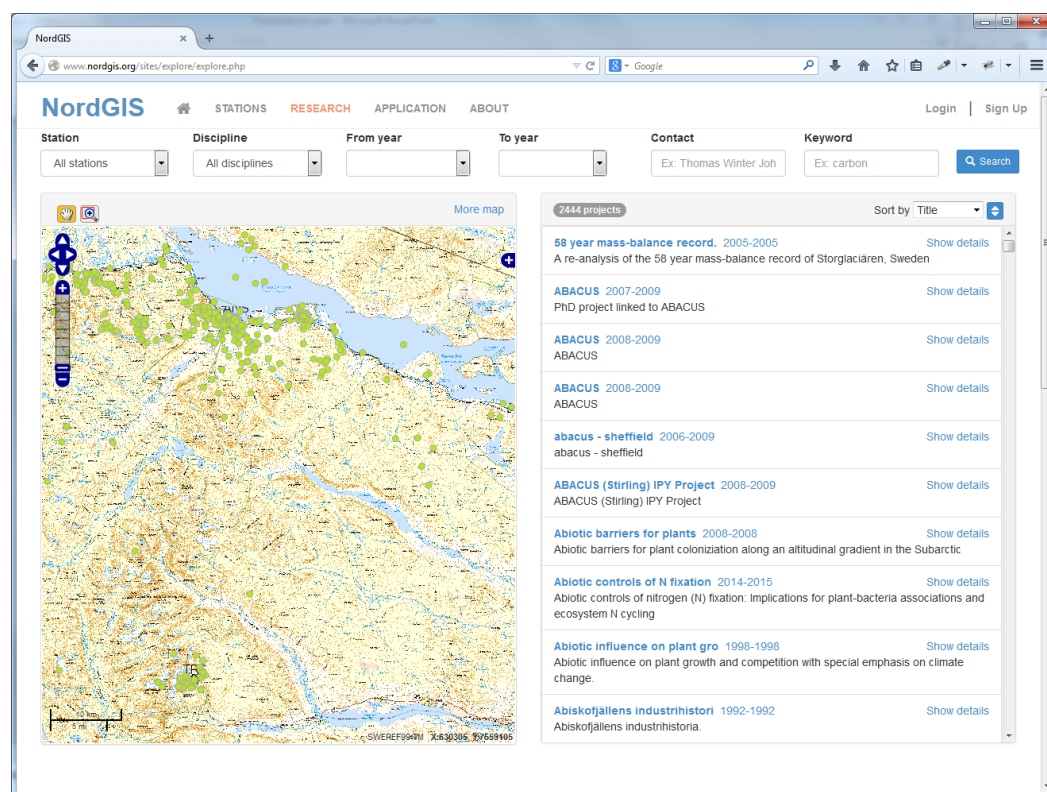

Figure 3: A subset of projects performed under the auspices of the Abisko station, situated in northernmost Sweden, is queried for. By "clicking" a project in the list of resulting text objects, it is highlighted in the map.
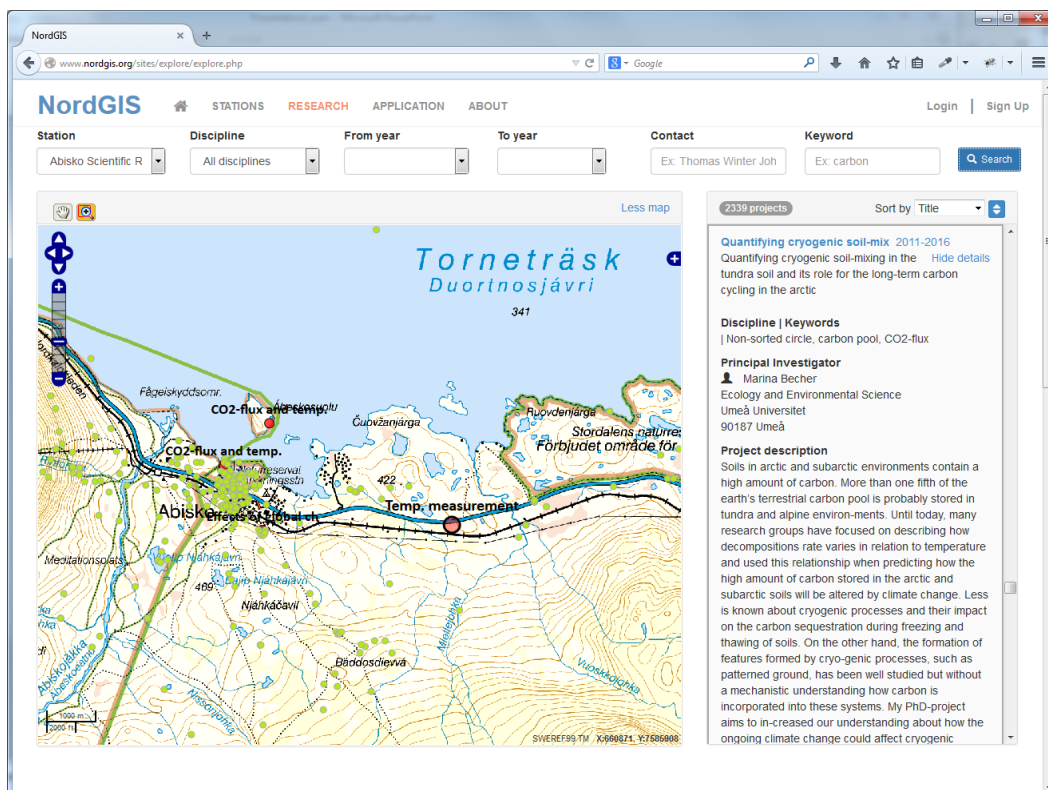
Figure 4: By "clicking" a project in the map, a text object is retrieved, subdivided by two activities.

4.3 Coordination of research and monitoring activities across stations

One particular administrative query issue is the overall assessment of research and monitoring activities across stations, and the relation of these activities to "external" agendas and/or requirements. One example would be the query of NordGIS/INTERACT GIS regarding the number and geographic setting of the stations currently monitoring the flux of greenhouse gases from soils to the atmosphere. Provided such information, the next overall administrative query would concern the dimensioning of the total monitoring effort, in order to provide a relevant geographic distribution of the total monitoring effort, and to avoid too much costly redundancy. These types of queries, where the dimensioning of the total monitoring effort is facilitated, opens a new dimension to collaboratively monitoring the Northern Polar region. In a networked regulated approach, individual stations and instruments are turned into communicative nodes in a surveillance instrument of global dimensions. With little doubt, this is how tomorrow's surveillance will be conceived, with the network itself considered as being the central single monitoring constituent.

Finally, there is an important statistical dimension to the construction of the NordGIS/INTERACT GIS information system that needs to be discussed. The perhaps most important choice in

designing the NordGIS/INTERACT GIS information system concerns exactly where to sample the process where individual stations administrate their respective activities data, for successive transfer to the networked database. If data are intermediately stored at the stations, and sampled some time-period after the initiation of projects, a statistical error is introduced with the probability of activities not being executed as planned, or changed relative to the original planning. This probability of data diffusivity increases with the time span in-between intermediate storage and sampling, and is at a minimum if data are sampled in real time, without any intermediate storage. In NordGIS/INTERACT GIS, data is sampled prior to the real-time execution of projects, when station access is applied for via the NordGIS/INTERACT GIS application form. Since this typically is done six months prior to actual activities execution, the system database initially contains metadata concerning intended activities, which may be subsequently followed up to reflect eventual changes. As a matter of fact, this follow-up process is a central element of systems design, and is meant to be done in close collaboration between station administrations and project PI's. Hence, NordGIS/INTERACT GIS is intended to constitute a living tool for communicating projects across stations and visiting scholars, aiming at minimising average error in the publication of activities metadata.