Synthetic Fields in Vanessa

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Introduction

Synthetic fields may now be displayed within the existing form architecture in VANESSA.

Synthetic fields are constructed fields present in a *view*. A *view* is a database object that displays the results of a *stored query*. In Postgres and other SQL databases, a *view* may also be called a *virtual table*. This virtual table may contain data from one or many underlying tables and is created using a *SELECT* statement.

One advantage of views is that various functions and transformations may be applied against an underlying set of data to create the resulting set of columns in a view. These data transformations may include aggregate operations where fine-grained data are rolled up into summary forms, *inter alia.* Data in a view are often not physically stored, except in the case of *materialized views.* In the general case, storing the defining *SELECT* statement is sufficient and allows on-the-fly generation of the constructed table columns and rows as needed so that the view is always up-to-date.

Synthetic fields are stored in the Data Dictionary

All data which are to appear in forms within VANESSA are stored in the data dictionary table, *sys_lu_data_dictionary*.

A *form* is defined by a unique name in the *section_table* column. In the current implementation, this name needs to correspond directly to the name of a table corresponding to that entity. For example, all data about people are stored in the *person* table, and therefore there is a section_table called "person" in *sys_lu_data_dictionary* (*figure 1 below*).

id	section_table	table_column	ctf_ref	ui_type	ui_order	tag
...	...	...	...	...	...	...
140	person	hospital		suggest_dropdown	94	phi
141	person	mrn		basic	95	phi
142	person	other_hospital_id		basic	106	phi
143	person	length_of_stay		number	107	
410	person	discharge		suggest_dropdown	108	
162	person			section_header	112	
542	person		sys_view_mais.mais_1h	view_only	121	synthetic
543	person		sys_view_mais.mais_2f	view_only	122	synthetic
544	person		sys_view_mais.mais_3n	view_only	123	synthetic
545	person		sys_view_mais.mais_4t	view_only	124	synthetic
546	person		sys_view_mais.mais_5a	view_only	125	synthetic
547	person		sys_view_mais.mais_6s	view_only	126	synthetic
548	person		sys_view_mais.mais_7u	view_only	127	synthetic
549	person		sys_view_mais.mais_8l	view_only	128	synthetic
442	person			section_header	130	phi
443	person	isp1		number	131	phi
444	person	isp2		number	132	phi
...	...	...	...	...	...	...

Figure 1. The data dictionary table, `sys_lu_data_dictionary`, contains all of the data needed to generate a form in VANESSA. For standard data, the combination of two columns, `section_table` and `table_column`, tells the system where to retrieve the data. For example, `length_of_stay` may be found in the `person.length_of_stay` column. In contrast, data from views are defined in the single `ctf_ref` column where both the view and the column name are stored together, as we see for `sys_view_mais.mais_3n`.

For data that are directly present in the *person* table, it is sufficient to simply name the fields that one wants to appear on the form in the *table_column* column: *hospital, length_of_stay*, and *isp1* all appear directly in the *person* table.

For view data, we instead must leave the *table_column* column blank (*null*) and fill in the *ctf_ref* column with both a view name prefix and a column name from that view, using the dot member operator to separate the view name from the column name, e.g. "`sys_view_mais.mais_3n`", etc. The name of the column "`ctf_ref`" derives from "*cross table form reference*".

ADDITIONAL REQUIREMENTS FOR SYNTHETIC FIELDS

In addition to specifying the view and view column in the *ctf_ref* column, it is also critical to specify the *ui_type* as "`view_only`". No other choice is possible, as views are by definition *read-only* entities.

Also, it is highly recommended to fill in the *tag* column with "`synthetic`". This tells VANESSA to display the read-only form widget in a unique color that is only used for synthetic view data.

As you can see in *figure 1*, *table_column* remains *null* while both "`view_only`" and "`synthetic`" are marked for all eight MAIS columns constructed in the *sys_view_mais* view.

Although not shown in *figure 1*, it is also a good idea to fill in the *label* column of *sys_lu_data_dictionary* with the display label that you prefer to see on the generated forms: otherwise, the label will be automatically constructed from the view column name (by removing the underscore characters).

VIEWS MUST BE KEYED ON PRIMARY KEY OF THE SECTION TABLE

As long as one adheres to the rules and procedures outlined above, VANESSA's architecture now allows for an unlimited number of view tables and view table columns to be included in a single section_table form.

Note however that each view must be keyed to the primary key of the section table. That is to say, if the section_table is the "`person`" table, then the view must have a foreign key column named "`person_id`".

Views must be one-to-one with the section table

In addition to the foreign key constraint mentioned above, there must also be a *one-to-one correspondance* of rows between the section table and the view table. That is to say, a view may contain only one row for each row referenced in the *section_table*.

Using the *sys_view_mais* view as an example, we may note that this view is actually constructed from data present in the *injury* table, which is *1-to-n* with the person table, because a person can have any number of injuries. However, the data in *sys_view_mais* represent a *roll-up aggregate* of the injury data, because the MAIS scores refer to maximum AIS scores across all injuries for a given body region. Thus, the *sys_view_mais* view meets the criteria of having only one row per person.

Appearance in Vanessa

Figure 2 below shows how the synthetic columns from the *sys_view_mais* table appear in the person form.

Figure 2. *Synthetic columns showing the maximum AIS score by body region appear nestled in the* person *form in VANESSA. These read-only columns which are calculated on-th-fly replace the older manually-entered hard-coded MAIS data columns.*

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