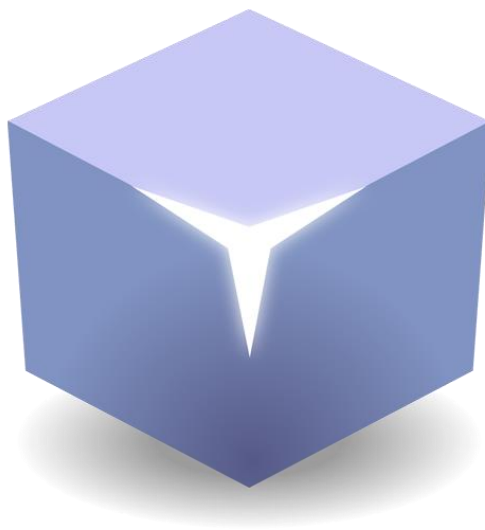


Dashboard features with Kyubit Business Intelligence

www.kyubit.com



Dashboards - User Manual

Using dashboard features of Kyubit Business Intelligence

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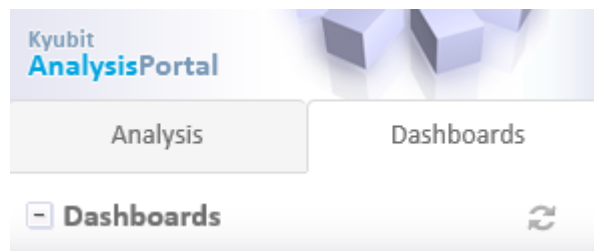
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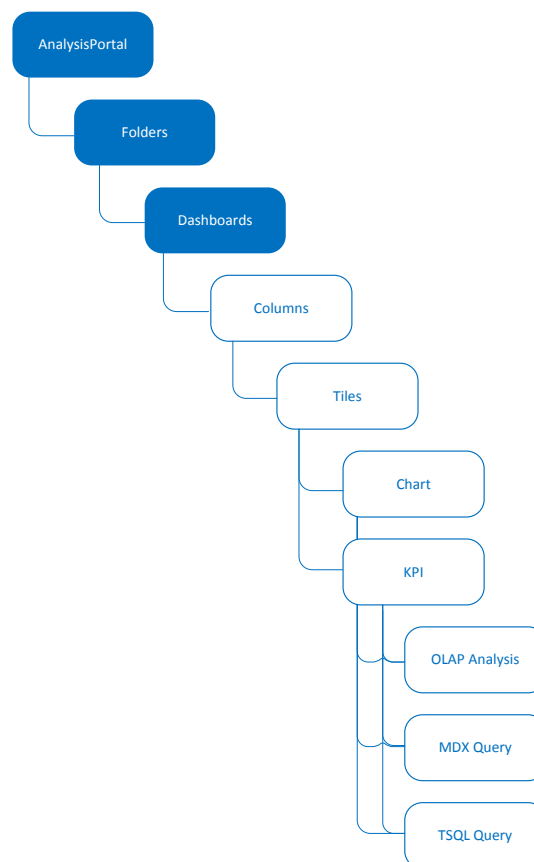
1. Dashboard features overview

Kyubit Business Intelligence supports dashboard features starting from version 3.0, delivering monitoring of business essential data to users in various ways. Dashboard presents data from Microsoft OLAP and SQL databases, trying to give simple and comprehensive feedback about critical business values and trends. While creating dashboard, user has various visual options to present data most efficiently regarding the nature of data and user expectations. Easy drag-and-drop features makes dashboard creation simple and straightforward task, which is easy to adopt and fun to use. To retrieve data for dashboard elements, existing OLAP analyses on Kyubit Business Intelligence could be used or SQL/MDX queries could be created. Dashboards could be also delivered to users on scheduled subscriptions or integrated within third web applications and sites.

To work with dashboard features, select 'Dashboards' tab on the top of the Kyubit Business Intelligence application and other dashboard related section will be shown left side of user interface.

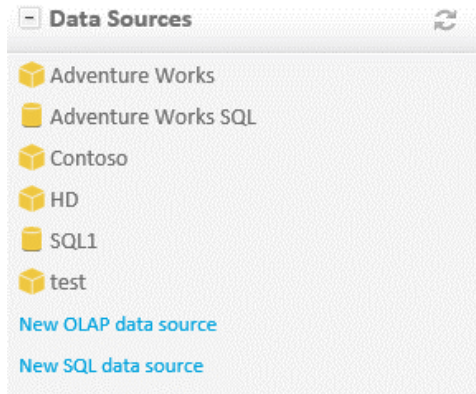


(Kyubit Business Intelligence Dashboards - Entities schema)



2. Managing Data Sources

All data for dashboard elements is retrieved from data sources that contains interesting business data for presentation. Once created, data sources are used from multiple queries and analysis. To see all existing data sources in Kyubit Business Intelligence, open Dashboards -> Data Source (tab).



Create new OLAP or SQL data source for future queries and analysis.

<div style="background-color: #0070c0; color: white; padding: 2px; border: 1px solid #0070c0;">OLAP Cube Reference</div> <p>OLAP reference name: <input type="text" value="Adventure Works"/></p> <p>Server(Data source): <input type="text" value="TestServer"/></p> <p>OLAP database(Catalog): <input type="text" value="Adventure Works DW"/></p> <p>Cube name: <input type="text" value="Adventure Works"/></p> <p><input type="checkbox"/> Set custom connection string</p> <p><input type="button" value="Test connection"/></p> <p><input type="button" value="Save"/> <input type="button" value="Close"/></p>	<div style="background-color: #0070c0; color: white; padding: 2px; border: 1px solid #0070c0;">SQL Data Source Permissions</div> <p>Data Source name: <input type="text" value="Adventure Works SQL"/></p> <p><input type="checkbox"/> Set connection string</p> <p>MS SQL Server: <input type="text" value="TestServer"/></p> <p>Database: <input type="text" value="AdventureWorksDW2012"/></p> <p><input checked="" type="checkbox"/> Windows integrated authentication</p> <p>User name: <input type="text"/></p> <p>Password: <input type="text"/></p> <p><input type="button" value="Test connection"/></p>
--	--

For both, OLAP and SQL data sources, custom connection strings could be set and connection could be tested before data source is save.

2.1. Set Data Source permissions

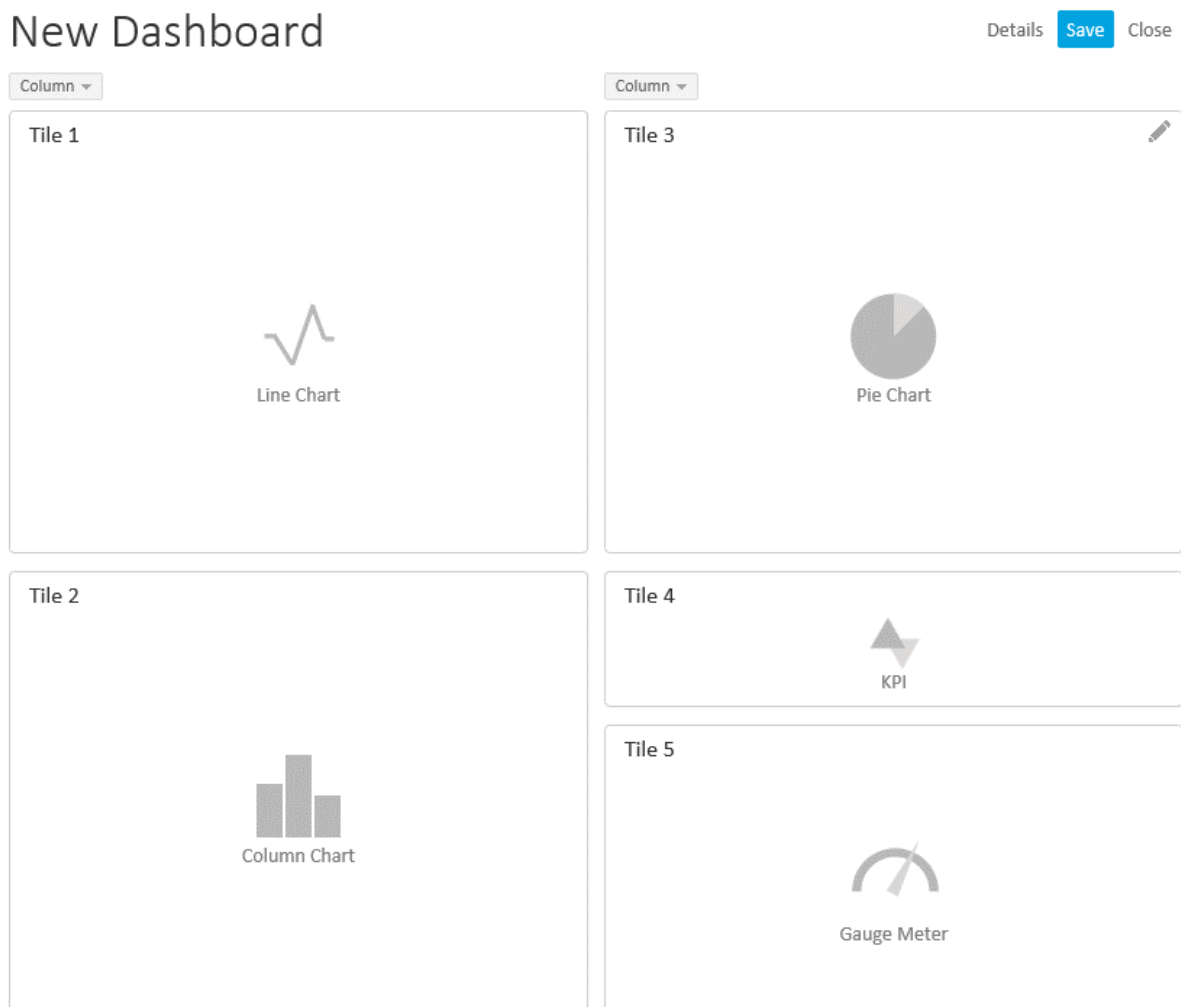
If Data Source should be visible to other users, click on the 'Permissions' options in the upper-right corner and add appropriate Active Directory users and groups to have 'Read' or 'Read/Write' permissions or set unrestricted access to created Data Source. (See chapter 7.1. for more details)

3. Creating and designing dashboards

All users with access to Kyubit Business Intelligence application could create new dashboards. To start creation of new dashboard, click 'Create New Dashboard' button on the dashboards view. New Dashboard will be opened in design view, ready to be designed and configured.

3.1. Dashboard area, tiles and columns

Dashboards consist of dashboard elements (tiles) that are arranged in dashboard columns. Dashboard columns can accept any number of tiles that will be displayed vertically. Each tile needs to be defined what kind of visualization and data it will display. By default, dashboard contains two columns and columns could be added and removed.



3.2. Working with Tiles

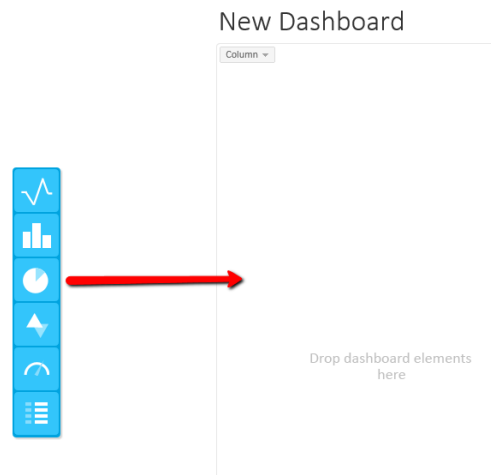
On every dashboard user can add 6 different types of dashboard element (tiles) that present some kind of data visualization. On the toolbar on the right, tile types are presented with descriptive icons.



- Line chart
- Column chart
- Pie chart
- KPI
- Gauge meter
- List
- Geo Map

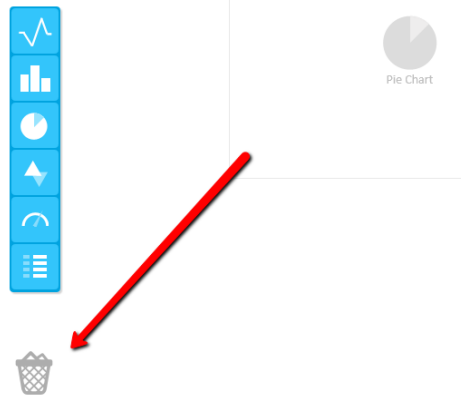
3.2.1. Add tile to dashboard

To add tile to dashboard, drag-and-drop preferred tile type (visualization) from toolbar on the left to one of the column on the right.



3.2.2. Remove tile from dashboard

To remove tile (delete) from dashboard drag-and-drop tile from dashboard column to trash icon on the left, that is visible when drag-and-drop operation is started.



3.2.3. Rearrange tiles on dashboard

At any time in design view, tiles could be rearranged with same dashboard column or moved to any position on another dashboard column. Simply drag-and-drop tiles to preferred location on any of the columns. New location of drag-and-drop tile will be displayed in blue color.

New Dashboard

Details [Save](#) [Close](#)

Column ▾

Tile 3

Pie Chart

Column ▾

Tile 4

KPI

Tile 5

Gauge Meter

Tile 4

KPI

Tile 5

Column Chart

Tile 4

KPI

Tile 6

Line Chart

3.2.4. Configure tile to show visualization

When moving mouse over tile (while dashboard is in design mode) 'Pen' icon is displayed, which allows user to click and open tile configuration form.



Enter dashboard general information: like title, description and, if you like, set child dashboard that will be opened as more detailed view on the same data, enabling users to have 'drill down' experience while using dashboards.

Tile > Tile 3

General Tile Details

Name

Description

Child Dashboard

'Tile Details' is second tab on the tile form, where data to visualize will be defined.

Tile > Bikes in Canada

General Tile Details

Select query that will return data for dashboard chart.

Query/Analysis

Select New

Change Chart Type Pie Chart

Test Chart

Click 'Test Chart' to see visualize chart with current query data.

'Query/Analysis' is input where user selects existing Analysis or Query (TSQL or MDX) to retrieve data to show in this tile visualization ('Pie' in this case). Existing 'Analysis' means that OLAP analysis is created in 'Analysis' part of Kyubit Business Intelligence application and current user has permissions to read at least. Existing Query (TSQL or MDX) means, that query is created in 'Dashboards' part of Kyubit Business Intelligence application and current user has permissions to read at least. If query user needs still does not exists, user could click on 'New' button and right away from tile form create new MDX or TSQL query. To select existing analysis or query, click on the 'Select' button and selection form of existing Analyses and Queries will be displayed.

ANALYSIS SELECTION...

Select existing Query or Analysis

Queries Analyses

Filter by DataSource -




Analysis Name	Data Source
■ Bikes in Canada Analysis	Adventure Works
■ Europe sales Q1	Adventure Works
■ Internet sales Q1 vs last year	Adventure Works
■ Product by color	Contoso

... OR QUERY SELECTION ...

Select existing Query or Analysis

Queries Analyses

Filter by DataSource -


Query Name	Data Source
 Reseller info	SQL1
 Top 10 Products	Adventure Works SQL
 Top 5 Products	Adventure Works SQL

All analysis created within Kyubit Business Intelligence for which current user has at least 'Read' permission are displayed in selection form. Displayed list could be filtered by 'Data Source' for environments with many analyses. Same principles works for Query selection.

After Analysis/Query is selected, click on 'Test' button in tile form to test visualization with selected analysis/query data.


General Tile Details

Select query that will return data for dashboard chart.

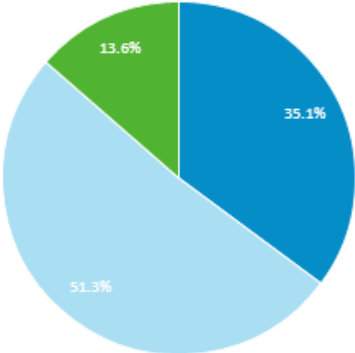
Query/Analysis  Bikes in Canada Analysis

Select New

Change Chart Type Pie Chart

 Test Chart

● Mountain Bikes ● Road Bikes ● Touring Bikes



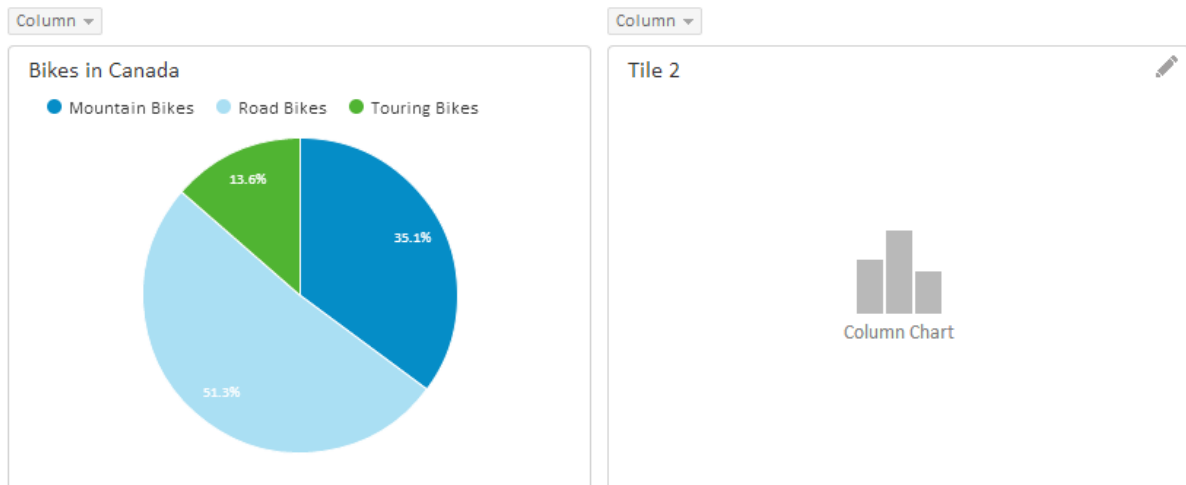
Category	Percentage
Mountain Bikes	35.1%
Road Bikes	51.3%
Touring Bikes	13.6%

In tile configuration form, user still can change tile (visualization) type, if concludes that given data is more appropriate to show with different chart type.

Finally, click 'OK' in tile configuration form and tile will present data within dashboard area.

New Dashboard

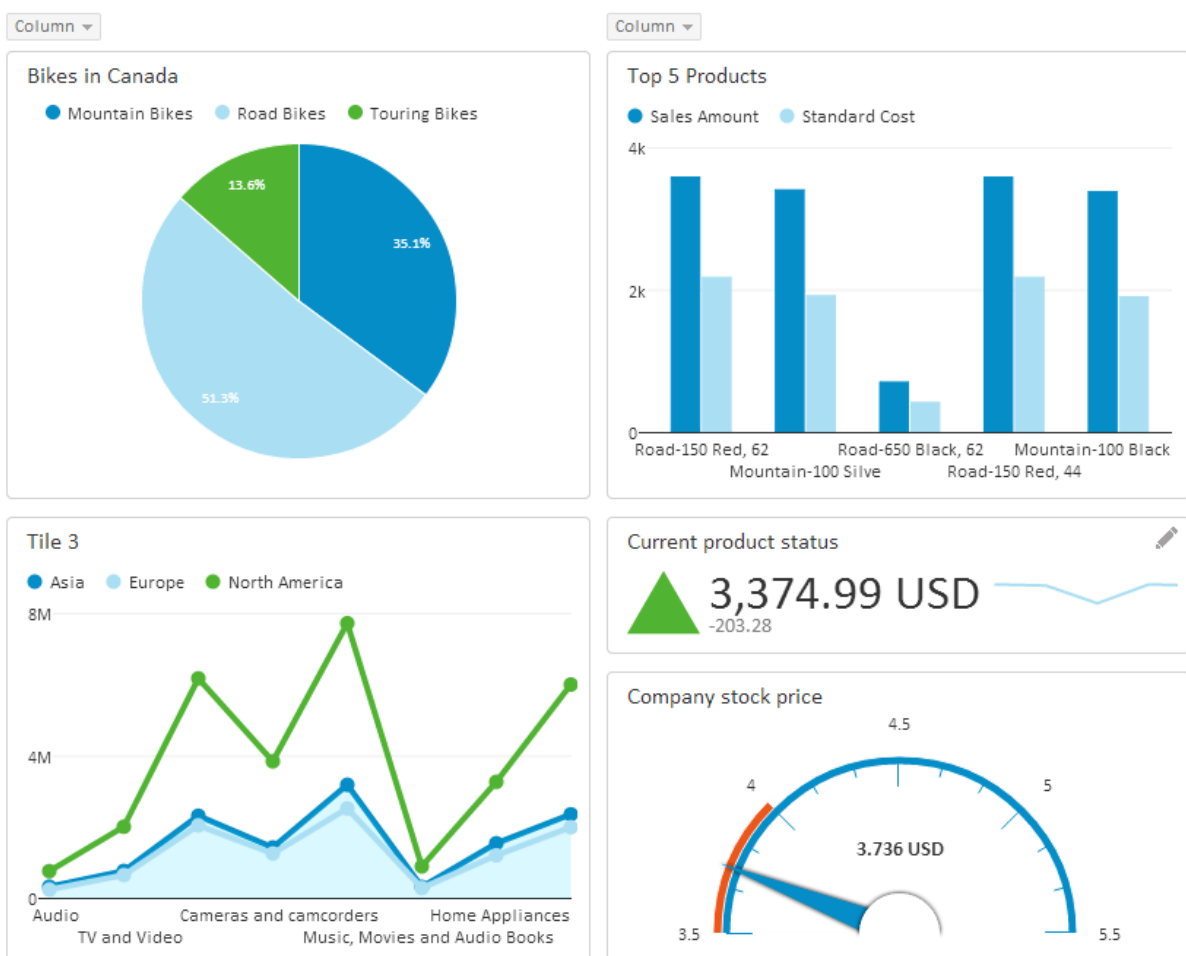
Details Exit design **Save** Close



Using same principles configure other tiles to appropriate visualize other relevant business data on dashboard...

New Dashboard

Details Exit design **Save** Close



3.3. Tile automatic data refresh


Every dashboard tile could be configured to automatically refresh data in a defined period of time in minutes. Only tiles with defined 'Tile Refresh' attribute will be refreshed with new data.

Tile > Tile 2

General Tile Details

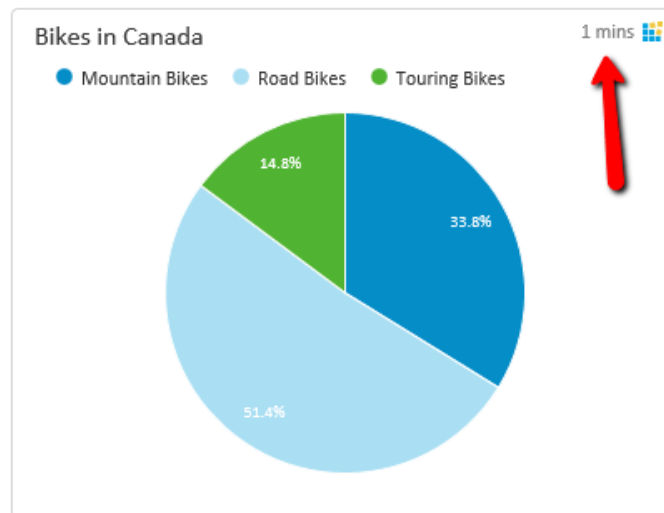
Name

Child Dashboard

Tile Refresh Minutes 

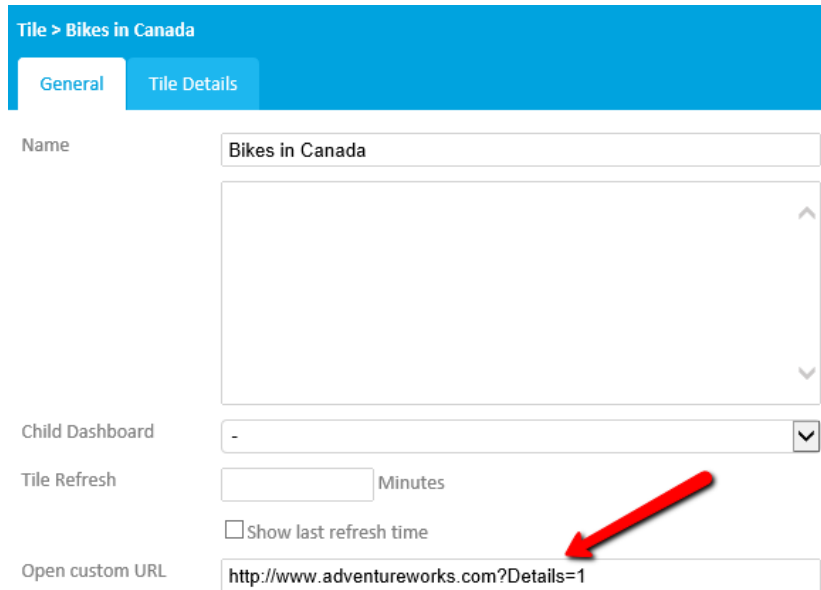
Show last refresh time

If option 'Show last refresh time' is checked, dashboard tile will display time passed since last data refresh in dashboard.



3.4. Open custom link in a context of dashboard data

To open custom link when user clicks on a dashboard tile element, set 'Open custom URL' attribute of tile.



The screenshot shows the configuration interface for a dashboard tile. At the top, there is a blue header with the text "Tile > Bikes in Canada". Below the header are two tabs: "General" and "Tile Details". The "Tile Details" tab is active. The form contains the following fields:

- Name:** A text input field containing "Bikes in Canada".
- Child Dashboard:** A dropdown menu with a hyphen "-" selected.
- Tile Refresh:** A text input field followed by the word "Minutes".
- Show last refresh time:** A checkbox that is currently unchecked.
- Open custom URL:** A text input field containing the URL "http://www.adventureworks.com?Details=1". A red arrow points to this field.

By clicking on a dashboard tile element, new browser tab will be opened with URL that is defined, but also with additional URL query string that is created within context of point/bar/wedge which is actually clicked/selected.

For example:

`http://www.adventureworks.com?Details=1&pointName=United States&pointUnique=[Geography].[Geography Hierarchy].[Region Country Name].&[United States]`

If data source is based on SQL data, added query string will be based category id defined in query object.

3.5. Dashboard title, header and footer

While in dashboard 'design view' click on the 'Details' button to define dashboard 'Title', 'Description' on the 'General' tab.

Dashboard details

General
Header/Footer

Dashboard title

Description

Edit dashboard title and description.

On the 'Header/Footer' tab set appropriately dashboard header and/or footer and its alignments text and alignments...

Dashboard details

General
Header/Footer

Header alignment

Header text

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim veniam, quis nostrud exerci tation ullamcorper suscipit lobortis nisl ut aliquip ex ea commodo consequat.

Footer alignment

Footer text

Duis autem vel eum iriure dolor in hendrerit in vulputate velit esse molestie consequat, vel illum dolore eu feugiat nulla facilisis at vero eros et accumsan et iusto odio dignissim qui blandit praesent luptatum zzril delenit augue dui dolore te feugait nulla facilisi. Nam liber tempor cum soluta nobis eleifend option congue nihil imperdiet doming id quod mazim placerat facer possim assum.

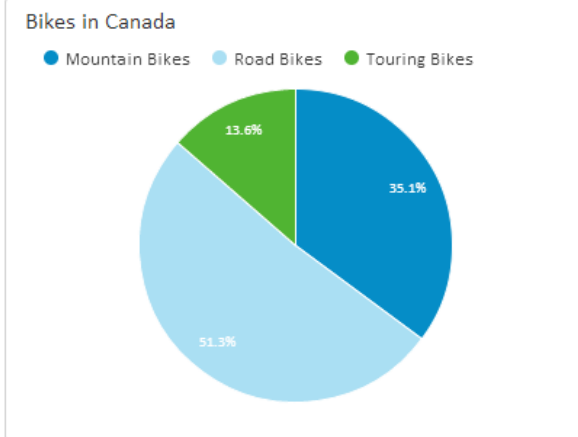
Edit dashboard header and footer text.

Bikes production and sales

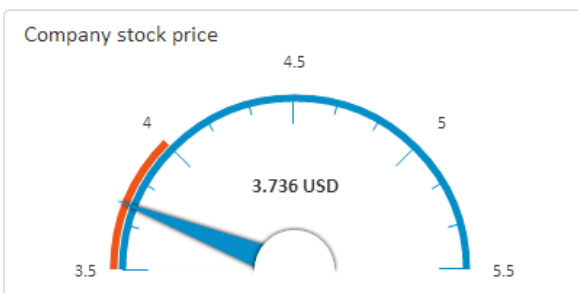
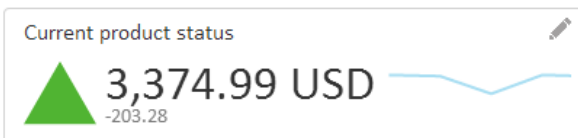
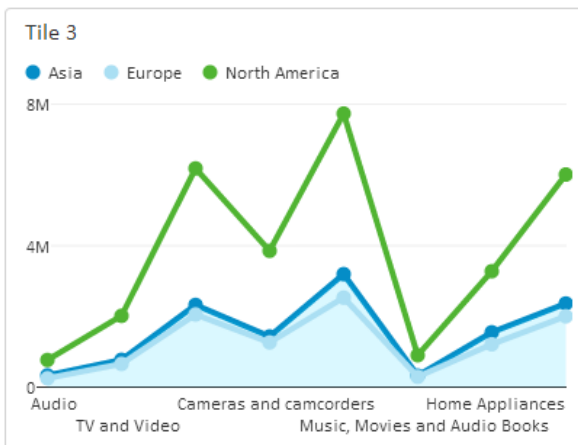
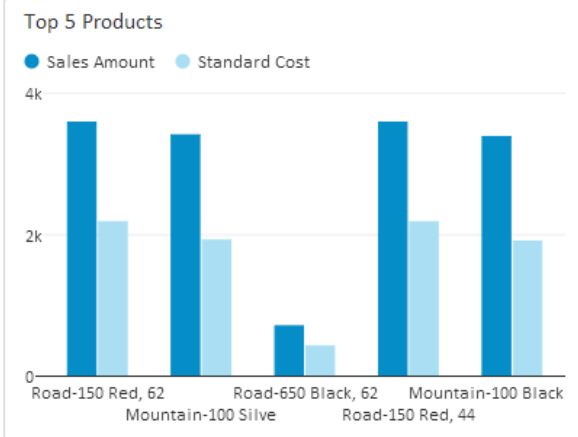
Details Exit design [Save](#) Close

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim veniam, quis nostrud exerci tation ullamcorper suscipit lobortis nisl ut aliquip ex ea commodo consequat.

Column ▾



Column ▾

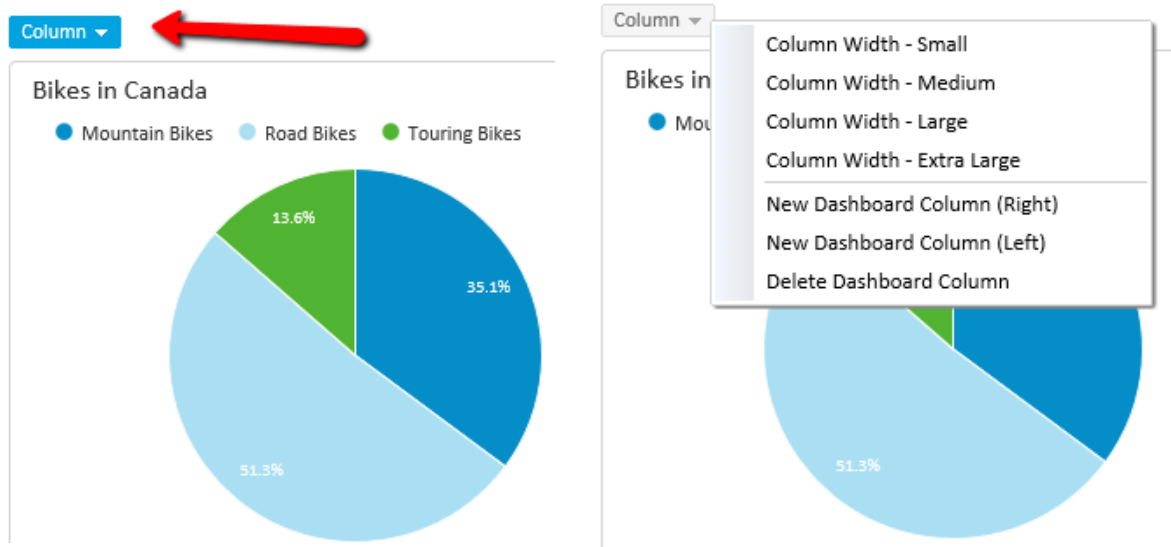


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3.6. Manage columns on dashboard

Dashboard columns are containers for dashboard visual elements (tiles). While working in design mode, it is possible to add or remove dashboard columns. Dashboard can contain from 1 to 5 dashboard columns.

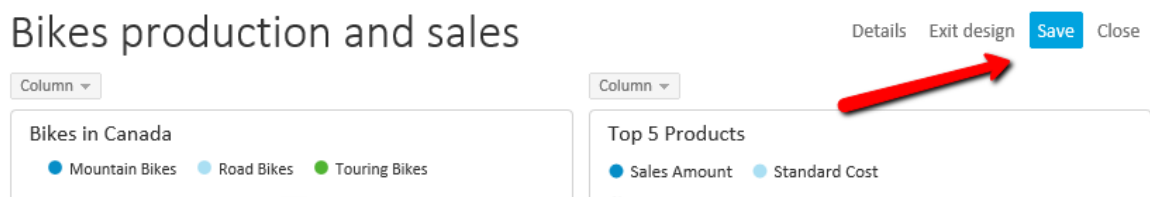
To add column, remove column or edit column width click on the 'Column' button which is located above every dashboard column and select one of appropriate actions.



For each dashboard column new column could be added on the 'Left' or 'Right' side of the selected column, changed width to 4 predefined column widths or to delete selected column.

3.7. Saving Dashboard

All work in design mode needs to be saved with the 'Save' button in upper-right area of the dashboard. Within 'Save' action all tiles, their settings and arrangements are saved for future dashboard openings.



Dashboard immediately appears in 'My Dashboards' list, ready to be used.

Folder

My Dashboards

Create New Dashboard

Create New Folder

Delete Dashboards

Title ▾ ▲

-  North America Bikes sales Q3
-  Margins 2014
-  Bikes production and sales

3.8. Enter and exit 'Design' view for dashboard

After existing dashboard is opened, design options are disabled and only users with 'Read/Write' permissions on the dashboard could choose to continue design work on the dashboard. While user is not in 'design' view, dashboard data, tiles and all dashboard arrangements are not available to change. 'Design' mode is just slightly different than 'Regular' view, so at the end of design, user should 'Exit design' to see exactly how other users will see dashboard while consuming prepared dashboard details.

4. Configuring dashboard tiles

After adopting general dashboard design and construction details, this chapter describes how to create all visual details on the dashboard elements (tiles) to best reflect business data situations and give end-users clear and easy-to-understand status of business important values and indicators. Dashboard could display 2 group of visual elements, Chart and Key Performance Indicators (KPIs).

Charts:

- Line Chart, most appropriate to show time related data.
- Column Chart, most appropriate to show multiple series data.
- Pie Chart, most appropriate to show single data with one-series data.
- List, most appropriate to show ordered list with names and numbers.
- Geo Map, most appropriate to show data related to geography (world countries and regions)

KPIs:

- Standard KPI, show KPI icon, KPI value, last change and optionally small line chart that describes KPI values in the past to the current one.
- Gauge Meter, is KPI presentation with Gauge visualization, giving feeling to end user, how much current value is successful.

4.1. Data usage within tiles (Categories and series)

After drag-and-drop tile to dashboard, click to edit tile (Pen icon), choose dashboard title and select or create analysis/query that will feed current tile with data we like to visualize.

Essentially, each dashboard tile is receiving data in the format of categories and series. Column and line charts could accept many series of values, list chart accepts one or two series of values, while Pie chart, KPI and Gauge meter accepts only one series of values to visualize data.

4.2. 'Analysis' data for dashboard tiles

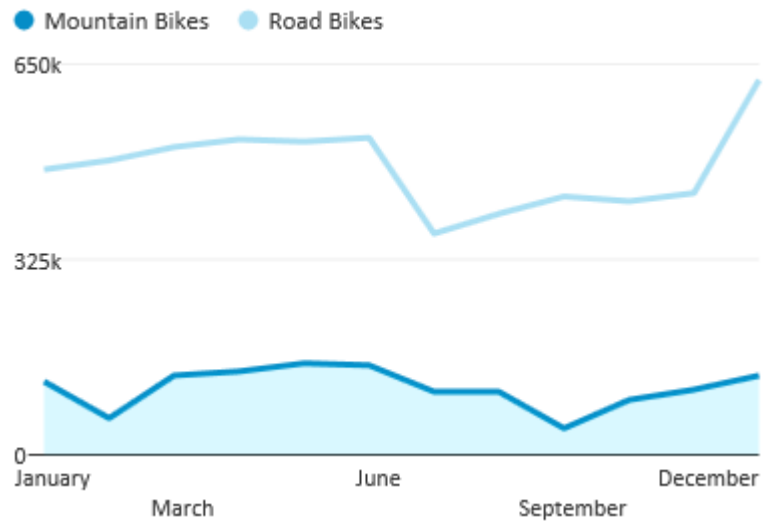
Analysis created in Kyubit Business Intelligence could be used as data for dashboard tile. Analysis rows presents are categories while columns in analysis presents series. In this example 'Month of Year' presents categories, while '(Product) Subcategories' present two series of values ('Mountain bikes' and 'Road Bikes').



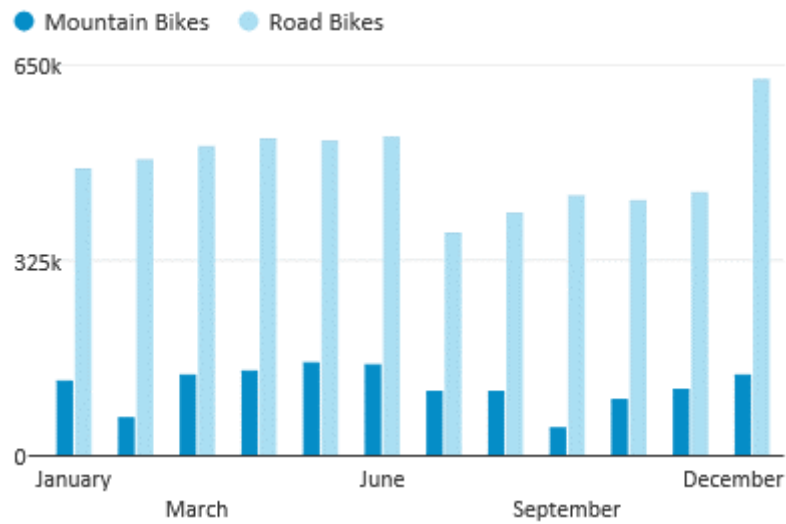
Month	Subcategories	
	Mountain Bikes	Road Bikes
January	\$121.949,64	\$474.796,92
February	\$60.924,82	\$489.891,87
March	\$132.074,61	\$512.060,59
April	\$138.799,59	\$524.892,70
May	\$152.324,55	\$521.231,65
June	\$149.074,56	\$527.689,09
July	\$105.074,69	\$368.313,47
August	\$104.974,69	\$401.217,00
September	\$44.099,87	\$429.843,16
October	\$91.424,73	\$421.904,74
November	\$108.474,68	\$435.518,73
December	\$131.924,61	\$623.603,28

When this analysis data is defined for dashboard tile, it will could be presented on these different ways using different visualizations (charts)

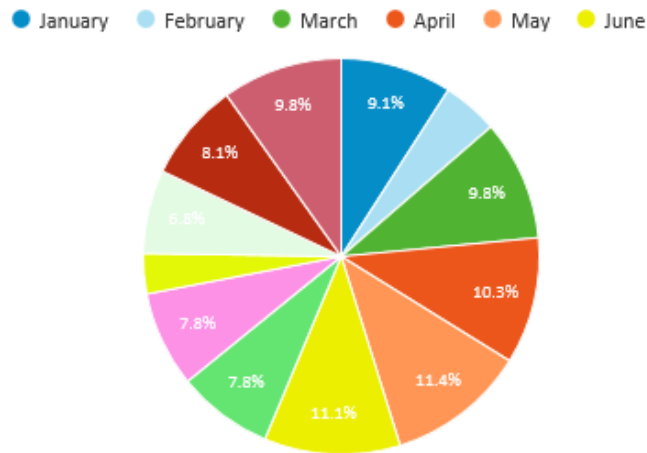
LINE CHART



COLUMN CHART



PIE CHART



(Note: pie chart shows only first series)

LIST CHART
(Data contains two series)

Month of Year	Mountain Bikes	Road Bikes
January	121.949,64 \$	474.796,92 \$
February	60.924,82 \$	489.891,87 \$
March	132.074,61 \$	512.060,59 \$
April	138.799,59 \$	524.892,70 \$
May	152.324,55 \$	521.231,65 \$
June	149.074,56 \$	527.689,09 \$
July	105.074,69 \$	368.313,47 \$
August	104.974,69 \$	401.217,00 \$
September	44.099,87 \$	429.843,16 \$
October	91.424,73 \$	421.904,74 \$

(Data contains one series)

Month of Year	Mountain Bikes
January	121.949,64 \$
February	60.924,82 \$
March	132.074,61 \$
April	138.799,59 \$
May	152.324,55 \$
June	149.074,56 \$
July	105.074,69 \$
August	104.974,69 \$
September	44.099,87 \$
October	91.424,73 \$

4.3. 'Geo Maps' configuration and usage

'Geo Maps' displays data related to world countries and regions in a geographical context. To correctly interpret retrieve data to 'countries' or 'regions', certain convention is expected. For countries, country names could be defined in English language or using two letter country codes (ISO 3166). Two letter country codes is recommended approach. For country regions, names of the regions are required in English language. For example, for US region data is expected as "Virginia", "North Carolina", "District of Columbia" etc.

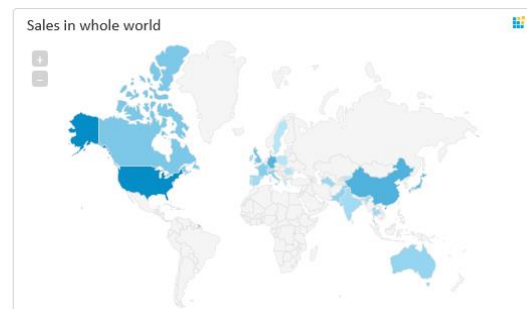
Kyubit Business Intelligence support Geo maps for all continents and major countries. List of available maps is expanded with almost every new version of Kyubit BI application.

Check end section of this document for detailed list of values that are supported when supplying data for Geo maps for various countries and regions.

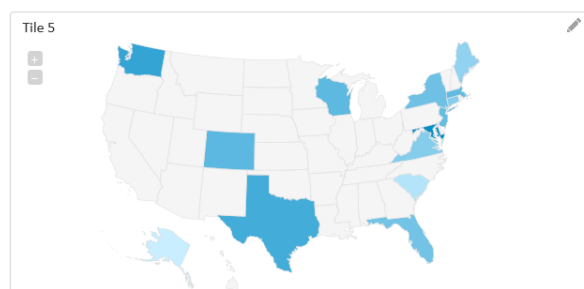
Please, contact support@kyubit.com for additional maps and region name conventions.

Examples...

Region Country Name	IT Machine Down Time
Armenia	748
Australia	2777
Bhutan	215
Canada	8361
China	37623
Denmark	95
France	5553
Germany	31515
Greece	200
India	1554
Iran	3444
Ireland	1567
Italy	4507
Japan	21482
Kyrgyzstan	350
Malta	446
Pakistan	3709
Poland	413
Portugal	1593
Romania	469
Russia	5782
Singapore	122
Slovenia	1551
South Korea	1309
Spain	1442
Sweden	384
Switzerland	473
Syria	10308
Taiwan	296
Thailand	1818
the Netherlands	2547
Turkmenistan	2245
United Kingdom	12997
United States	228804
Sum	396699



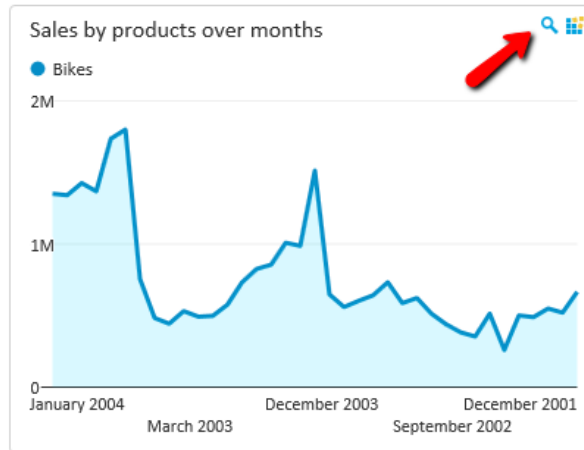
State Province Name	Sales Amount
Alaska	\$22.786.936,44
Colorado	\$479.343.655,50
Connecticut	\$179.553.290,07
Florida	\$291.138.194,37
Maine	\$136.784.555,29
Maryland	\$2.268.325.223,96
Massachusetts	\$431.952.060,98
New Jersey	\$391.396.628,18
New York	\$317.099.887,75
South Carolina	\$46.289.982,00
Texas	\$769.424.994,66
Virginia	\$178.943.325,51
Washington	\$1.058.348.463,92
Wisconsin	\$465.269.258,85
Sum	\$7.036.656.457,48



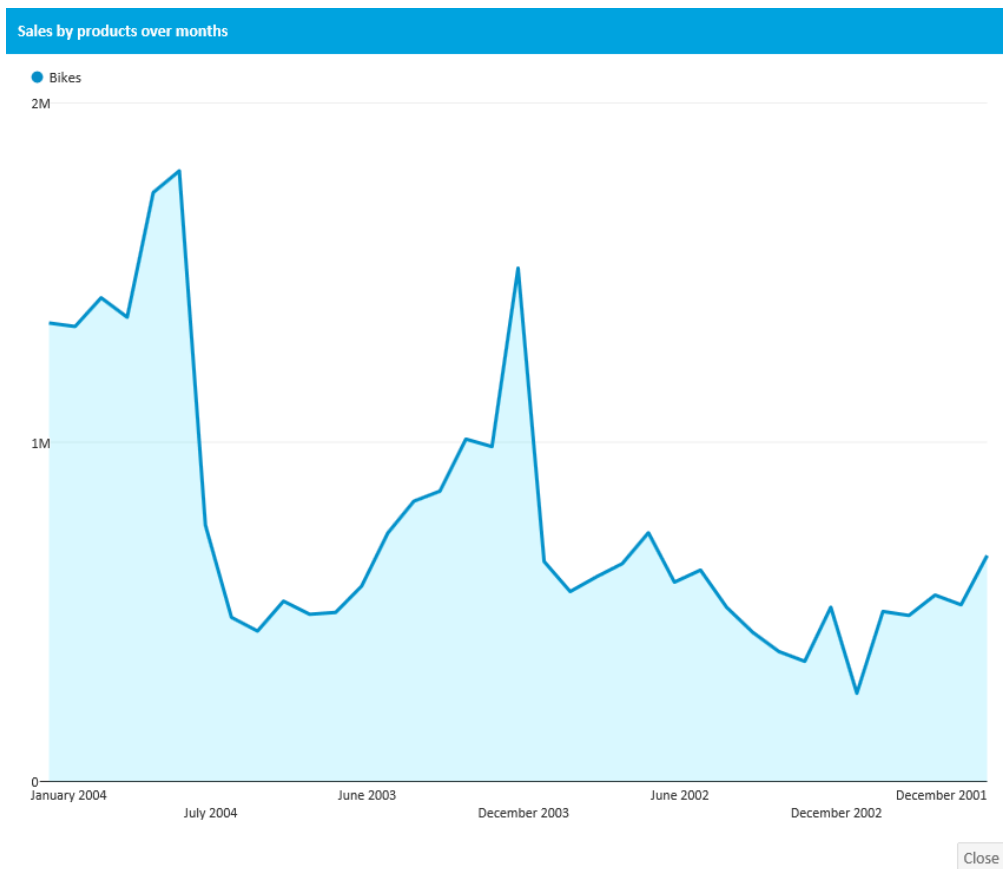
4.4. Enlarged view on dashboard tile

Data visualization on dashboard tile in certain moments is not large enough, for example, for presentation purposes, when focus is on a particular tile.

All tiles have 'Magnify' icon that enlarges tile visualization.



Enlarge action transforms view to single tile visualization on the screen.



Enlarged view also enables OLAP actions (if data is from OLAP data source) and single point visualization.

4.5. 'MDX query' data for dashboard tiles

While creating MDX query for dashboard tiles, values on column axis presents series, while values on rows axis presents categories. (More information about queries, see '6. Working with queries section')

Query

Data

Impersonate

Caching

Define query to return required data.

Query name:

Data source:

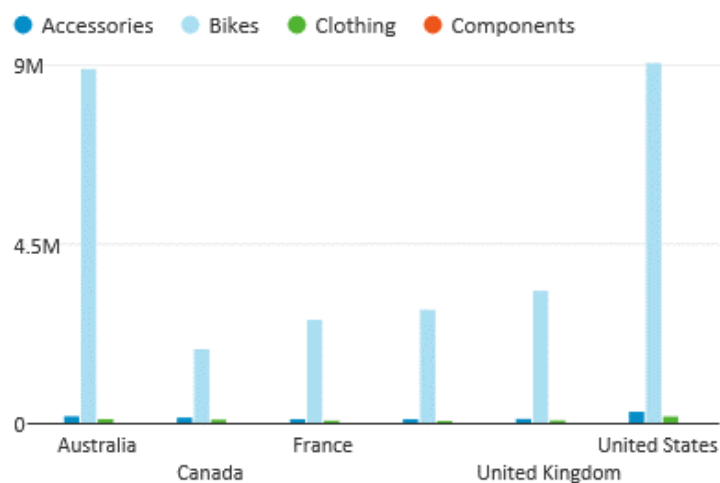
Query:

```
select
{{Product}.[Product Categories].children} on columns,
{{Customer}.[Customer Geography].children} on rows
from
[Adventure Works]
where
[Measures].[Internet Sales Amount]
```

Results

Category Customer Geography	Seria Value Accessories [USD]	Seria Value Bikes [USD]	Seria Value Clothing [USD]	Seria Value Components [USD]
Australia	138690,63 USD	8852050,0044 USD	70259,95 USD	0 USD
Canada	103377,85 USD	1821302,3921 USD	53164,62 USD	0 USD
France	63406,78 USD	2553575,7143 USD	27035,22 USD	0 USD
Germany	62232,59 USD	2808514,3482 USD	23565,4 USD	0 USD
United Kingdom	76630,04 USD	3282842,6609 USD	32239,51 USD	0 USD
United States	256422,07 USD	8999859,5308 USD	133507,91 USD	0 USD

Example of 'Column chart' using above query data...



4.6. 'TSQL Queries' data for dashboard tiles

While creating TSQL query for dashboard tiles, values on column axis presents series, while values on rows axis presents categories. (More information about queries, see '6. Working with queries section')

Query

Data

Impersonate

Caching

Define query to return required data.

Query name:

Data source:

Query:

```
select distinct top 5
substring(DimProduct.EnglishProductName, 0, 19), FactInternetSales.SalesAmount as 'Sales Amount',
FactInternetSales.ProductStandardCost as 'Standard Cost'
from FactInternetSales left join DimProduct
on FactInternetSales.ProductKey = DimProduct.ProductKey
```

Series

↙

Results

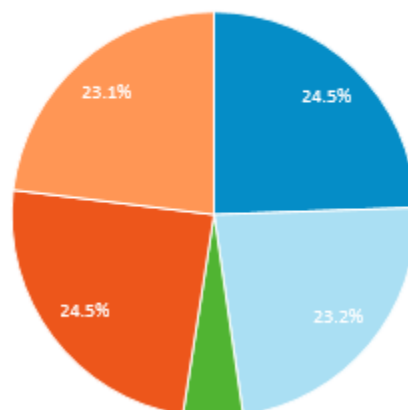
Category Column1	Seria Value Sales Amount [USD]	Seria Value Standard Cost [USD]
Road-150 Red, 62	3578,2700 USD	2171,2942 USD
Mountain-100 Silve	3399,9900 USD	1912,1544 USD
Road-650 Black, 62	699,0982 USD	413,1463 USD
Road-150 Red, 44	3578,2700 USD	2171,2942 USD
Mountain-100 Black	3374,9900 USD	1898,0944 USD

Categories

↗

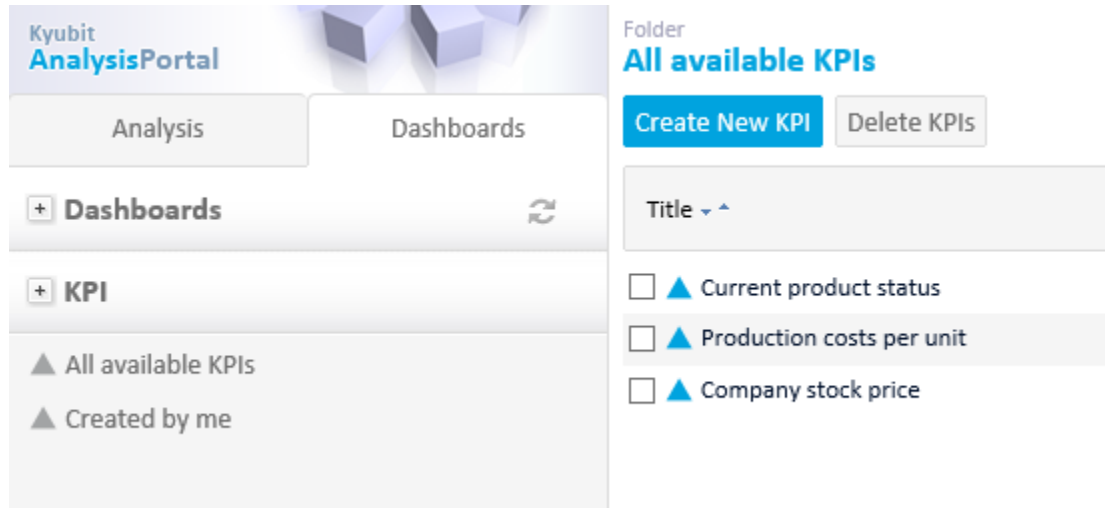
Example of 'Pie chart' using above query data...

● Road-150 Red, 62
 ● Mountain-100 Silve
 ● Road-650 Black, 62
● Road-150 Red, 44
 ● Mountain-100 Black



5. Working with KPIs

Once created, KPI could be re-used on many dashboards with respect to defined permissions on the KPI. All available KPIs to current user are visible in 'Dashboards' -> 'KPI' section of Kyubit Business Intelligence.

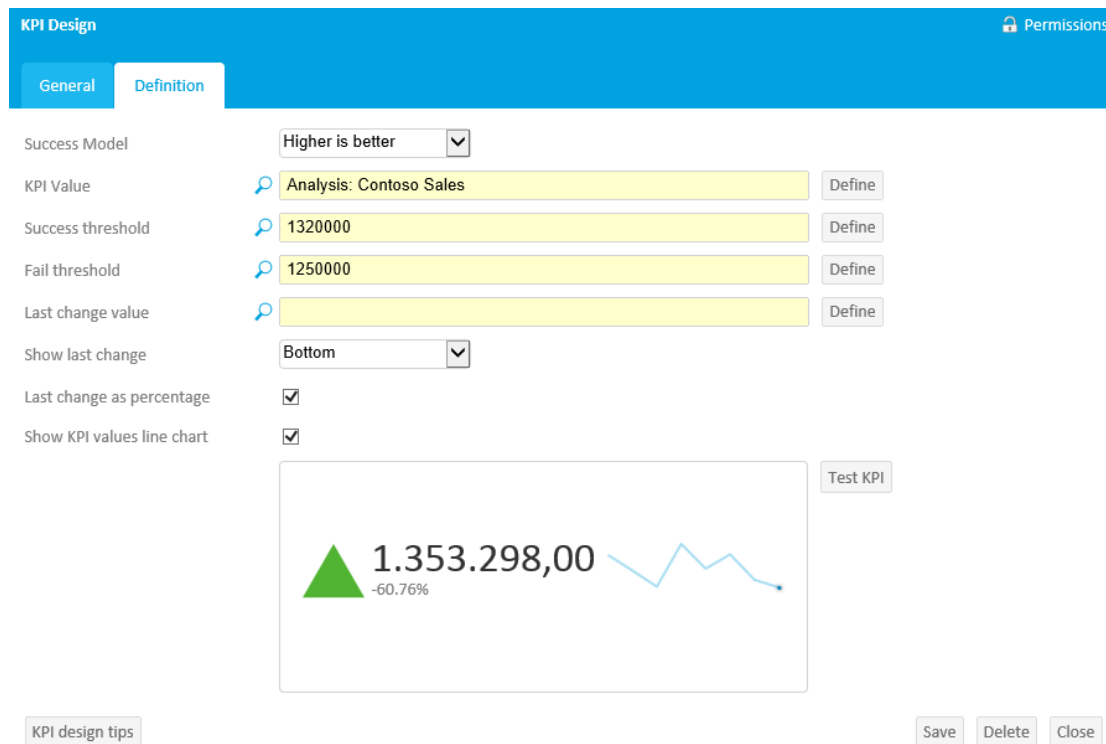


The screenshot shows the Kyubit AnalysisPortal interface. On the left, there are tabs for 'Analysis' and 'Dashboards'. Below the 'Dashboards' tab, there is a '+ Dashboards' button and a '+ KPI' button. Under the '+ KPI' button, there are two expandable sections: 'All available KPIs' and 'Created by me'. On the right, there is a 'Folder' section titled 'All available KPIs' with 'Create New KPI' and 'Delete KPIs' buttons. Below this, there is a 'Title' dropdown menu and a list of KPIs with checkboxes: 'Current product status', 'Production costs per unit', and 'Company stock price'.

When one of dashboard tiles should display KPI, one must first be defined in the Kyubit Business Intelligence application to be used on dashboard itself. It could be right away created while in dashboard 'Design' view, without leaving working dashboard.

5.1. Designing KPI

'KPI Design' form offers everything on one place to create KPI in Kyubit Business Intelligence application.



The screenshot shows the 'KPI Design' form in the Kyubit Business Intelligence application. The form is divided into 'General' and 'Definition' tabs. The 'Definition' tab is active, showing fields for Success Model, KPI Value, Success threshold, Fail threshold, Last change value, Show last change, Last change as percentage, and Show KPI values line chart. A preview window shows a KPI value of 1.353.298,00 with a green triangle icon and a line chart. The 'Test KPI' button is visible next to the preview window. At the bottom, there are 'Save', 'Delete', and 'Close' buttons.

- 'KPI Name', defines full name of the KPI in the system.
- 'KPI Short Name', will be used on places (mobile device), where space is limited
- 'KPI Description', simply described KPI structure for other users.
- 'Success Model', defines if higher values are more successful or lower values are more successful.
- 'KPI Value' is actual value that is tested for KPI success. Could be configured as 'Fixed numeric value' or value from 'Query/Analysis'.
- 'Success threshold', defines limit above KPI status is consider as 'Success' and marked with green arrow icon. Could be configured as 'Fixed numeric value' or value from 'Query/Analysis'.
- 'Fail threshold', defines limit bellow KPI status is considered as 'Failed' and marked with red arrow icon. Could be configured as 'Fixed numeric value' or value from 'Query/Analysis'.
- If 'KPI value' is between 'Success' and 'Fail' limit, KPI is in the 'Even' status and marked with yellow circle.
- 'Last change as percentage', defines if last change will be displayed as percentage or regular delta value.
- 'Show KPI values line chart', defined if line chart will be visible next to KPI to reflect changing of data through time, up to last (current) value. KPI data feed is based on series of values (first series of analysis/query) and last value in series is considered as current value to be evaluated for KPI, previous values are considered as historic and could be displayed as list chart next to KPI indicator.

When all inputs are selected, click on 'Test KPI' to immediately display KPI visualization and perhaps make correction, before it is closed.

5.2. Understanding data usage for KPI design

Data to display KPI comes from 'Analysis' (existing analysis within Kyubit Business Intelligence application), 'MDX Query' or 'TSQL Query'. Value to be evaluated as relevant for KPI is the last value in the first series of values retrieved from analysis or query. All other values before last values are considered as historic supplement of values and are used to describe trend and last value change (delta).



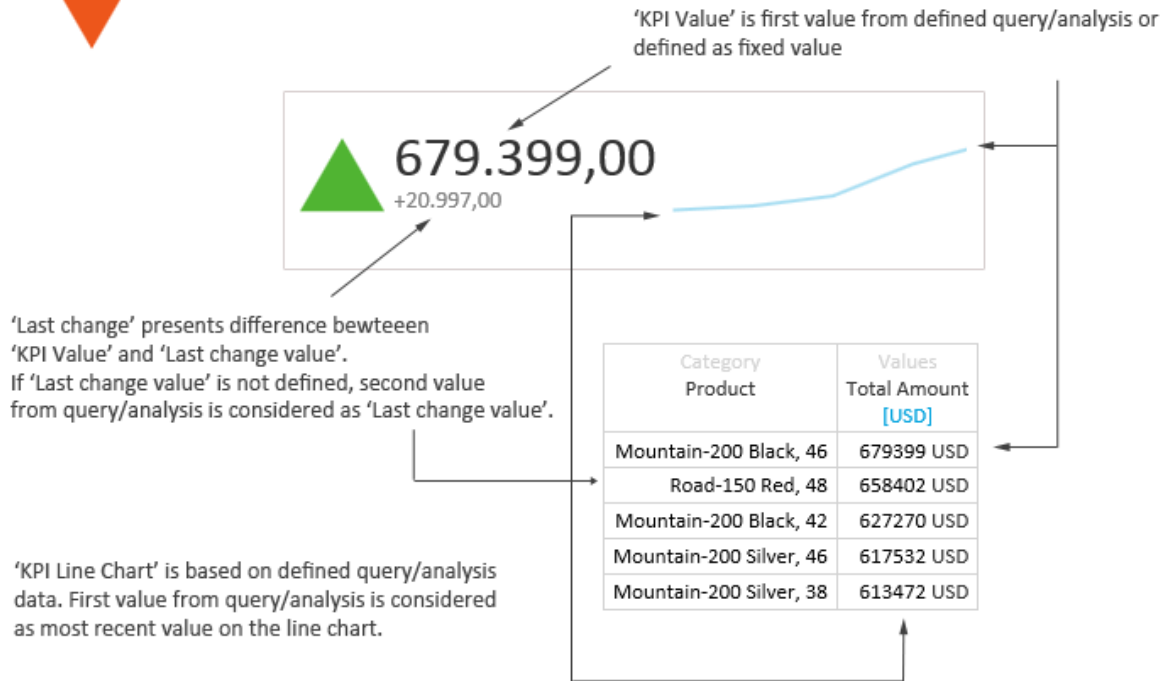
'KPI Value' above 'Success Threshold'



'KPI Value' between 'Success Threshold' and 'Fail Threshold'



'KPI Value' below 'Fail Threshold'



KPI value is first value in first series of query values, other values are used to draw line chart and penultimate value is used to show 'last value change'.



Same principles are used if data is retrieved from 'Analysis' or 'MDX query'.

5.3. Setting permissions for KPI

If KPI should be visible to other users, click on the 'Permissions' options in the upper-right corner and add appropriate Active Directory users and groups to have 'Read' or 'Read/Write' permissions or set unrestricted access to created KPI. (See chapter 7.1. for more details)

6. Working with Queries

Data for dashboard tiles comes from 'Analysis' (existing analysis in Kyubit Business Intelligence) or from MDX/TSQL queries. This chapter describes 'Query' creation and some important properties of queries.

All queries available to current user are displayed in Dashboards -> Queries section of Kyubit Business Intelligence. Two query views are available: 'All available Queries' (considering query permissions) and all queries 'Created by me'.

The screenshot shows the Kyubit AnalysisPortal interface. On the left, there is a navigation menu with 'Analysis' and 'Dashboards' tabs. Below these are sections for '+ Dashboards', '+ KPI', and '+ Queries'. The 'Queries' section is expanded, showing 'All available Queries' and 'Created by me' options. On the right, the 'All available queries' folder is displayed, containing a list of queries with checkboxes and icons (SQL or MDX). The queries listed are: Reseller info, Top 100 Products, Top 5 Products, Some special products, Sales geography info, and Mountain-Silver by month.

6.1. Creating query

All Kyubit Business Intelligence users could create query using Query design form.

The screenshot shows the 'Query' design form. It has three tabs: 'Data', 'Impersonate', and 'Caching'. The 'Query name' is 'Top 100 Products' and the 'Data source' is 'Adventure Works SQL (SQL)'. The 'Query' field contains the following SQL query:

```
select top 100
DimProduct.EnglishProductName, FactInternetSales.SalesAmount as 'Sales Amount', FactInternetSales.ProductStandardCost
as 'Standard Cost'
from FactInternetSales left join DimProduct
on FactInternetSales.ProductKey = DimProduct.ProductKey
```

The 'Results' section shows a table with the following data:

Category	EnglishProductName	Sales Amount [USD]	Standard Cost [Set units]
Road-150 Red, 62	Road-150 Red, 62	3578,2700 USD	2171,2942
Mountain-100 Silver, 44	Mountain-100 Silver, 44	3399,9900 USD	1912,1544
Mountain-100 Silver, 44	Mountain-100 Silver, 44	3399,9900 USD	1912,1544
Road-650 Black, 62	Road-650 Black, 62	699,0982 USD	413,1463
Mountain-100 Silver, 44	Mountain-100 Silver, 44	3399,9900 USD	1912,1544
Road-150 Red, 44	Road-150 Red, 44	3578,2700 USD	2171,2942
Road-150 Red, 62	Road-150 Red, 62	3578,2700 USD	2171,2942

At the bottom of the form, there are buttons for 'Run Query', 'Save', 'Delete', and 'Close'.

For each query 'Data source' have to be selected. If data source is OLAP database, MDX query will be expected and if data source is SQL database, TSQL query will be expected.

Both MDX and TSQL queries always expect first column as category column with any type of data, while all subsequent columns are considered as series of values and must be of numeric type.

Both MDX and TSQL queries expects at least one series of values (one category and one series columns of data).

6.2. Query values measure units

For each of query series of values, measure unit has to be set individually.

Category EnglishProductName	Seria Value Sales Amount [USD]	Seria Value Standard Cost [Set units]
Road-150 Red, 62	3578,2700 USD	2171,2942
Mountain-100 Silver, 44	3399,9900 USD	1912,1544
Mountain-100 Silver, 44	3399,9900 USD	1912,1544

Click on the column 'Set units' option and fill-in measure units for selected column.

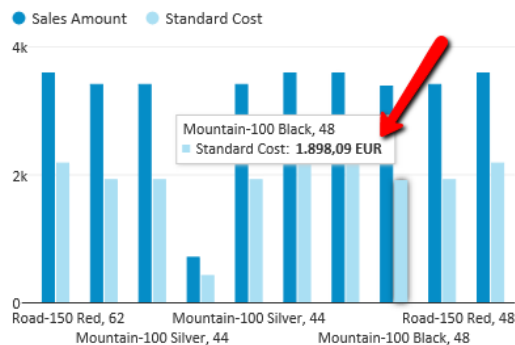
Set measure units for column 'Standard Cost'

Measure unit

OK

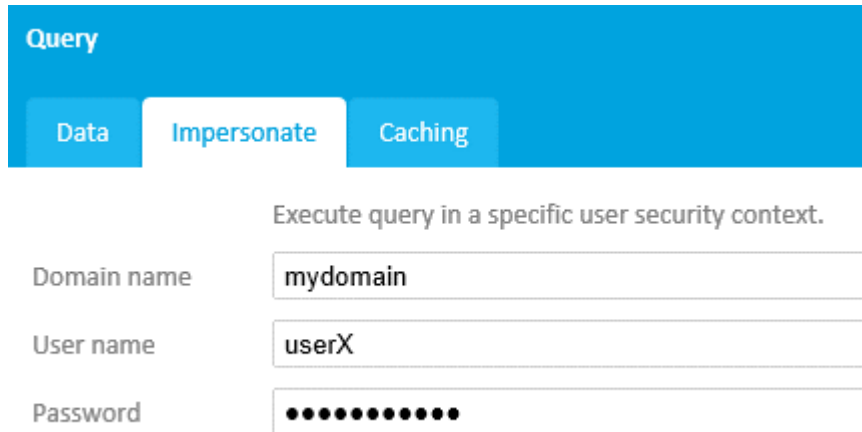
Cancel

Same measure unit will be displayed wherever this query is used on any of the dashboard visual elements (tiles).



6.3. Impersonate query execution

By default, query will be executed in the context of current user. If for any reason data source needs to be accessed with different user credentials. Impersonate user credentials could be defined on 'Impersonate' tab on the query design form.



Query

Data Impersonate Caching

Execute query in a specific user security context.

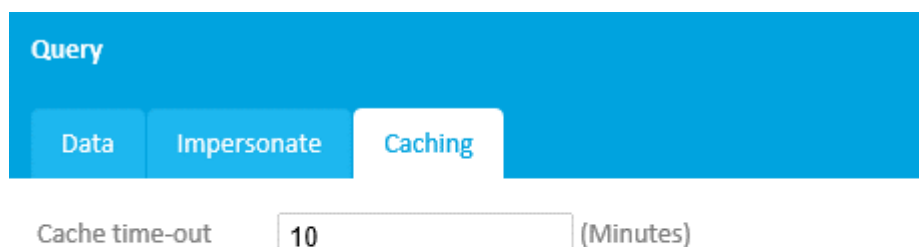
Domain name

User name

Password

6.4. Query caching

Query results could be cached to avoid production data sources from constant query execution and save their processing time. Imagine hundreds of users opening same dashboard and for each opening queries to underlying data sources executes each time dashboard is opened. That kind of query execution is unnecessary in most scenarios and caching queries for certain amount of time perfectly good for most dashboard scenarios. To set caching on certain query, open query design form and on 'Caching' tab set number of minutes for which query results will be cached.



Query

Data Impersonate Caching

Cache time-out (Minutes)

If defined, query results will be cached for defined period of time. All requests be returned from cached memory, allowing large number of users/requests to original data source. To disable caching, leave this field empty or set it to 0.

Query results are cached on two levels. First, query results are cached on ASP.NET level within Kyubit Business Intelligence application memory. If, for any reason, IIS is restarted or application is recycled within IIS

execution, query results are stored in Kyubit Business Intelligence internal database. In both cases, cached query results will expired after defined amount of time and original data source will be queries afterwards.

6.5. Setting Query permissions

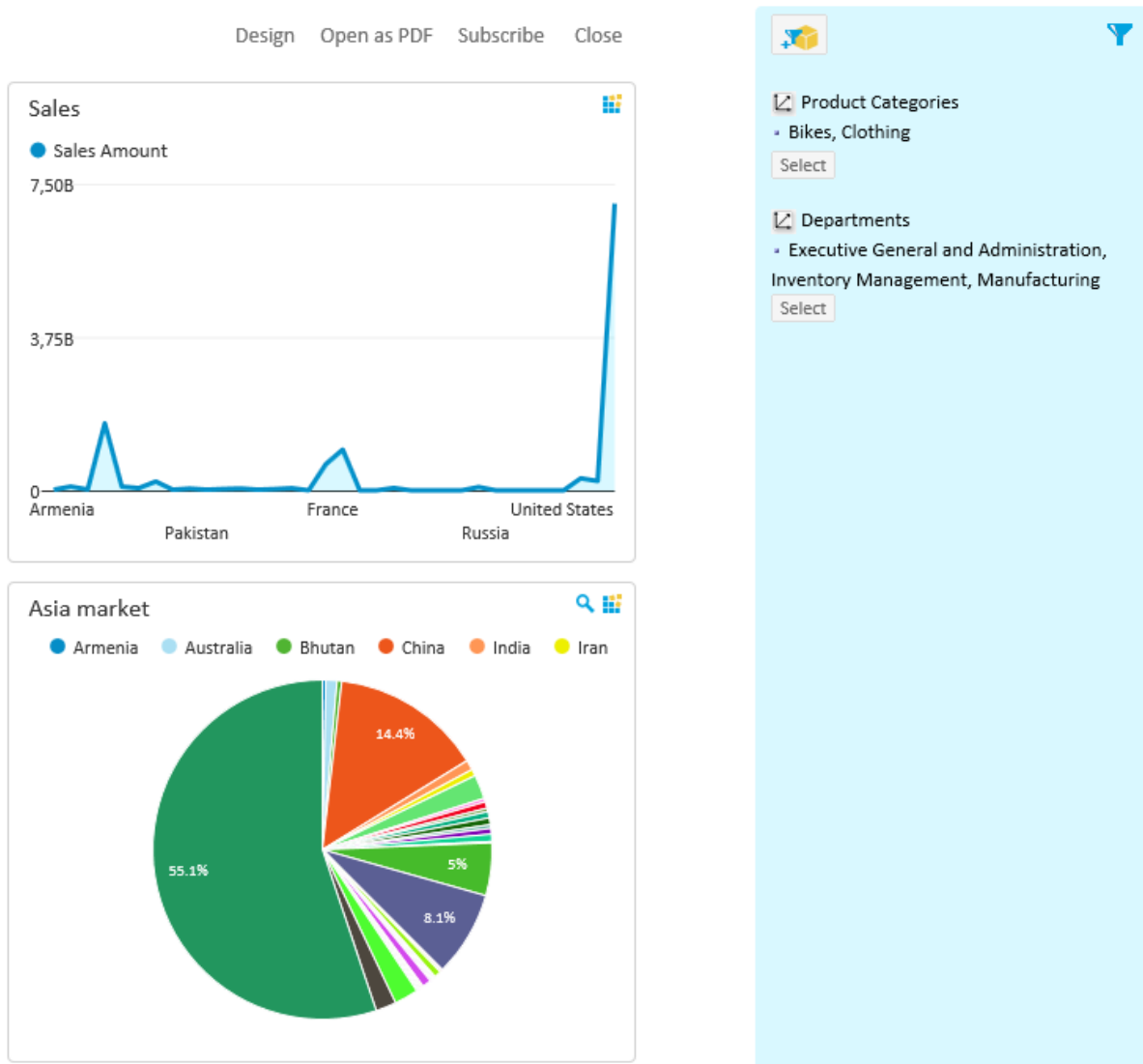
If Query should be visible to other users, click on the 'Permissions' options in the upper-right corner and add appropriate Active Directory users and groups to have 'Read' or 'Read/Write' permissions or set unrestricted access to created Query. (See chapter 7.1. for more details)

7. Dashboard slicers and analysis within dashboard

7.1. Slicers

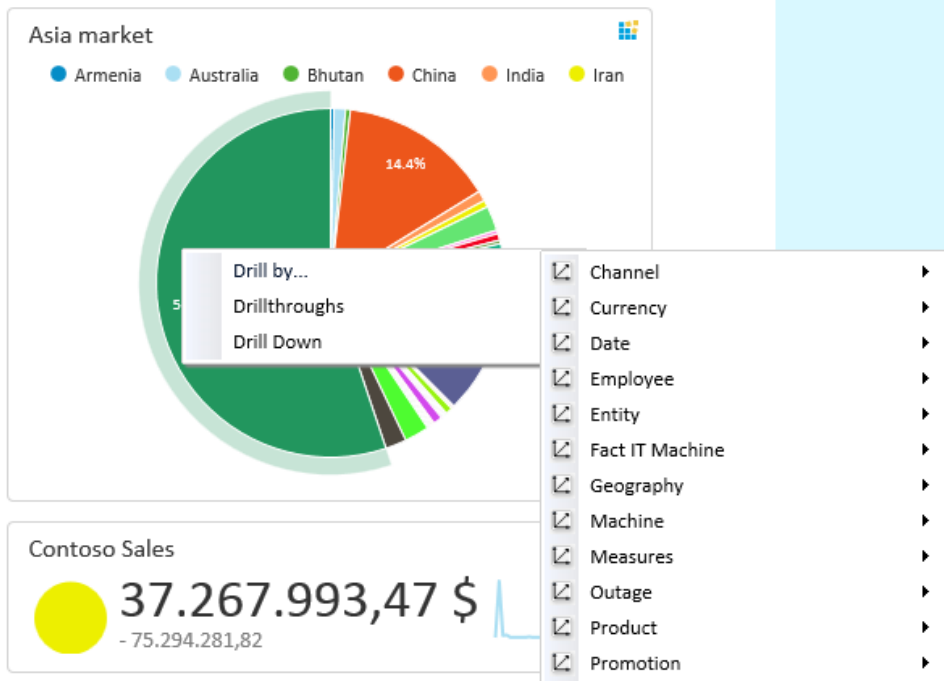
All data on dashboards that is based on OLAP data source could be manipulated with OLAP data slicers that could be added in design or production time. If slicer is added in design time, it will be part of the dashboard whenever dashboard is opened. Also users who are not dashboard designers, but only use dashboard could also add dashboard slicer that will be only a temporary supplement to the dashboard.

Adding slicer for certain OLAP data source will automatically filter (refresh) all tiles based on same OLAP data source with slicer dimension members. Slicers could be additional changed, reordered and removed to provide fine analysis tool while exploring OLAP data.



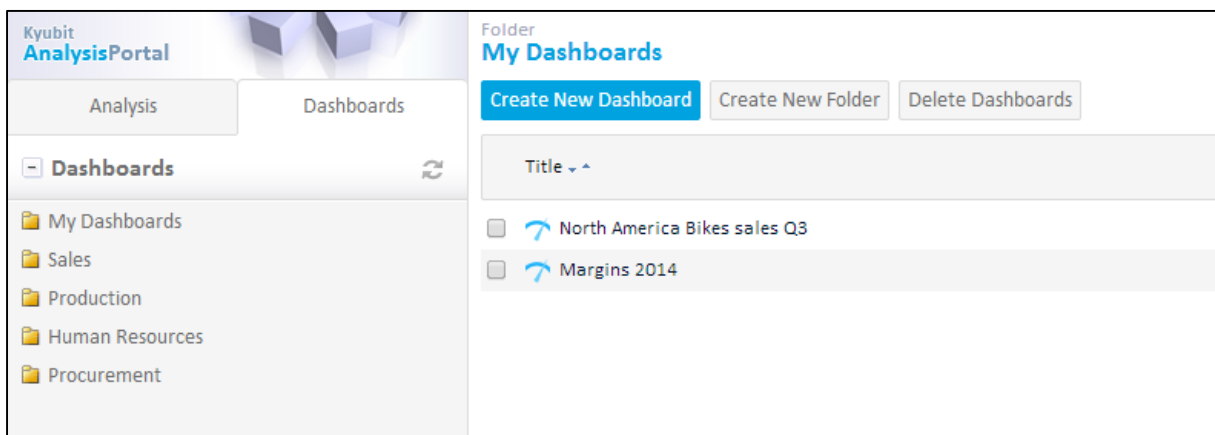
7.2. Tiles drilldown, drill-through OLAP actions within dashboard

All dashboard tiles based on OLAP data source could be drilled down, sliced or drilled through in place within dashboard. Right click on the OLAP dashboard tile and selected one of available OLAP actions.



8. Folders and dashboards access permissions

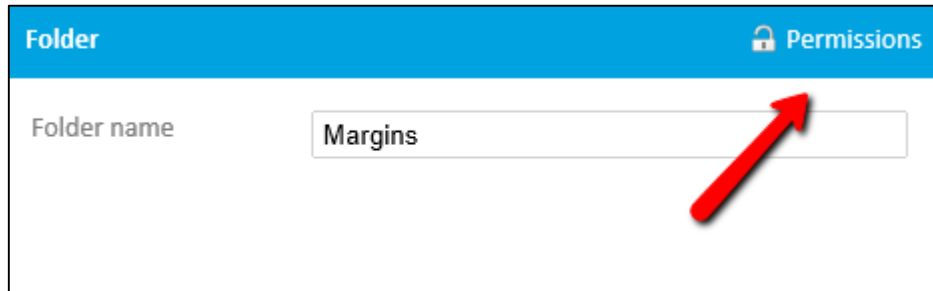
To group more dashboards into logical group that shares same user permissions, folders could be created to contain any number of dashboards. When created, dashboard by default is located in 'My Dashboards' folder, visible only to dashboard creator. At any time user can share dashboard with other users by moving dashboard to folder that is shared by other users.



To create folder, choose option 'Create New Folder', fill-in folder title and click save. New folder will appear in the list of folders. New folder is by default visible only to creator and administrators. To give other people access to folder, open the same folder (Edit option) and select 'Permissions' in the upper-right corner.

8.1. Setting object permissions

To set permissions for any Kyubit Business Intelligence object, click on the 'Permissions' option in the upper-right corner of the form and edit object permission.



The screenshot shows a web form titled 'Folder' with a blue header bar. On the right side of the header bar, there is a lock icon and the text 'Permissions'. Below the header, there is a text input field labeled 'Folder name' containing the text 'Margins'. A red arrow points from the bottom right towards the 'Permissions' tab in the header bar.

Search for domain users and groups to set appropriate permissions.


Read/Write permission gives full rights on folder and dashboards within folder.

Read permission give right to see folder and open all dashboards within folder. No changes are allowed.

By setting permissions to 'Everyone' (unrestricted) gives (Read or Read/Write) permission to any user that is trying to access folder and all dashboards within folder.

Find users from ActiveDirectory...

Domain name - User name

 Adam 'Junior'

Everyone (Unrestricted access)

Folder

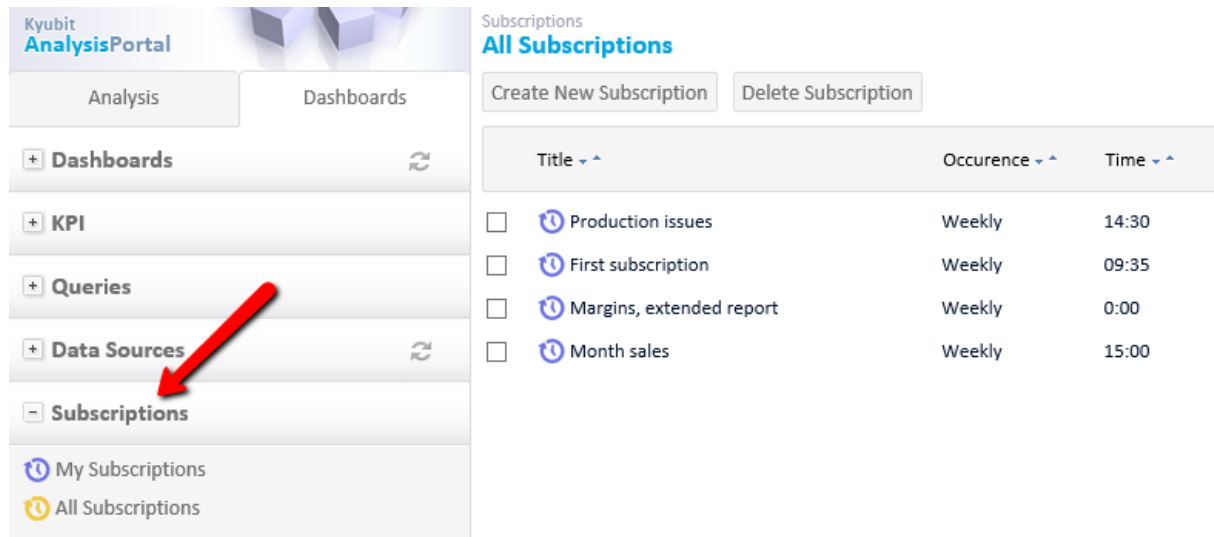
<input type="checkbox"/>	User	Adam 'Junior'	Read/Write
--------------------------	------	---------------	------------

9. Subscriptions

Important aspect of Kyubit Business Intelligence dashboards usage is to deliver dashboards to users using email subscriptions, which contain dashboard data in form of HTML with embedded dashboard image or attached PDF document with dashboard details. Every user of Kyubit Business Intelligence with at least 'Read' permission has privileges to make a subscription to dashboard and receive dashboard on email within scheduled time of delivery.

9.1. My subscriptions

Every user can see all his own subscriptions (Analysis and Dashboards) in Kyubit Business Intelligence -> Dashboards section, where all his subscriptions could be managed.

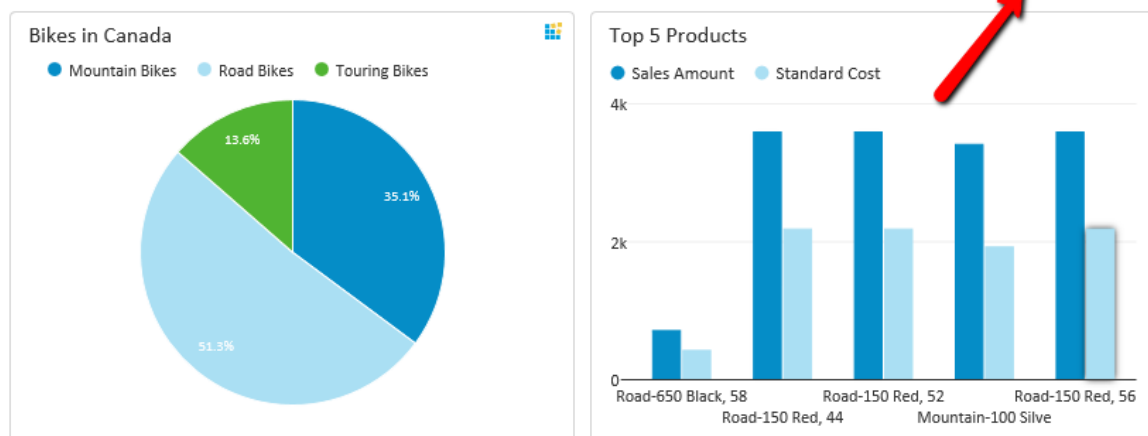


Title	Occurrence	Time
<input type="checkbox"/> Production issues	Weekly	14:30
<input type="checkbox"/> First subscription	Weekly	09:35
<input type="checkbox"/> Margins, extended report	Weekly	0:00
<input type="checkbox"/> Month sales	Weekly	15:00

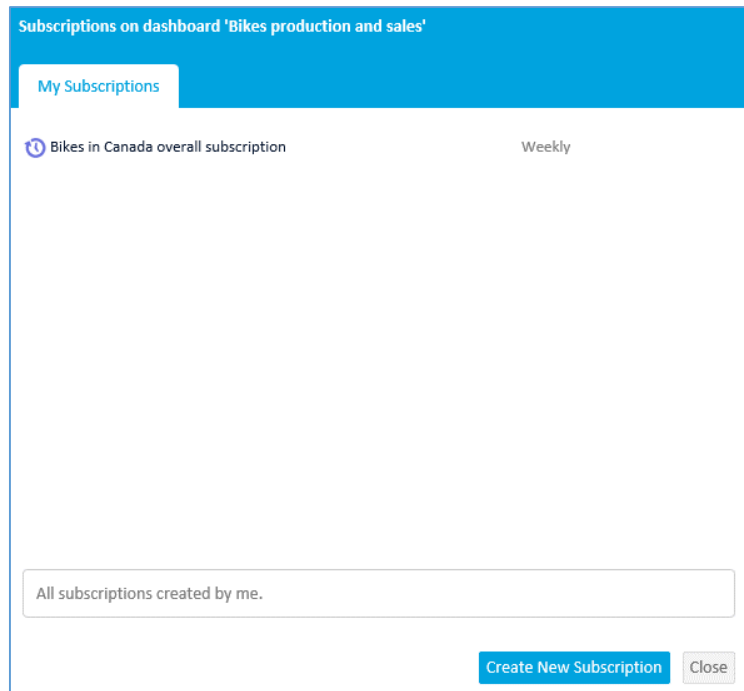
9.2. Subscriptions within dashboard

When user opens certain dashboard, he can immediately see if he already has some subscriptions created to the same dashboard.

Bikes production and sales



By click on "Subscribe" link, form with existing subscriptions of current user will be displayed with option to create new subscription, edit or delete existing.

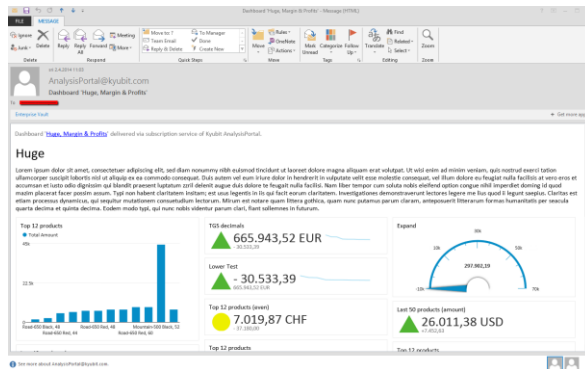


9.3. Subscription details

There are several subscription settings that could impact the way users are receiving subscriptions.

- **Subscription title**, sets the name that will appear when delivering dashboard/analysis inside email message.
- **Subscription item**, selects Kyubit Business Intelligence content (Analysis or Dashboard) to deliver within subscription. User can subscribe to all content with at least 'Read' permissions.

- **Occurs**, defines scheduled time to deliver subscription. There are three different time scheduling categories:
 - **Weekly**, set the week days to deliver subscription
 - **Monthly**, set the month days to deliver subscription
 - **Once**, set single day to deliver subscription
- **Time**, sets time within day to deliver subscription
- **Recipients**, list of email addresses to deliver subscription (separated by semicolon)
- **Include**, type of delivered content
 - **Only link** to Kyubit Business Intelligence dashboard
 - Link + **embedded dashboard image** (user immediately sees dashboard image when opens email message)



- Link + **PDF dashboard document**
- **Disable**, all subscriptions marked disable will not be delivered at scheduled time.

9.4. Send subscriptions conditionally

Dashboard subscriptions have ability to be sent conditionally, depending on the one of containing KPI status.

Subscription

Details
Condition
Impersonate

Send subscription email conditionally

Send subscription only when KPI Current product status status is Success

For dashboard subscriptions, first select specific dashboard in 'Details' and dashboard KPIs will be displayed to select as conditional KPI.

If dashboard contains at least one KPI, it could be used to set condition to send subscription. For example, if some Key performance indicator is in status "Fail", subscription could be sent to alarm and inform appropriate users.

9.5. Impersonate subscriptions data usage

By default, subscriptions are performed in the context of "Kyubit Subscription" windows service logon user. In some cases, same user does not have access to dashboard or analysis data source. If impersonate user

credentials are provided, subscription will be performed in the context of impersonated user, regardless of “Kyubit Subscription” windows service logon user.

Impersonate feature could be also used to deliver data relevant for specific user. For example, one user could have permissions to see OLAP dimensions and measures, other user is not permitted. By setting specific user credentials subscribed content could be different for same analysis or dashboard than to other users.

Subscription

Details Condition **Impersonate**

Execute subscription in a specific user security context.

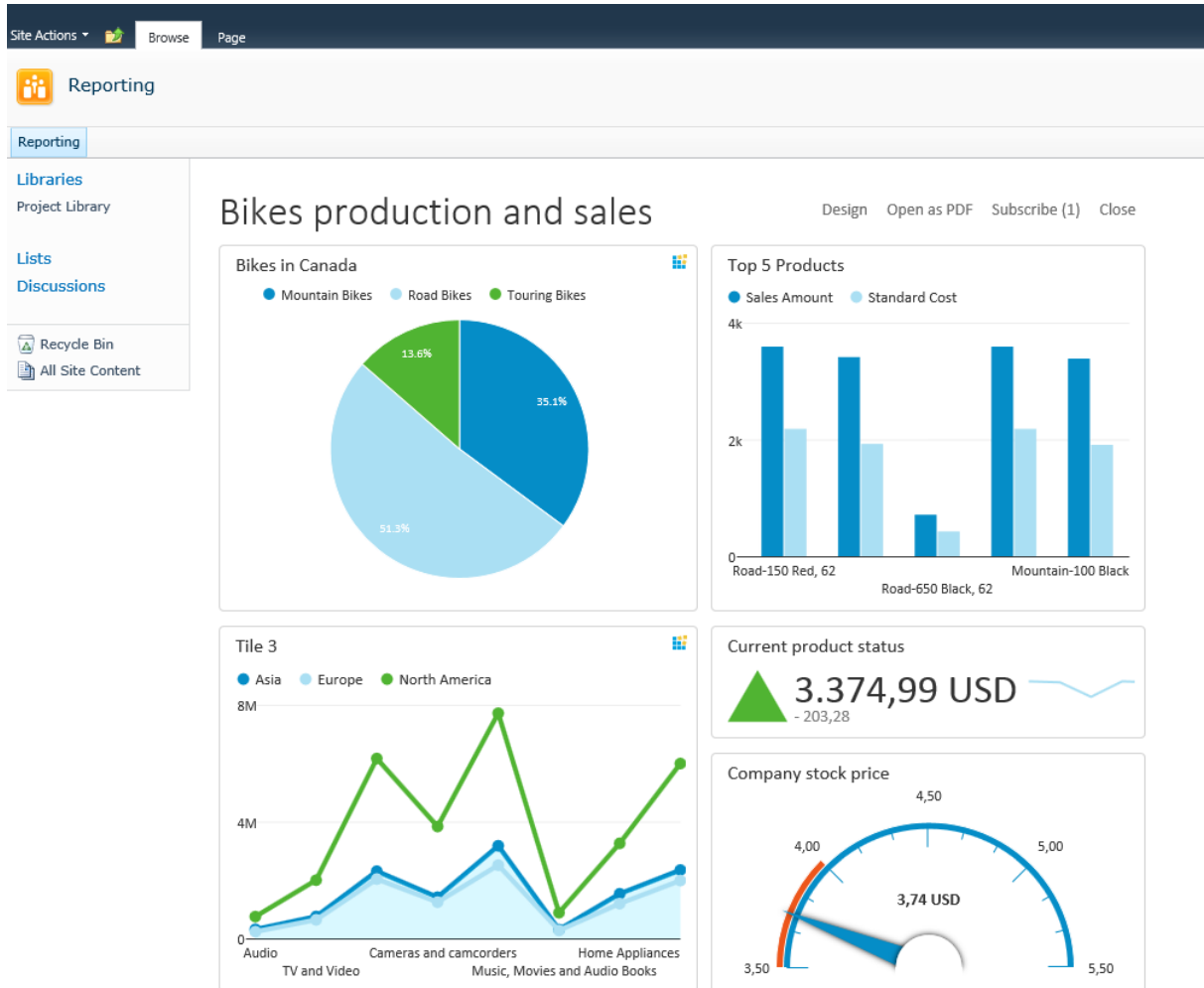
Domain name

User name

Password

10. Integrate dashboards with other web applications and sites

Dashboard created within Kyubit Business Intelligence could be easily embedded/included in any HTML page using IFRAME element, allowing number of configuration options to customize dashboard appearance to best fit visually into existing HTML page.



Simple example of embedded dashboard using IFRAME element:

```
<iframe id="dashFrame" src="http://KyubitBI/Forms/Dashboard.aspx?DashboardID=3" width="800px" height="1000px" frameborder="0" scrolling="no"></iframe>
```

Add IFRAME element and set SRC attribute to URL of the dashboard from Kyubit Business Intelligence application (Same URL if opened from Kyubit Business Intelligence application).

Additional URL attributes to customize dashboard appearance:

- **Align**, alignment of the dashboard within IFRAME element
- **Font**, dashboard fonts
- **FontColor**, dashboard font color
- **TileFontSize**, dashboard title size
- **HideDesignButton**, hides 'Design' button

- **HideCloseButton**, hides 'Close' button
- **HideOpenPDFbutton**, hides 'Open PDF' button
- **HideSubscribeButton**, hides 'Subscribe' button

Example with all attributes:

```
<iframe id="dashFrame"
src="http://KyubitBI/Forms/Dashboard.aspx?DashboardID=3&align=right&font=helvetica&fontColor=red&tileFont
ontSize=11px&hideDesignButton=1&hideCloseButton=1&hideOpenPDFbutton=1&hideSubscribeButton=1"
width="800px" height="1000px" frameborder="0" scrolling="no"></iframe>
```

11. Geo Maps available lists of keys

OLAP and SQL data that are geographically related could be displayed in Geo Maps dashboard tile. Data has to match “codes” or “names” for specific Geo map that presents certain country or region. Below is list of available “codes” and “names” for specific Geo Map.

11.1. Continents

No	Code	Name
1	AF	Africa
2	NA	North America
3	OC	Oceania
4	AS	Asia
5	EU	Europe
6	SA	South America

11.2. World, Africa, Asia, Europe, Oceania, South America, North America

No	Code	Name
1	BD	Bangladesh
2	BE	Belgium
3	BF	Burkina Faso
4	BG	Bulgaria
5	BA	Bosnia and Herz.
6	BN	Brunei
7	BO	Bolivia
8	JP	Japan
9	BI	Burundi
10	BJ	Benin
11	BT	Bhutan
12	JM	Jamaica
13	BW	Botswana
14	BR	Brazil
15	BS	Bahamas
16	BY	Belarus
17	BZ	Belize
18	RU	Russia
19	RW	Rwanda
20	RS	Serbia
21	TL	Timor-Leste
22	TM	Turkmenistan
23	TJ	Tajikistan
24	RO	Romania
25	GW	Guinea-Bissau
26	GT	Guatemala

27	GR	Greece
28	GQ	Eq. Guinea
29	GY	Guyana
30	GE	Georgia
31	GB	United Kingdom
32	GA	Gabon
33	GN	Guinea
34	GM	Gambia
35	GL	Greenland
36	GH	Ghana
37	OM	Oman
38	TN	Tunisia
39	JO	Jordan
40	HR	Croatia
41	HT	Haiti
42	HU	Hungary
43	HN	Honduras
44	PR	Puerto Rico
45	PS	Palestine
46	PT	Portugal
47	PY	Paraguay
48	PA	Panama
49	PG	Papua New Guinea
50	PE	Peru
51	PK	Pakistan
52	PH	Philippines
53	PL	Poland
54	ZM	Zambia
55	EH	W. Sahara
56	EE	Estonia
57	EG	Egypt
58	ZA	South Africa
59	EC	Ecuador
60	IT	Italy
61	VN	Vietnam
62	SB	Solomon Is.
63	ET	Ethiopia
64	SO	Somalia
65	ZW	Zimbabwe
66	ES	Spain
67	ER	Eritrea
68	ME	Montenegro
69	MD	Moldova
70	MG	Madagascar
71	MA	Morocco
72	UZ	Uzbekistan
73	MM	Myanmar
74	ML	Mali
75	MN	Mongolia
76	MK	Macedonia
77	MW	Malawi
78	MR	Mauritania
79	UG	Uganda

80	MY	Malaysia
81	MX	Mexico
82	IL	Israel
83	FR	France
84	XS	Somaliland
85	FI	Finland
86	FJ	Fiji
87	FK	Falkland Is.
88	NI	Nicaragua
89	NL	Netherlands
90	NO	Norway
91	NA	Namibia
92	VU	Vanuatu
93	NC	New Caledonia
94	NE	Niger
95	NG	Nigeria
96	NZ	New Zealand
97	NP	Nepal
98	XK	Kosovo
99	CI	Côte d'Ivoire
100	CH	Switzerland
101	CO	Colombia
102	CN	China
103	CM	Cameroon
104	CL	Chile
105	XC	N. Cyprus
106	CA	Canada
107	CG	Congo
108	CF	Central African Rep.
109	CD	Dem. Rep. Congo
110	CZ	Czech Rep.
111	CY	Cyprus
112	CR	Costa Rica
113	CU	Cuba
114	SZ	Swaziland
115	SY	Syria
116	KG	Kyrgyzstan
117	KE	Kenya
118	SS	S. Sudan
119	SR	Suriname
120	KH	Cambodia
121	SV	El Salvador
122	SK	Slovakia
123	KR	Korea
124	SI	Slovenia
125	KP	Dem. Rep. Korea
126	KW	Kuwait
127	SN	Senegal
128	SL	Sierra Leone
129	KZ	Kazakhstan
130	SA	Saudi Arabia
131	SE	Sweden
132	SD	Sudan

133	DO	Dominican Rep.
134	DJ	Djibouti
135	DK	Denmark
136	DE	Germany
137	YE	Yemen
138	DZ	Algeria
139	US	United States
140	UY	Uruguay
141	LB	Lebanon
142	LA	Lao PDR
143	TW	Taiwan
144	TT	Trinidad and Tobago
145	TR	Turkey
146	LK	Sri Lanka
147	LV	Latvia
148	LT	Lithuania
149	LU	Luxembourg
150	LR	Liberia
151	LS	Lesotho
152	TH	Thailand
153	TF	Fr. S. Antarctic Lands
154	TG	Togo
155	TD	Chad
156	LY	Libya
157	AE	United Arab Emirates
158	VE	Venezuela
159	AF	Afghanistan
160	IQ	Iraq
161	IS	Iceland
162	IR	Iran
163	AM	Armenia
164	AL	Albania
165	AO	Angola
166	AR	Argentina
167	AU	Australia
168	AT	Austria
169	IN	India
170	TZ	Tanzania
171	AZ	Azerbaijan
172	IE	Ireland
173	ID	Indonesia
174	UA	Ukraine
175	QA	Qatar
176	MZ	Mozambique

11.3. USA

No	Code	Name
1	VA	Virginia

2	PA	Pennsylvania
3	TN	Tennessee
4	WV	West Virginia
5	NV	Nevada
6	TX	Texas
7	NH	New Hampshire
8	NY	New York
9	HI	Hawaii
10	VT	Vermont
11	NM	New Mexico
12	NC	North Carolina
13	ND	North Dakota
14	NE	Nebraska
15	LA	Louisiana
16	SD	South Dakota
17	DC	District of Columbia
18	DE	Delaware
19	FL	Florida
20	CT	Connecticut
21	WA	Washington
22	KS	Kansas
23	WI	Wisconsin
24	OR	Oregon
25	KY	Kentucky
26	ME	Maine
27	OH	Ohio
28	OK	Oklahoma
29	ID	Idaho
30	WY	Wyoming
31	UT	Utah
32	IN	Indiana
33	IL	Illinois
34	AK	Alaska
35	NJ	New Jersey
36	CO	Colorado
37	MD	Maryland
38	MA	Massachusetts
39	AL	Alabama
40	MO	Missouri
41	MN	Minnesota
42	CA	California
43	IA	Iowa
44	MI	Michigan
45	GA	Georgia
46	AZ	Arizona
47	MT	Montana
48	MS	Mississippi
49	SC	South Carolina
50	RI	Rhode Island
51	AR	Arkansas

11.4. India

No	Code	Name
1	BR	Bihar
2	PY	Puducherry
3	DD	Daman and Diu
4	DN	Dadra and Nagar Haveli
5	DL	Delhi
6	NL	Nagaland
7	WB	West Bengal
8	HR	Haryana
9	HP	Himachal Pradesh
10	AS	Assam
11	UT	Uttaranchal
12	JH	Jharkhand
13	JK	Jammu and Kashmir
14	UP	Uttar Pradesh
15	SK	Sikkim
16	MZ	Mizoram
17	CT	Chhattisgarh
18	CH	Chandigarh
19	GA	Goa
20	GJ	Gujarat
21	RJ	Rajasthan
22	MP	Madhya Pradesh
23	OR	Orissa
24	TN	Tamil Nadu
25	AN	Andaman and Nicobar
26	AP	Andhra Pradesh
27	TR	Tripura
28	AR	Arunachal Pradesh
29	KA	Karnataka
30	PB	Punjab
31	ML	Meghalaya
32	MN	Manipur
33	MH	Maharashtra
34	KL	Kerala

11.5. Norway

No	Code	Name
1	07	Vestfold
2	01	Østfold
3	06	Buskerud
4	21	Svalbard
5	20	Finnmark
6	03	Oslo
7	05	Oppland
8	10	Vest-Agder
9	11	Rogaland
10	12	Hordaland
11	04	Hedmark
12	14	Sogn og Fjordane
13	15	Møre og Romsdal
14	16	Sør-Trøndelag
15	17	Nord-Trøndelag
16	18	Nordland
17	19	Troms
18	08	Telemark
19	09	Aust-Agder
20	02	Akershus

11.6. Spain

No	Code	Name
1	NA	Navarra
2	B	Barcelona
3	CS	Castellón
4	ZA	Zamora
5	O	Asturias
6	OR	Orense
7	M	Madrid
8	L	Lérida
9	J	Jaén
10	H	Huelva
11	CU	Cuenca
12	T	Tarragona
13	C	La Coruña
14	AV	Ávila
15	A	Alicante
16	CR	Ciudad Real
17	CO	Córdoba
18	VA	Valladolid
19	Z	Zaragoza

20	MA	Málaga
21	AL	Almería
22	CE	Ceuta
23	PM	Baleares
24	VI	Álava
25	S	Cantabria
26	TE	Teruel
27	CC	Cáceres
28	P	Palencia
29	PO	Pontevedra
30	GI	Gerona
31	TO	Toledo
32	MU	Murcia
33	GR	Granada
34	GU	Guadalajara
35	AB	Albacete
36	SO	Soria
37	ML	Melilla
38	LU	Lugo
39	SE	Sevilla
40	CA	Cádiz
41	SG	Segovia
42	BU	Burgos
43	SA	Salamanca
44	V	Valencia
45	LE	León
46	BI	Bizkaia
47	HU	Huesca
48	LO	La Rioja
49	SS	Gipuzkoa
50	BA	Badajoz

11.7. Australia

No	Code	Name
1	ACT	Australian Capital Territory
2	WA	Western Australia
3	TAS	Tasmania
4	VIC	Victoria
5	NT	Northern Territory
6	QLD	Queensland
7	SA	South Australia
8	NSW	New South Wales

11.8. France

No	Code	Name
1	C	Auvergne
2	B	Aquitaine
3	A	Alsace
4	G	Champagne-Ardenne
5	F	Centre
6	E	Bretagne
7	D	Bourgogne
8	K	Languedoc-Roussillon
9	J	Île-de-France
10	I	Franche-Comté
11	YT	Mayotte
12	O	Nord-Pas-de-Calais
13	N	Midi-Pyrénées
14	M	Lorraine
15	L	Limousin
16	S	Picardie
17	R	Pays de la Loire
18	Q	Haute-Normandie
19	P	Basse-Normandie
20	V	Rhône-Alpes
21	U	Provence-Alpes-Côte-d'Azur
22	T	Poitou-Charentes
23	RE	Réunion
24	GF	Guyane française
25	H	Corse
26	MQ	Martinique
27	GP	Guadeloupe

11.9. Thailand

No	Code	Name
1	57	Chiang Rai
2	56	Phayao
3	55	Nan
4	54	Phrae
5	53	Uttaradit
6	52	Lampang
7	51	Lamphun
8	50	Chiang Mai
9	93	Phatthalung
10	92	Trang
11	91	Satun
12	90	Songkhla
13	96	Narathiwat
14	95	Yala

15	58	Mae Hong Son
16	13	Pathum Thani
17	12	Nonthaburi
18	11	Samut Prakan
19	10	Bangkok Metropolis
20	17	Sing Buri
21	16	Lop Buri
22	15	Ang Thong
23	14	Phra Nakhon Si Ayutthaya
24	71	Kanchanaburi
25	70	Ratchaburi
26	19	Saraburi
27	72	Suphan Buri
28	75	Samut Songkhram
29	73	Nakhon Pathom
30	77	Prachuap Khiri Khan
31	76	Phetchaburi
32	18	Chai Nat
33	39	Nong Bua Lam Phu
34	74	Samut Sakhon
35	84	Surat Thani
36	85	Ranong
37	86	Chumphon
38	80	Nakhon Si Thammarat
39	81	Krabi
40	82	Phangnga
41	83	Phuket
42	32	Surin
43	40	Khon Kaen
44	41	Udon Thani
45	42	Loei
46	43	Nong Khai
47	44	Maha Sarakham
48	45	Roi Et
49	46	Kalasin
50	47	Sakon Nakhon
51	48	Nakhon Phanom
52	49	Mukdahan
53	26	Nakhon Nayok
54	27	Sa Kaeo
55	24	Chachoengsao
56	25	Prachin Buri
57	22	Chanthaburi
58	23	Trat
59	20	Chon Buri
60	21	Rayong
61	62	Kamphaeng Phet
62	63	Tak
63	60	Nakhon Sawan
64	61	Uthai Thani
65	66	Phichit
66	67	Phetchabun
67	64	Sukhothai

68	65	Phitsanulok
69	35	Yasothon
70	34	Ubon Ratchathani
71	37	Amnat Charoen
72	33	Si Sa Ket
73	38	Bueng Kan
74	36	Chaiyaphum
75	31	Buri Ram
76	94	Pattani
77	30	Nakhon Ratchasima

11.10. Russia

No	Code	Name
1	PNZ	Penzenskaya oblast
2	VLA	Vladimirsкая oblast
3	LEN	Leningradskaya oblast
4	SAK	Sakhalinskaya oblast
5	KYA	Krasnoyarskiy kray
6	UD	Udmurtskaya Respublika
7	IVA	Ivanovskaya oblast
8	LIP	Lipetskaya oblast
9	AST	Astrakhanskaya oblast
10	CE	Chechenskaya Respublika
11	KHA	Khabarovskiy kray
12	ORE	Orenburgskaya oblast
13	KIR	Kirovskaya oblast
14	BA	Bashkortostan, Respublika
15	NGR	Novgorodskaya oblast
16	KLU	Kaluzhskaya oblast
17	OMS	Omskaya oblast
18	SAR	Saratovskaya oblast
19	ORL	Orlovskaya oblast
20	STA	Stavropolskiy kray
21	SE	Severnaya Osetiya-Alaniya, Respublika
22	SAM	Samarskaya oblast
23	SA	Sakha, Respublika
24	SVE	Sverdlovskaya oblast
25	KK	Khakasiya, Respublika
26	SPE	Sankt-Peterburg
27	MOS	Moskovskaya oblast
28	BEL	Belgorodskaya oblast
29	KHM	Khanty-Mansiyskiy avtonomnyy okrug
30	VLG	Vologodskaya oblast
31	CHE	Chelyabinskaya oblast
32	YAR	Yaroslavskaya oblast
33	TUL	Tulskaya oblast
34	IRK	Irkutskaya oblast
35	NIZ	Nizhegorodskaya oblast

36	YAN	Yamalo-Nenetskiy avtonomnyy okrug
37	KGD	Kaliningradskaya oblast
38	MOW	Moskva
39	KAM	Kamchatskiy kray
40	BU	Buryatiya, Respublika
41	KEM	Kemerovskaya oblast
42	CHU	Chukotskiy avtonomnyy okrug
43	ULY	Ulyanovskaya oblast
44	KGN	Kurganskaya oblast
45	KRS	Kurskaya oblast
46	KR	Kareliya, Respublika
47	ME	Mariy El, Respublika
48	IN	Ingushetiya, Respublika
49	MAG	Magadanskaya oblast
50	MO	Mordoviya, Respublika
51	TA	Tatarstan, Respublika
52	ZAB	Zabaykalskiy kray
53	RYA	Ryazanskaya oblast
54	TAM	Tambovskaya oblast
55	ARK	Arkhangelskaya oblast
56	KC	Karachayevo-Cherkesskaya Respublika
57	TY	Tyva, Respublika [Tuva]
58	MUR	Murmanskaya oblast
59	VOR	Voronezhskaya oblast
60	PSK	Pskovskaya oblast
61	TVE	Tverskaya oblast
62	VGG	Volgogradskaya oblast
63	KOS	Kostromskaya oblast
64	KL	Kalmykiya, Respublika
65	TOM	Tomskaya oblast
66	KO	Komi, Respublika
67	TYU	Tyumenskaya oblast
68	DA	Dagestan, Respublika
69	NVS	Novosibirskaya oblast
70	AD	Adygeya, Respublika
71	PER	Permskiy kray
72	ROS	Rostovskaya oblast
73	PRI	Primorskiy kray
74	KB	Kabardino-Balkarskaya Respublika
75	AL	Altay, Respublika
76	NEN	Nenetskiy avtonomnyy okrug
77	ALT	Altayskiy kray
78	KDA	Krasnodarskiy kray
79	YEV	Yevreyskaya avtonomnaya oblast
80	AMU	Amurskaya oblast
81	BRY	Bryanskaya oblast
82	SMO	Smolenskaya oblast
83	CU	Chuvashskaya Respublika

11.11. Netherlands

No	Code	Name
1	OV	Overijssel
2	FR	Friesland
3	UT	Utrecht
4	GE	Gelderland
5	FL	Flevoland
6	NH	Noord-Holland
7	ZE	Zeeland
8	ZH	Zuid-Holland
9	GR	Groningen
10	DR	Drenthe
11	NB	Noord-Brabant
12	LI	Limburg

11.12. Italy

No	Code	Name
1	23	Valle d'Aosta
2	21	Piemonte
3	25	Lombardia
4	52	Toscana
5	36	Friuli-Venezia Giulia
6	42	Liguria
7	45	Emilia-Romagna
8	57	Marche
9	32	Trentino-Alto Adige
10	55	Umbria
11	67	Molise
12	34	Veneto
13	65	Abruzzo
14	62	Lazio
15	75	Apulia
16	77	Basilicata
17	78	Calabria
18	82	Sicily
19	72	Campania
20	88	Sardegna

11.13. Germany

No	Code	Name
1	BE	Berlin
2	ST	Sachsen-Anhalt
3	RP	Rheinland-Pfalz
4	BB	Brandenburg
5	NI	Niedersachsen
6	MV	Mecklenburg-Vorpommern
7	TH	Thüringen
8	BW	Baden-Württemberg
9	HH	Hamburg
10	SH	Schleswig-Holstein
11	NW	Nordrhein-Westfalen
12	SN	Sachsen
13	HB	Bremen
14	SL	Saarland
15	BY	Bayern
16	HE	Hessen

11.14. Switzerland

No	Code	Name
1	SO	Solothurn
2	LU	Lucerne
3	SH	Schaffhausen
4	SG	Sankt Gallen
5	UR	Uri
6	NE	Neuchâtel
7	BS	Basel-Stadt
8	JU	Jura
9	BL	Basel-Landschaft
10	SZ	Schwyz
11	BE	Bern
12	NW	Nidwalden
13	ZG	Zug
14	FR	Fribourg
15	ZH	Zürich
16	VS	Valais
17	VD	Vaud
18	TI	Ticino
19	TG	Thurgau
20	OW	Obwalden
21	AG	Aargau
22	GE	Genève
23	AI	Appenzell Innerrhoden
24	GL	Glarus

25	GR	Graubünden
26	AR	Appenzell Ausserrhoden

11.15. US – States

For US states provide data that exactly match county name.
For example, “Knox County” or “Belmont County”.