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# Saiku with OPEN FORIS CALC

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Updated: November 2018

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<http://www.openforis.org>

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## 1. INTRODUCTION

Saiku was founded in 2008 by Tom Barber and Paul Stoellberger. Originally called the Pentaho After a complete rewrite in 2010, the software was renamed as Saiku. Saiku is open-source software and it comes within Open Foris Calc installation package<sup>1</sup>.

Saiku offers a user friendly, web based analytics solution that lets users quickly and easily analyze data and create and share reports.

## 2. OLAP ANALYSIS

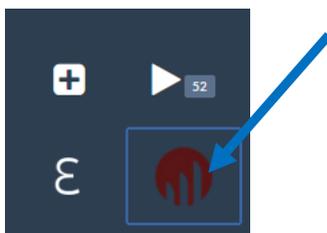
On-Line Analytical Processing (OLAP) is a category of software technology that enables software use to gain insight into data through fast, consistent, interactive access to a wide variety of possible views of information.

Saiku offers scalable in-memory analysis. Large amounts of data can be stored in memory in a distributed manner across the local network, offering greatly improved performance over large data warehouses as the aggregated data is retrieved from the network instead of reading from disk.

## 3. USING SAIKU

### 3.1. Start Saiku

If you start Saiku via Internet or LAN connection, just log into the system. If you start Saiku in Open Foris Calc, first run calculation chain and then (if no errors) click Saiku icon.



And log in (username and password: *calc*).

A screenshot of the Saiku 2.5 login form. The form has a title bar that says 'Saiku 2.5'. On the left side, there is a red Saiku logo icon. To the right of the logo, there are two input fields: 'Username' with the text 'calc' entered, and 'Password' with four dots (••••) entered. At the bottom right of the form, there is a 'Login' button.

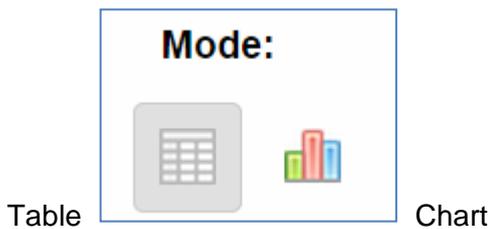
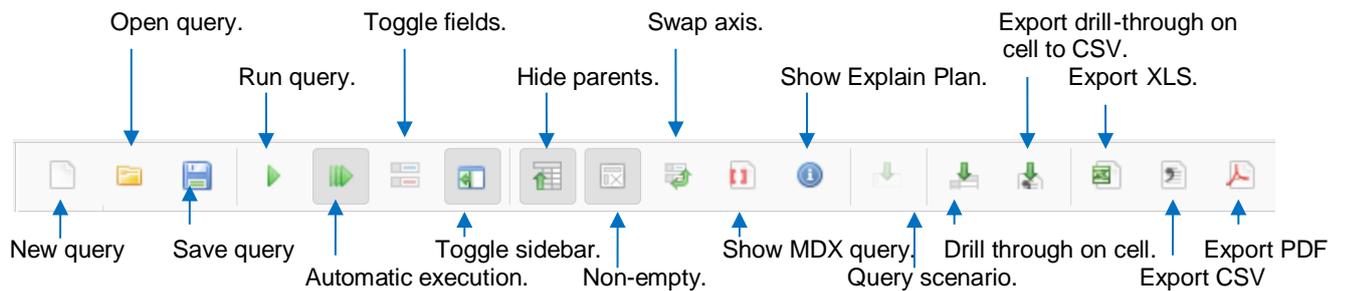
<sup>1</sup> Link to Saiku site: <http://www.meteorite.bi>



### 3.2. Toolbars

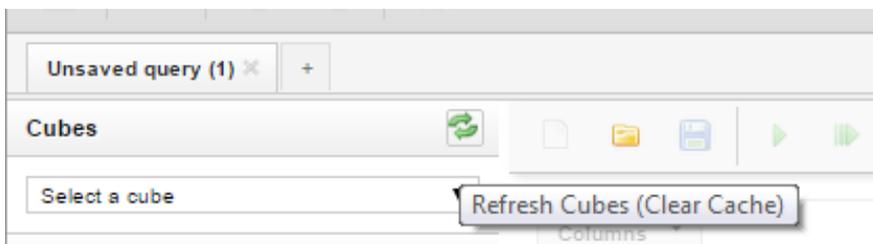


New query    Open query    Logout    About Saiku    Issue Tracker



### 3.3. Refresh cubes

It is recommended to refresh cubes every time after recalculating results in Open Foris Calc. This ensures that the latest changes made in Calc are taken into account in Saiku.



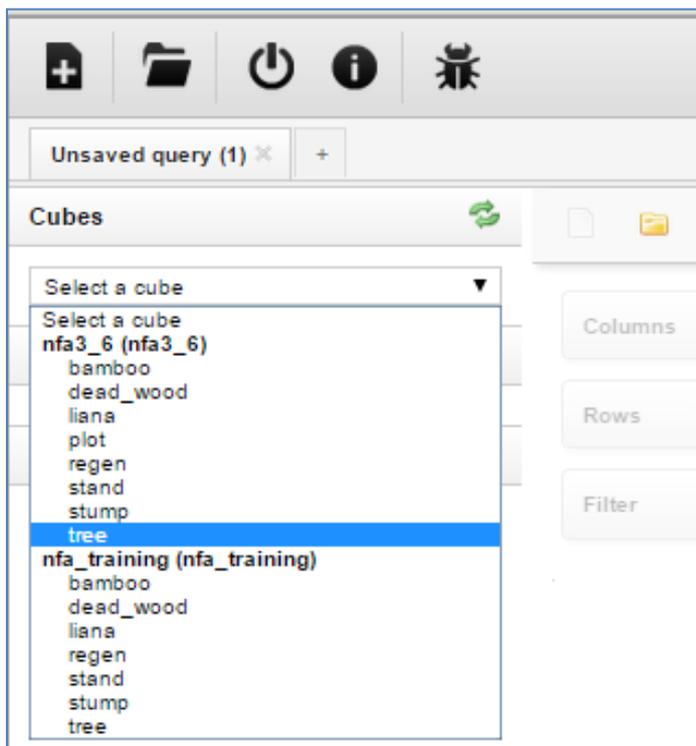


### 3.4. Creating a query

At the core of Saiku are the queries you will create to analyze data. You drag and drop dimensions and measures to build up the query you want. Under the hood Saiku uses the MDX query language to write the query but as an end user you don't need to see any MDX or understand what it means as we do all this for you.

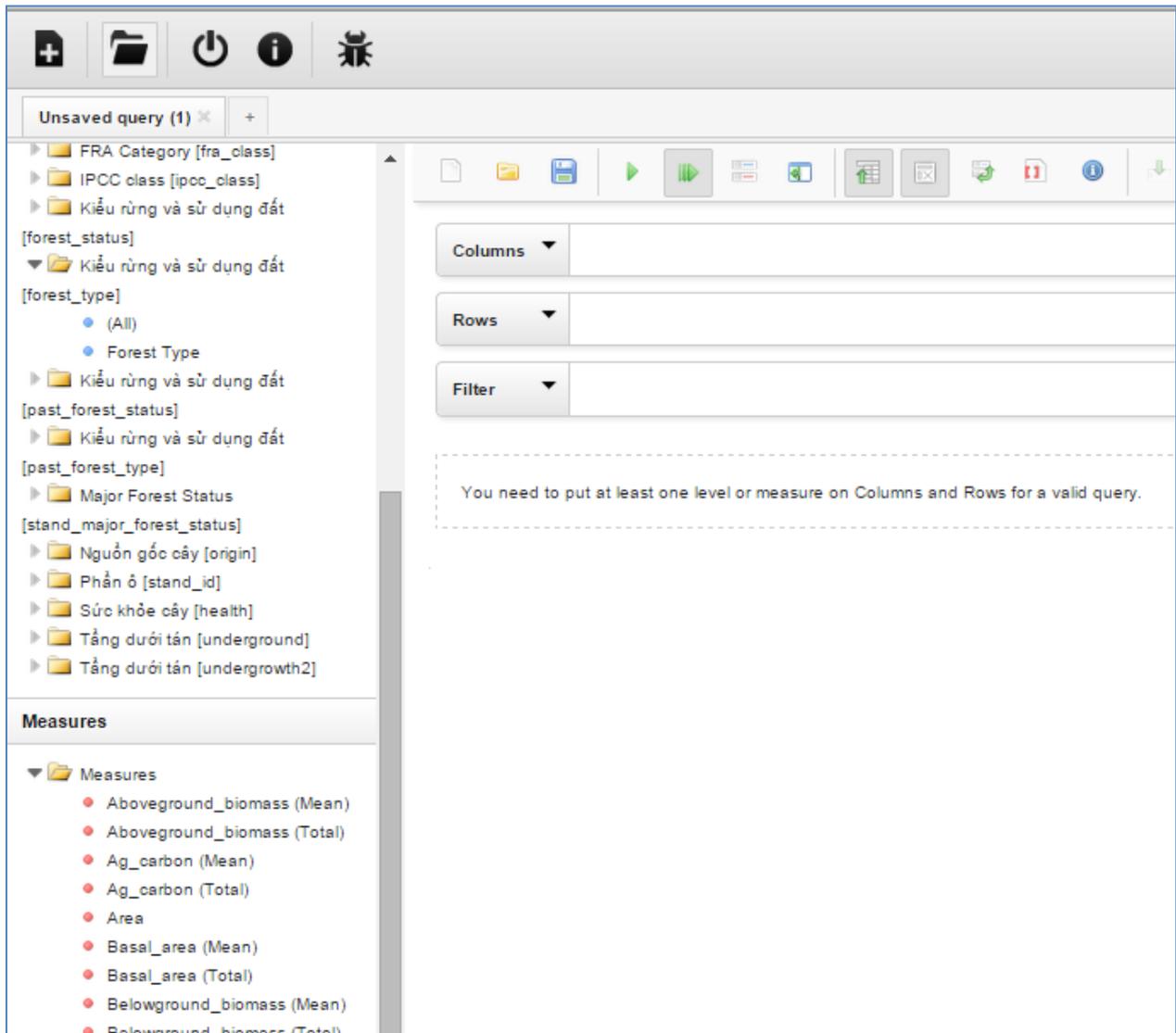
Open a new query window by clicking on the New Query icon. 

This will open a new query window and a blank canvas to create your query in. From the cubes list on the left hand panel select the cube you want to analyze from the drop down box.





Once a cube has been selected the available dimensions (with hierarchies) and measures are listed.



Saiku shows dimensions' titles as they are defined in the Inventory Data Metamodel (IDM) in Open Foris, with the following attributes: *Label* [*Name*]. As seen in the figure above, *Labels* were written in Vietnamese, but *Name* in English.

A Saiku query has 3 drop zones to help you define your query: Columns, Rows and Filter.



To start analyzing data you need to do now is include at least one dimension in the rows drop area and either one measure in the measures drop area or another dimension in the columns drop area. Once you have fulfilled these criteria then the query will execute and the results displayed on screen.

The screenshot shows the Saiku interface with the following configuration:

- Columns:** Basal\_area (Mean)
- Rows:** Major Forest Status
- Filter:** (empty)

Major Forest Status	Basal_area (Mean)
Secondary forest	12.2262
Plantation	7.9539
Bushes, grassland	0.5411
Agricultural land	1.3579
Other land	0.6843

You can swap axis easily by clicking “Swap axis” button.

The screenshot shows the Saiku interface with the following configuration:

- Columns:** Major Forest Status
- Rows:** Basal\_area (Mean)
- Filter:** (empty)

The toolbar shows the 'Swap axis' button (represented by two vertical bars) highlighted with a blue arrow.

MeasuresLevel	Secondary forest	Plantation	Bushes, grassland	Agricultural land	Other land
Basal_area (Mean)	12.2262	7.9539	0.5411	1.3579	0.6843

Then, we can “drag and drop” more dimensions and measures as we want into columns, rows, and filters. However, we are restricted only to not put measures on both columns and rows. After each change the query is updated and executed automatically.



Showing of empty / non-empty records, click 'Non-empty' button.

The screenshot shows the Open Foris Calc interface. At the top, there is a toolbar with various icons. Below the toolbar, there are three sections: 'Columns', 'Rows', and 'Filter'. The 'Columns' section contains three buttons: 'Basal\_area (Mean)', 'Stocking (Mean)', and 'Volume (Mean)'. The 'Rows' section contains a dropdown menu with 'Major Forest Status' selected. The 'Filter' section is currently empty. Below these sections is a data table with the following content:

Major Forest Status	Basal_area (Mean)	Stocking (Mean)	Volume (Mean)
NA			
Primary forest			
Secondary forest	12.2262	718.4783	76.9456
Plantation	7.9539	699.2857	50.4712
Bushes, grassland	0.5411	60.8	2.5243
Agricultural land	1.3579	220.8182	4.8407
Water			
Other land	0.6843	58.6207	3.0571



### 3.5. Filtering

There are a number of ways of refining the data you see from your query. These include filtering the dimension members that appear in the result window or using the Filter axis.

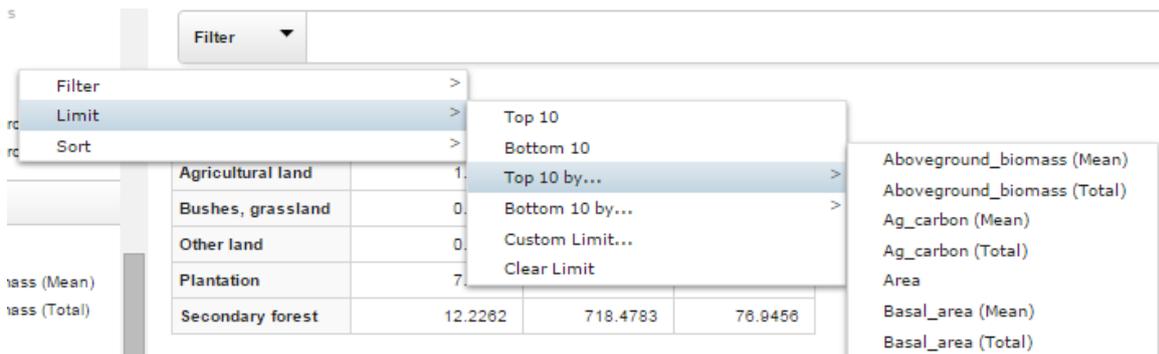
The filter axis allows you to filter what is visible in the result but using dimensions that aren't displayed on the table.

Using the Filter axis.

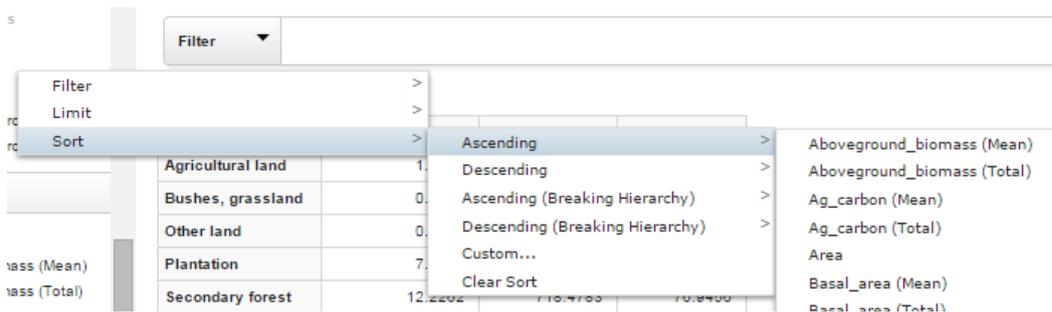
1) *Filter, Filter,.*



2) *Filter, Limit,..*



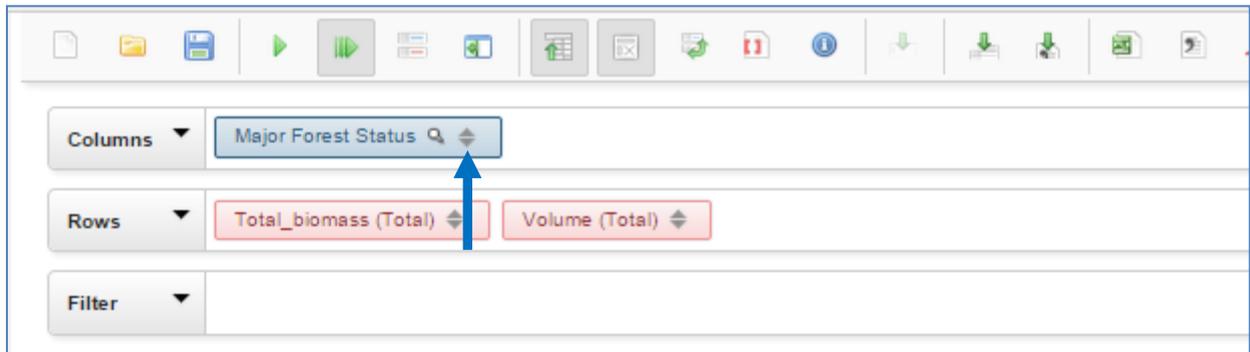
3) *Filter, Sort,..*





### 3.6. Ordering

Each dimension and/or measure can be used to order data, but not all possible combinations are allowed (since we can't order both by a measure on columns and a dimension on row, or vice versa).



### 3.7. Popup menus

Some options for fast filtering and adding/removing dimension levels are available by clicking on columns and rows header

Major Forest Status	Basal_area (Mean)	Stocking (Mean)	Volume (Mean)
Secondary forest	12.2262	718.4783	76.9456
Secondary forest	7.9539	699.2857	50.4712
Keep Only	0.5411	60.8	2.5243
Show Children	1.3579	220.8182	4.8407
Include Level >	0.6843	58.6207	3.0571
Keep and Include Level >			
Remove Level >			



### 3.8. Statistics

Saiku allows also showing some statistics about columns values.



Click the summary button.

The screenshot shows the Saiku interface with the summary tool activated. The 'Columns' dropdown is set to 'Major Forest Status'. The 'Rows' dropdown is set to 'Total\_biomass (Total)' and 'Volume (Total)'. The 'Filter' dropdown is empty. Below the controls is a table showing statistics for six categories: Secondary forest, Plantation, Bushes, grassland, Agricultural land, and Other land. The statistics include Min, Max, Sum, Average, and Std. Deviation for each category.

Statistics	Secondary forest	Plantation	Bushes, grassland	Agricultural land	Other land
Min	341994692.813	279301957.364	6112486.395	48355010.186	8341367.946
Max	412514397.087	329404046.774	7354950.957	62057761.389	10332582.516
Sum	754509089.900	608706004.138	13467437.352	110412771.575	18673950.462
Average	377254544.950	304353002.069	6733718.676	55206385.788	9336975.231
Std. Deviation	35259852.137	25051044.705	621232.281	6851375.601	995607.285

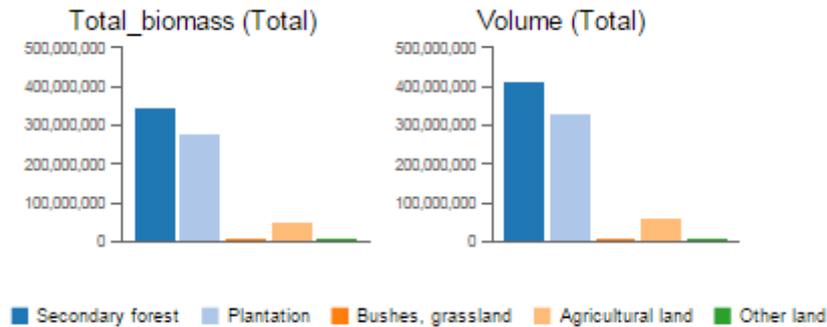
Warning! Do not use summary tools to calculate averages of averages (as mean volume)! It is very easy to show totally meaningless result figures with statistics tool in Saiku.



## 3.9. Charts and Graphs

Once you have designed your query charts are very straightforward in Saiku.

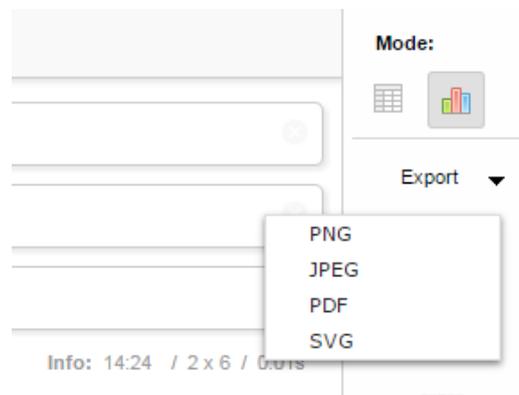
Press the chart button in the top right hand corner of the workspace. This will show a bar chart.



If you want to show a different chart type you can select one from the list on the right hand side.

Don't forget though, if you pivot the result set the chart data can be completely different. So play around with your query if you don't see the layout you desire.

If you want to export your chart into a file for example and JPG, there is the command 'Export' in the right side of the window.



## 3.10. Saving and opening queries

It is recommended that you save a useful query into Query Repository that it can be reused. Saving of queries is done with button 'Save query'.

*NOTE: Saiku does not always show columns in the preferred (or right) order at the same time you create your query. The query works correctly when you first save it, close the query tab sheet, and open it again.*

All query files are saved with file extension `.SAIKU` into the default repository folder, usually into

```
.. \calc-server\tomcat\webapps\saiku\WEB-INF\classes\saiku-repository\
```

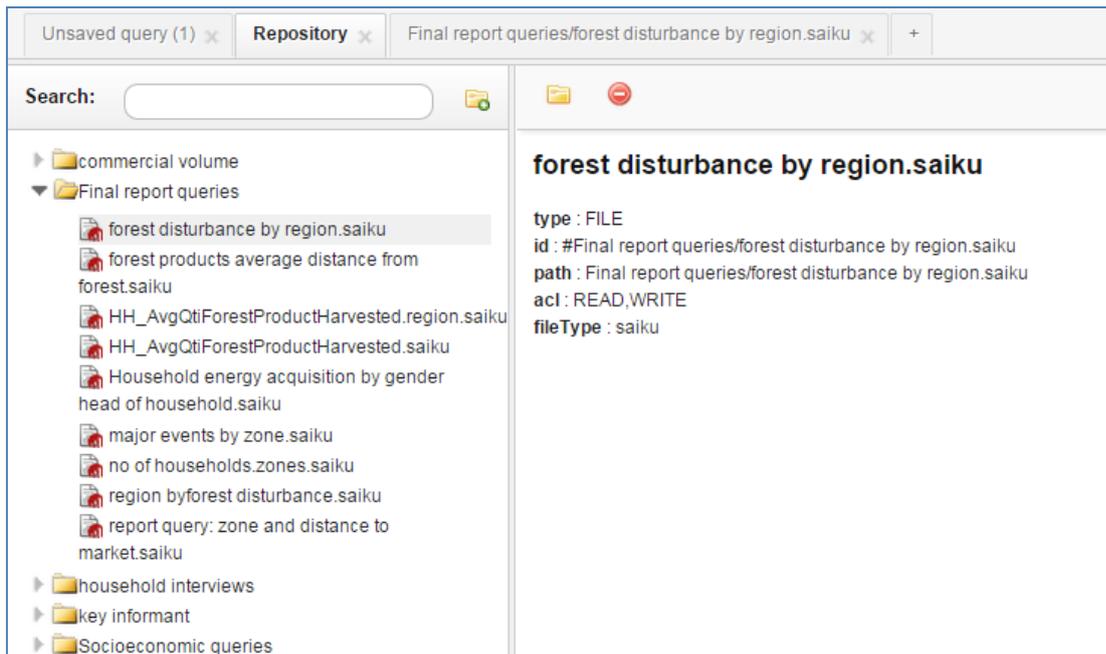
Files will be plain XML and editable in case you need to update them (connection name change etc.) or organize into folders.



This button also enables to create new folders:

Existing queries are viewed with clicking button 'Open query'.

The next figure shows queries made for the NAFORMA Project in Tanzania. The queries are organized into the folders.



When executing the query the result window shows like this below.

Region	Fire	Disease	Lumbering	Encroachment	Grazing	Charcoal making	Other, (describe)
Dar						2	
Morogoro	94	10	64	59	41	58	20
Pwani	32	4	23	13	8	30	9
Tanga	33		21	19	16	26	23
Lindi	59	14	33	13	8	17	14
Mtwara	26		11	14	3	4	4



## 3.11. Transfer of queries to another computer

Sometimes there is need to copy Saiku queries to another computer. The process is to copy the queries from the Saiku default repository folder, usually from `..\\calc-server\\tomcat\\webapps\\saiku\\WEB-INF\\classes\\saiku-repository\\`

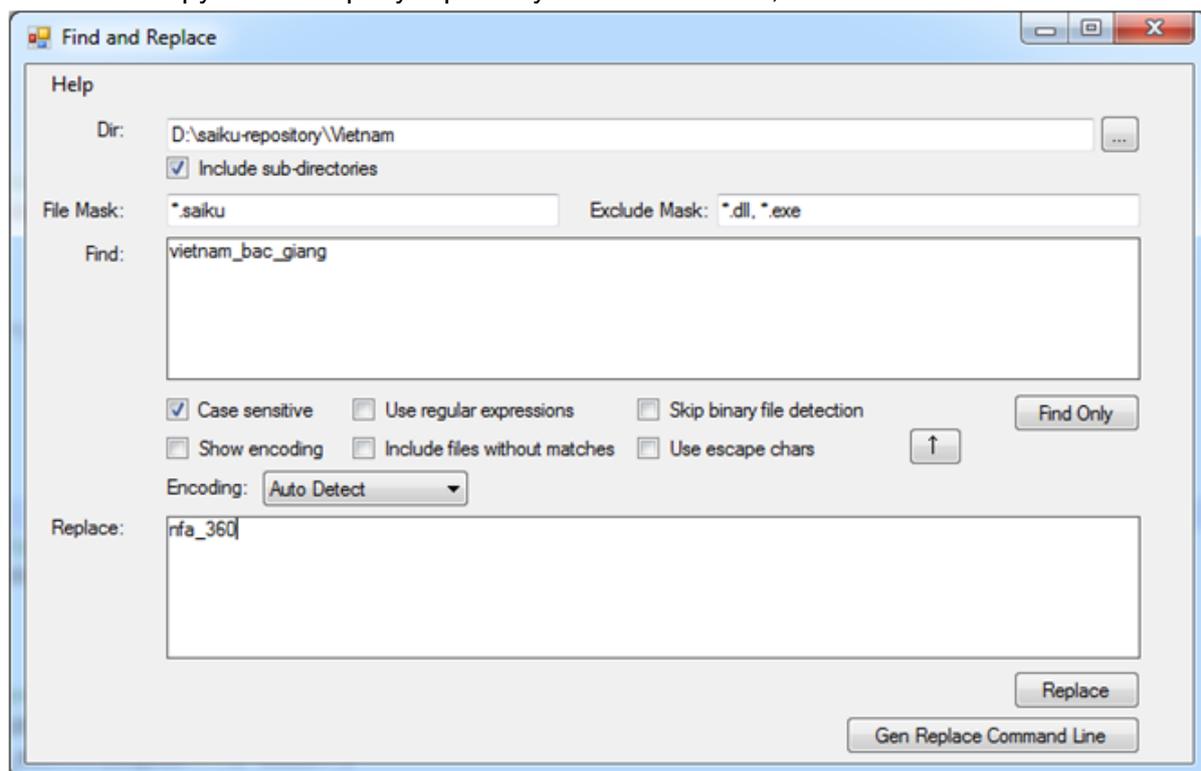
And then paste these subfolders and files into the target machine. In cases where Calc workspaces have different names, these `.saiku` files need to be edited so that the names match with the target workspace. If there are several query files to edit, this free utility can be very useful: **fnr.exe** at <https://findandreplace.codeplex.com/>

**An example.** We need to change workspace name in Saiku queries from `'vietnam_bac_giang'` into `'nfa_360'`.

In Saiku query file there is now

```
<?xml version="1.0" encoding="UTF-8"?>
<Query name="DDC21DC9-A8DC-2A76-AE29-E06C1C63B16A" type="QM" connection="vietnam_bac_giang"
cube="[bamboo]" catalog="vietnam_bac_giang" schema="vietnam_bac_giang">
  <QueryModel>
    <Axes> ....
```

First take a copy of Saiku query repository. The run **fnr.exe**, as follows:



In the target file there is now:

```
<?xml version="1.0" encoding="UTF-8"?>
<Query name="DDC21DC9-A8DC-2A76-AE29-E06C1C63B16A" type="QM" connection="nfa_360"
cube="[bamboo]" catalog="nfa_360" schema="nfa_360">
  <QueryModel>
    <Axes>
```



## 4. MDX MODE

If you want greater control over your query you can use Saiku's MDX mode<sup>2</sup>. This allows users to edit the query itself rather than use the drag and drop tools available to you.

You can either create a blank query or create something close to what you want and then edit the query itself.

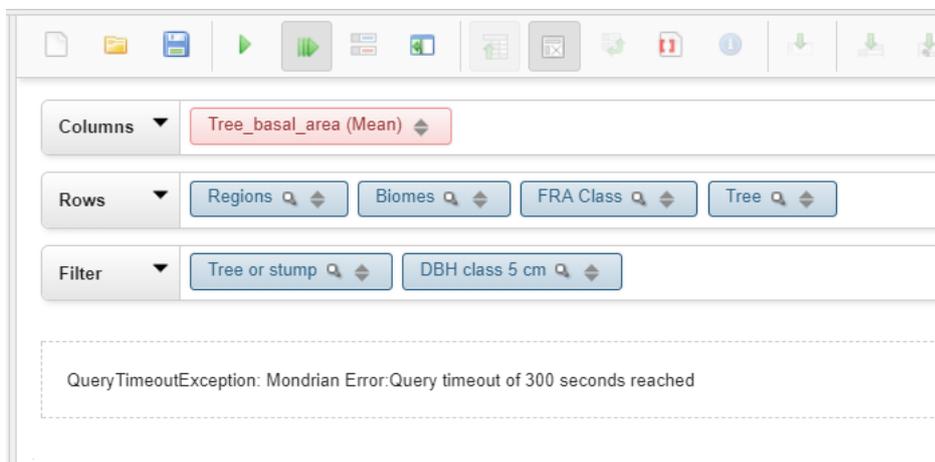
MDX is a multi dimensional query language and there are plenty of tutorials on the internet that explain how to write and understand MDX queries. Read more at <http://wiki.meteorite.bi/display/SAIK/MDX+Mode>

## 5. ERROR CASES

A typical error while running Saiku is that it keeps on “running query”. In this case try first another web browser. So if you are using Google Chrome, try running Saiku with Edge or Firefox.

In some cases Saiku refuses to work if there are conflicts with installed Chrome extensions, or computer has malwares.

With very complex queries Saiku can result in a timeout error because 300 seconds is the default property value in the file *mondrian.properties* (see the next image)<sup>3</sup>.



You may try to change this setting in property *mondrian.rolap.queryTimeout*, as follows

<sup>2</sup> MDX: Multi-Dimensional eXpressions

– A language designed for querying OLAP databases

– A standard developed by Microsoft (<http://msdn.microsoft.com/en-us/library/ms145506.aspx> )

<sup>3</sup> In windows the default path is

C:\opt\OpenForisCalc\calc-server\tomcat\webapps\saiku\WEB-INF\classes



```

mondrian.properties
1 #KB (15-09-2011) - vedi http://jira.pentaho.com/browse/MONDRIAN-762:
2 mondrian.rolap.EnableRolapCubeMemberCache=true
3 mondrian.result.highCardChunkSize=500
4 ### END OF CUSTOM SETTINGS
5
6 # Allow the use of aggregates
7 mondrian.rolap.aggregates.Use=true
8 mondrian.rolap.aggregates.Read=true
9 mondrian-.rolap-.aggregates-.ChooseByVolume=false
10
11 # mondrian.properties
12 mondrian.result.limit=500000
13
14 #####
15 # Integer property indicating timeout value, in seconds, for queries.
16 # Default of 0 indicates no timeout
17 mondrian.rolap.queryTimeout=500
18 #mondrian.rolap.queryTimeout=0
19

```

After this change, you need to stop Calc/Saiku server, restart it and try to rerun the query in Saiku.

Columns ▼ Tree\_basal\_area (Mean) ⌵

---

Rows ▼ Regions ⌵ Biomes ⌵ FRA Class ⌵ Tree ⌵

---

Filter ▼ Tree or stump ⌵ DBH class 5 cm ⌵

Regions	Biomes	FRA Class	Tree	Tree_basal_area (Mean)
Tigray	Acacia-Commiphora	Other Wooded Land	Euphorbia candelabrum	2.801
		Other Land	Euphorbia candelabrum	0.359
	Combretum-Terminalia	Forest	Combretum molle	0.192
			UNLISTED	0.788
			Albizia schimperiana	0.030
			Dalbergia melanoxylon	0.131