

BEXIS 2.8.0

Data Planning Module

User Guide

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Acknowledgement

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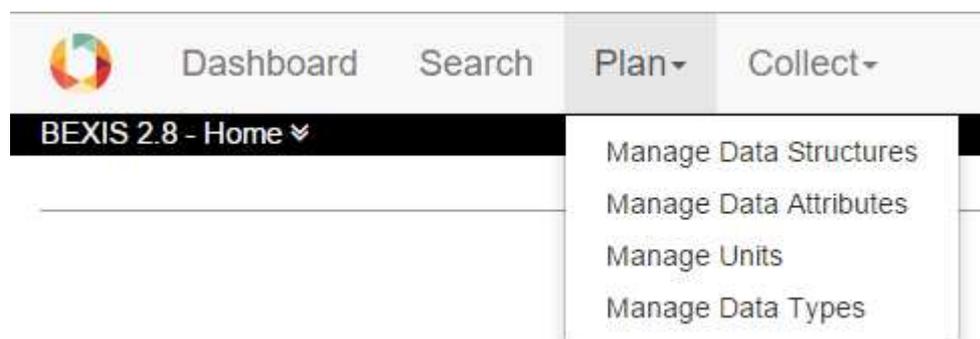
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1. Overview

In BEXIS your data is stored and managed as part of a dataset. A dataset may be anything from a single record up to a collection of millions of records and multiple variables. Each dataset may have an individual structure given by the number of variables and their properties. It is up to the user or the data manager of a project to define such Data Structures. This is what the Data Planning Module is for.

The module is called “Data Planning” since it is good practice to specify the Data Structure before collecting your data in the field or the laboratory. Your data can only be uploaded to the system (using the Data Collection Module) if there is a corresponding Data Structure already existing.

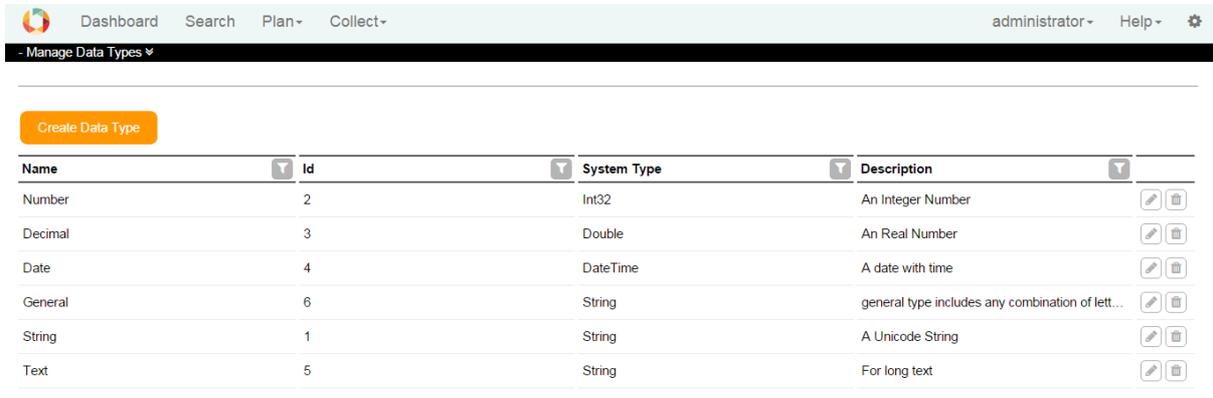
A Data Structure contains one or more Data Attributes. Each Data Attribute is defined by its Data Type, a Unit, and a unique name. So defining Data Types and Units would be the first step, if they are not available yet.



The system encourages reuse of Data Attributes, as well as Data Types and Units. For example, there should be only one Data Attribute for temperature values with a Data type of ‘float’ and measured in degree Celsius (i.e. unit). All datasets containing such temperature measurements should use this data attribute in their data structure. The advantage of such reuse is not only to avoid redundancy (e.g. different names for same thing), but is foremost to enable integration of identical variables across different datasets for large synthesis tasks later on.

2. Data Type Manager

With the Data Type Manager you are able to create, modify and delete Data Types. They are required to specify Data Attributes.



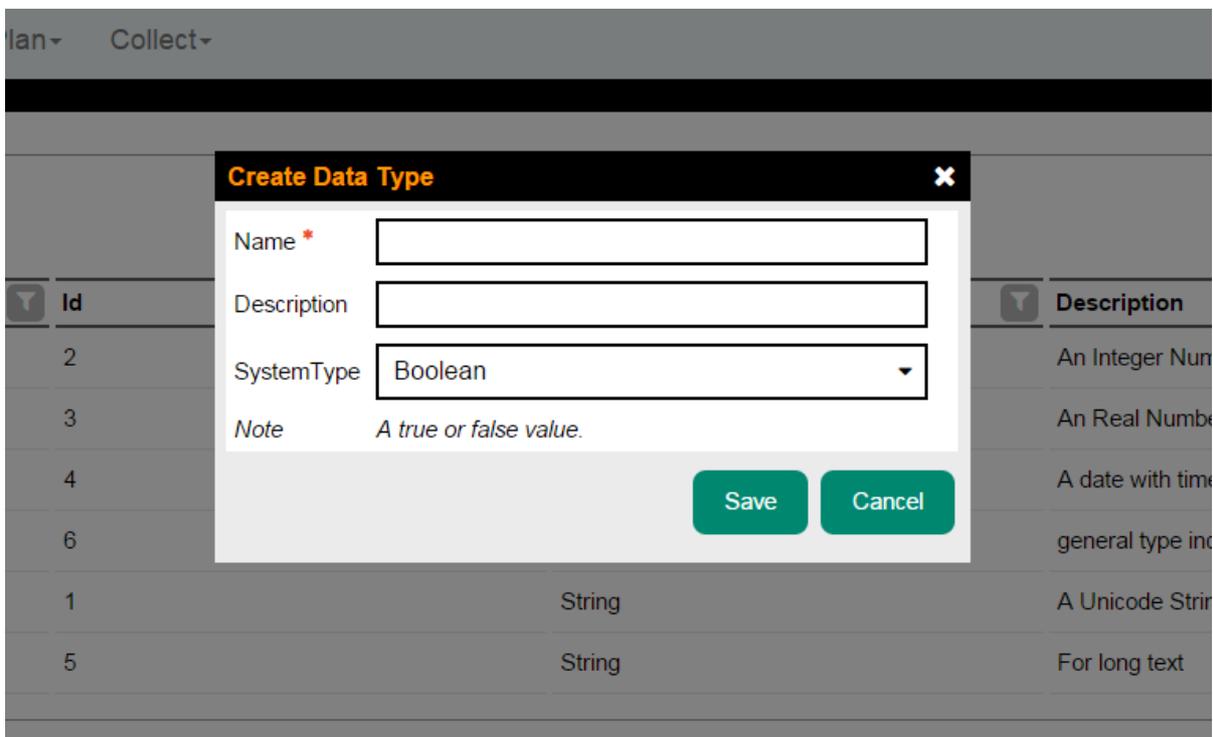
The screenshot shows the 'Manage Data Types' interface. At the top, there is a navigation bar with 'Dashboard', 'Search', 'Plan', and 'Collect' menus, and user information 'administrator' and 'Help'. Below the navigation bar is a header for 'Manage Data Types'. A prominent orange button labeled 'Create Data Type' is located above a table. The table lists several data types with their respective IDs, system types, and descriptions. Each row in the table includes edit and delete icons.

Name	Id	System Type	Description	
Number	2	Int32	An Integer Number	 
Decimal	3	Double	An Real Number	 
Date	4	DateTime	A date with time	 
General	6	String	general type includes any combination of lett...	 
String	1	String	A Unicode String	 
Text	5	String	For long text	 

To create a Data Type, click on the Create Data Type button. Fill the fields, select a system type and click on the Save button. The Data Type is stored if all information are correct and it is not a duplicate.

Use  for edit and  for delete a data type.

In a typical project scenario, the responsible data(base) manager would have created the most common Data Types and Units.



The screenshot shows the 'Create Data Type' dialog box. It has a title bar with 'Create Data Type' and a close button. The dialog contains three input fields: 'Name *' (required), 'Description', and 'SystemType' (a dropdown menu). The 'SystemType' dropdown is currently set to 'Boolean'. Below the input fields is a 'Note' section with the text 'A true or false value.'. At the bottom of the dialog are two buttons: 'Save' and 'Cancel'. The background shows the 'Manage Data Types' table with the 'Create Data Type' button highlighted.

3. Unit Manager

With the Unit Manager you are able to create, modify and delete Units. Units may be required to define Data Attributes.

The screenshot shows the 'Users' section of the application. At the top, there is a 'Create User' button. Below it is a table with columns: Id, User Name, Full Name, Email, Is Approved, Is Blocked, and Is Locked Out. The table contains three rows of user data. Navigation controls for the table are visible above and below the table.

Id	User Name	Full Name	Email	Is Approved	Is Blocked	Is Locked Out
5	BExIS	Demo	bexis-support@uni-jen...	true	false	false
4	navabpourn	Nafiseh Navabpour	nafiseh.navabpour@un...	true	false	false
3	Administrator	Admin	admin@bexis.de	true	false	false

To create a Unit, click on the Create Unit button. Fill the fields, select a Measurement System and create or select a Dimension. To create a Dimension enter a Name in the Dimension Name field and edit the Dimension Specification in this pattern "L(0,0)M(0,0)T(0,0)I(0,0)Θ(0,0)N(0,0)J(0,0)", for more information click [here](#). For example, a Unit of meter per second (m/s) would be represented as "L(1,0)M(0,0)T(0,1)I(0,0)Θ(0,0)N(0,0)J(0,0)".

For a Unit, you could define one or more data types associated with it. By clicking on the Save button, the Unit is stored if all information is correct and it is not a duplicate.

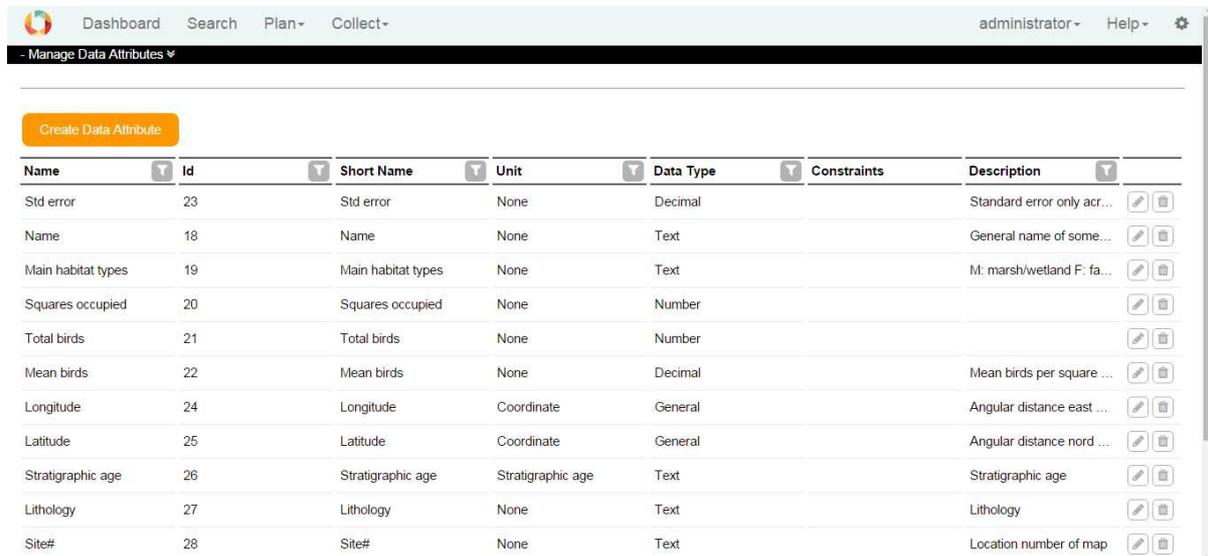
Use  for edit and  for delete a Unit.

The screenshot shows the 'Create Unit' form. It includes fields for Name, Abbreviation, Description, Dimension Name (with a dropdown menu), Dimension Specification (with a text input containing a complex formula), and Measurement System (with a dropdown menu). Below these fields is a table of data types to be associated with the unit.

Name	Id	System Type	Description
<input type="checkbox"/> Number	2	Int32	An Integer Number
<input type="checkbox"/> Decimal	3	Double	An Real Number
<input type="checkbox"/> Date	4	DateTime	A date with time
<input type="checkbox"/> General	6	String	general type includes any combination of letters, digits and punctuation.
<input type="checkbox"/> String	1	String	A Unicode String
<input type="checkbox"/> Text	5	String	For long text

4. Data Attribute Manager

With the Data Attribute Manager you are able to create, modify and delete Data Attributes. Data Attributes as variables are required to create Data Structures.

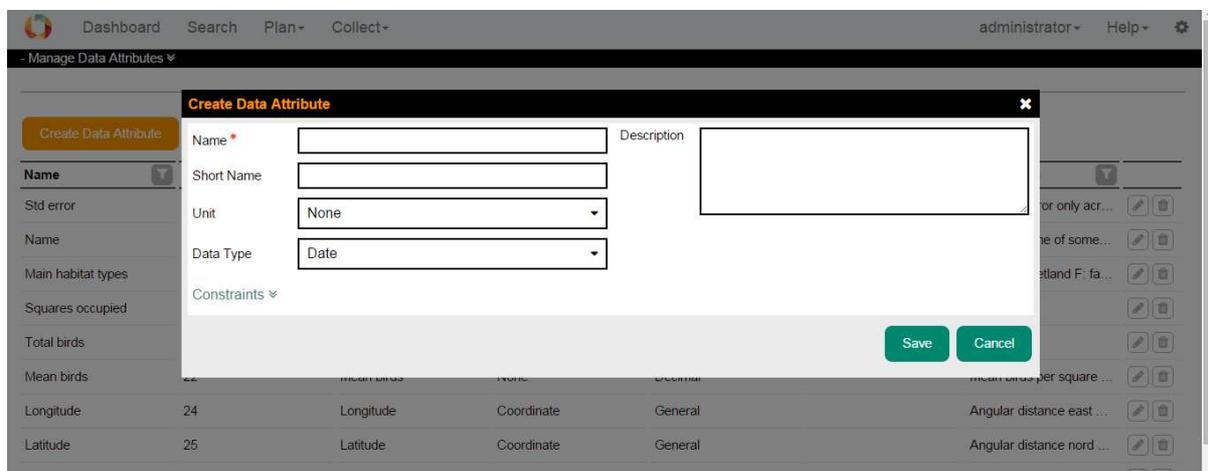


The screenshot shows the 'Manage Data Attributes' page. At the top, there is a navigation bar with 'Dashboard', 'Search', 'Plan', and 'Collect'. The user is logged in as 'administrator'. Below the navigation bar is a 'Create Data Attribute' button. The main content is a table with the following columns: Name, Id, Short Name, Unit, Data Type, Constraints, and Description. The table contains 11 rows of data.

Name	Id	Short Name	Unit	Data Type	Constraints	Description
Std error	23	Std error	None	Decimal		Standard error only acr...
Name	18	Name	None	Text		General name of some...
Main habitat types	19	Main habitat types	None	Text		M: marsh/wetland F: fa...
Squares occupied	20	Squares occupied	None	Number		
Total birds	21	Total birds	None	Number		
Mean birds	22	Mean birds	None	Decimal		Mean birds per square ...
Longitude	24	Longitude	Coordinate	General		Angular distance east ...
Latitude	25	Latitude	Coordinate	General		Angular distance nord ...
Stratigraphic age	26	Stratigraphic age	Stratigraphic age	Text		Stratigraphic age
Lithology	27	Lithology	None	Text		Lithology
Site#	28	Site#	None	Text		Location number of map

To create a Data Attribute, click on the Create Data Attribute button. Fill the fields. Select an associated Unit and Data Type and click on the Save button. The Data Attribute is stored if all information are correct and it is not a duplicate.

Use  for edit and  for delete a Data Attribute.



The screenshot shows the 'Create Data Attribute' form overlaying the table. The form has the following fields: Name (required), Short Name, Unit (dropdown menu with 'None' selected), Data Type (dropdown menu with 'Date' selected), and Constraints (expandable section). There is a large text area for Description. At the bottom right of the form are 'Save' and 'Cancel' buttons.

It is possible to put constraints on Data Attributes, to add constraints click on the link Constrains. You can add a Range, a Pattern and a Domain Constraint to each Data Attribute.

- **Range:** If the input data is of numeric type, this constraint checks whether the input value falls in the specified range. If the input data is of type string, the range check behaves like a length check, which means the length of the input string should fall in the range. The range has a lower bound and an upper bound, plus two indicators to show whether the boundary values are included in the range. Negate function checks if the value is out of the range!

- **Pattern:** takes the value as input and matches it against a pattern to see whether the pattern is found in the input. If so, it returns true; otherwise false. Pattern constraints apply to text values only, for more information on the format click [here](#).
- **Domain:** takes the value as input and matches it against each and every domain item in the list. If the value matches one, it stops matching and returns true, which means the value satisfies the constraint. If no match is found it returns false. No duplicate domain item is allowed, although it does not affect the matching procedure described. Domain items can be characters, strings, Booleans or numbers. Their data type is enforced by the associated data attribute. Using the domain constraint as a tool to model acronyms and similar topics provided that some extra information such as description of each item is available, is supported.
- **Negation:** The inversion of the chosen constraint will apply. In fact the result of the constraint is XORed with the negation field. For example, a negated Range Constraint of Min = 1 and Max = 100 will allow all values outside of this range.

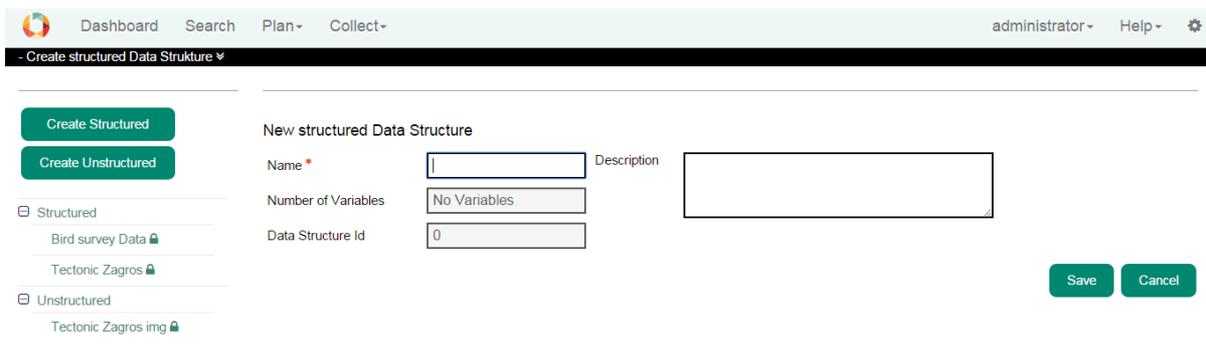
5. Data Structure Manager

The Data Structure Manager is a tool to create, modify and delete Data Structures. Data Structures contain Variables, which are specific instances of Data Attributes. For example, only one Data Attribute 'Count' is needed to build a Data Structure of multiple similar variables where only the name (e.g. species name) is different. Each Variable uses the same Data Attribute (e.g. instances of Count).

It is possible to create Data Structures for structured data (Excel tables, CSV-Files ...) and for unstructured data (images, videos ...).

5.1. Create a Data Structure

To create a data structure, in the plan Data Structure Manager, click on the Create Structured or Create Unstructured button. Fill fields and click on the Save button. A name for a data structure is required.



The screenshot shows the 'Create structured Data Structure' form in a web application. The interface includes a navigation bar with 'Dashboard', 'Search', 'Plan', and 'Collect' menus, and user information 'administrator' and 'Help'. The main content area is titled 'Create structured Data Structure' and features two buttons: 'Create Structured' and 'Create Unstructured'. Below these buttons is a list of existing data structures, categorized into 'Structured' (Bird survey Data, Tectonic Zagros) and 'Unstructured' (Tectonic Zagros img). The 'New structured Data Structure' form contains the following fields: 'Name *' (text input), 'Description' (text area), 'Number of Variables' (dropdown menu with 'No Variables' selected), and 'Data Structure Id' (text input with '0'). 'Save' and 'Cancel' buttons are located at the bottom right of the form.

By clicking on the name of a Data Structure in the list, if it is not already in use by a dataset, you can edit it. In case of Structured, you can edit name, description or variables.

In Edit mode, you can

- see datasets that are using that data structure
- download an Excel template (in case of structured)
- delete a data structure
- create a copy by clicking on the Save as button

5.2. Add Variables

In case of structured, a data structure usually contains variables. Variables are defined before as data attributes. If a data structure is in use, you are not able to add or remove variables.

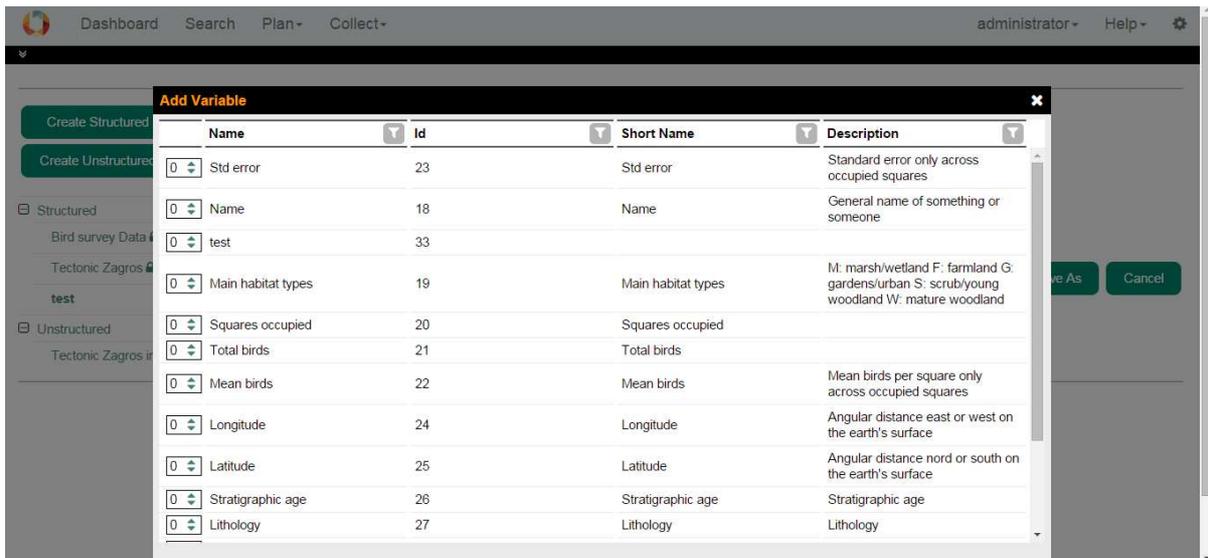


In the Add Variable window, by clicking on the up and down arrows near the variable name, you can select how many variables of that particular data attribute should be added your data structure.



After adding variables, you can rearrange the order of the variables by using the left and right arrows. Please note, that the order cannot be changed anymore once a dataset is using this data structure. You may also delete variable from the list by using the X button.

You can define requirement for each variable. In the Optional row, if the checkbox is ticked, means that during upload data to a dataset, this variable could be empty.



5.3. Create a copy data structure

Either from a structured or unstructured data structure, you can create a copy of it by clicking on the Save as button. In that window, the Name is filled with the original one and you need to fill it with a new one.

