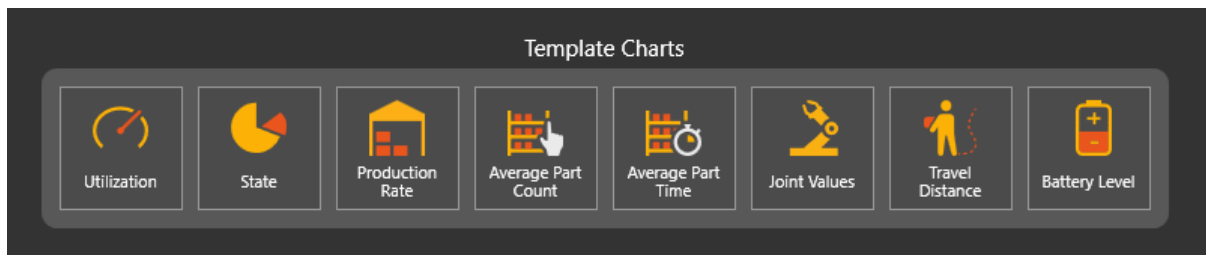


Using Statistics Templates

Visual Components 4.3 | Version: February 01, 2021



There are built-in statistics templates in Visual Components 4.3 that allows you to configure a statistics chart automatically for the selected components. In some templates, you also have an option to re-configure the chart in the action panel, for example, to change the statistics properties from interval based to show the whole simulation data.

Note this document only applies to Visual Component 4.3, and it will not cover the basics of reporting statistics. To start with the basics, see the Visual Components Help file > Tasks > Components > Reporting statistics.

In this tutorial, you will learn how to:

- Use statistics templates
- Create a new template
- Add icons and localize the commands

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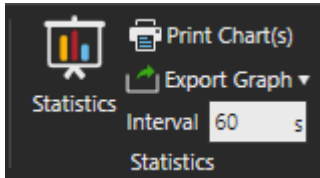
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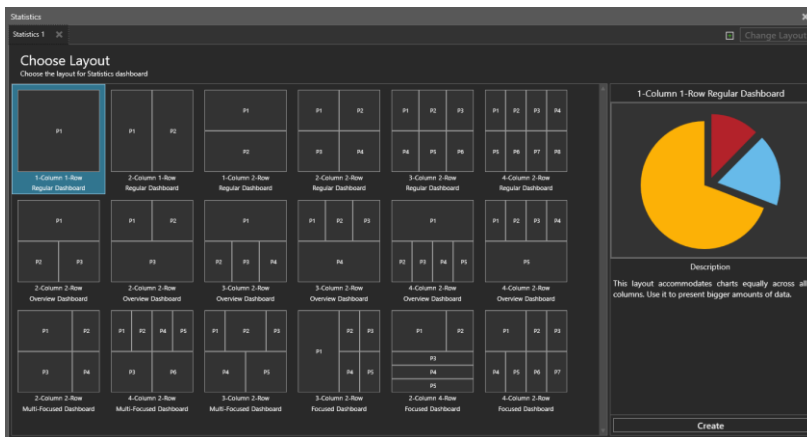
How to use statistics templates

1. Open Statistics Dashboard

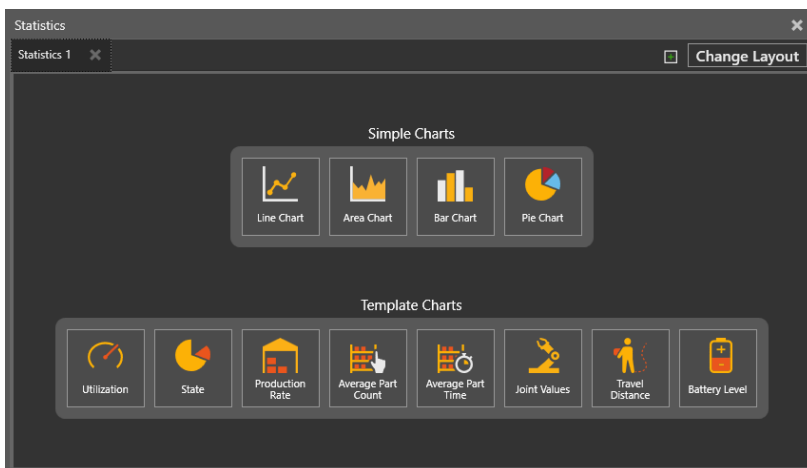
To find the statistics templates, go to the Home tab, in the Statistics ribbon group, click Statistics icon.



The statistics dashboard will open. Then Choose the layout you would prefer to use.

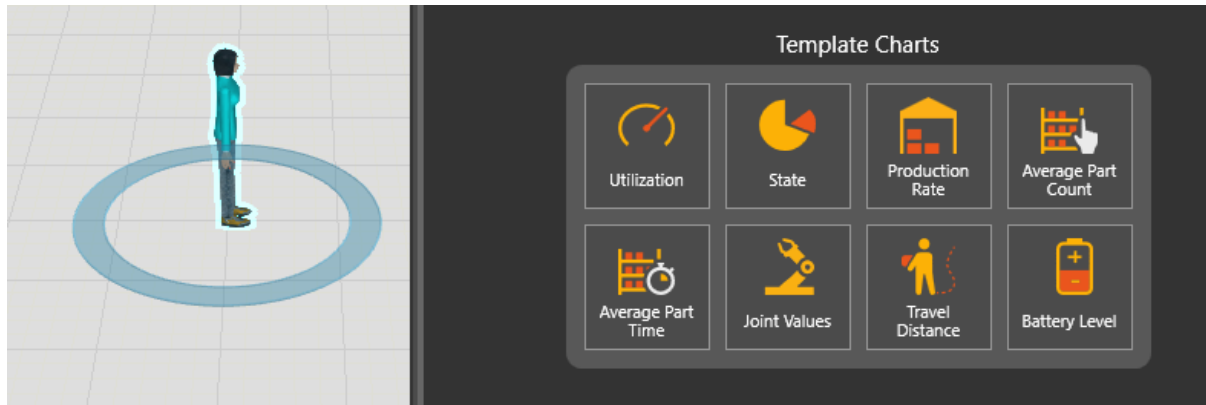


A placeholder without a chart will display two options for adding a chart: You can either create a new chart from scratch or use a template. There are eight template charts by default, but the user can add more templates in that group.



2. Select A Component

Before selecting a template, you need to first select one or more components in the 3D world. To do that, you can move the Statistics dashboard on the side of the screen. If you have two screens, you can move the dashboard to the other screen. We use here *Human (Anna)* as an example.



3. Select Template

Once you have selected component(s) in the 3D viewport, select one of the templates to add. The tooltip shows more information about the template:

Utilization – Utilization rate of the selected component(s). Indicates, in percentage, how long the component(s) has been in "setup" or "busy" state over the elapsed simulation time or the last interval period.

State – Indicates the percentage for each state of the selected component over the elapsed simulation time or the last interval period.

Production Rate – Indicates the amount of components produced or transported by the selected component(s)

Average Part Count – Indicates the amount of parts in average within the last interval in the selected component(s), for example to indicate Buffer Levels.

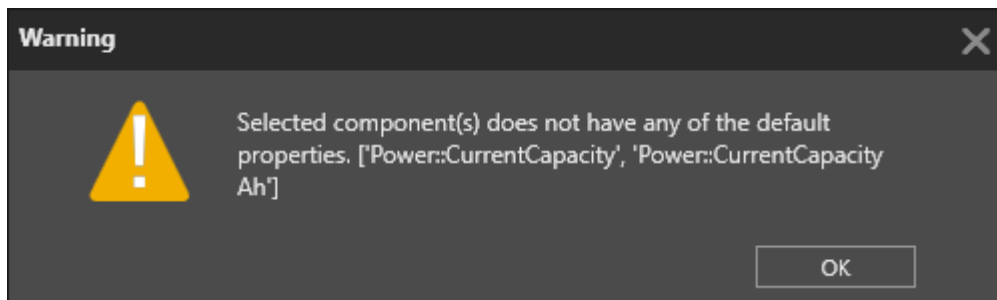
Average Part Time - Indicates the average duration that parts have visited the selected component(s) within the last interval, for example to indicate transporting or processing times.

Joint Values - Joint values of the selected component(s).

Travel Distance - Distance that the selected component(s) has travelled during the simulation run.

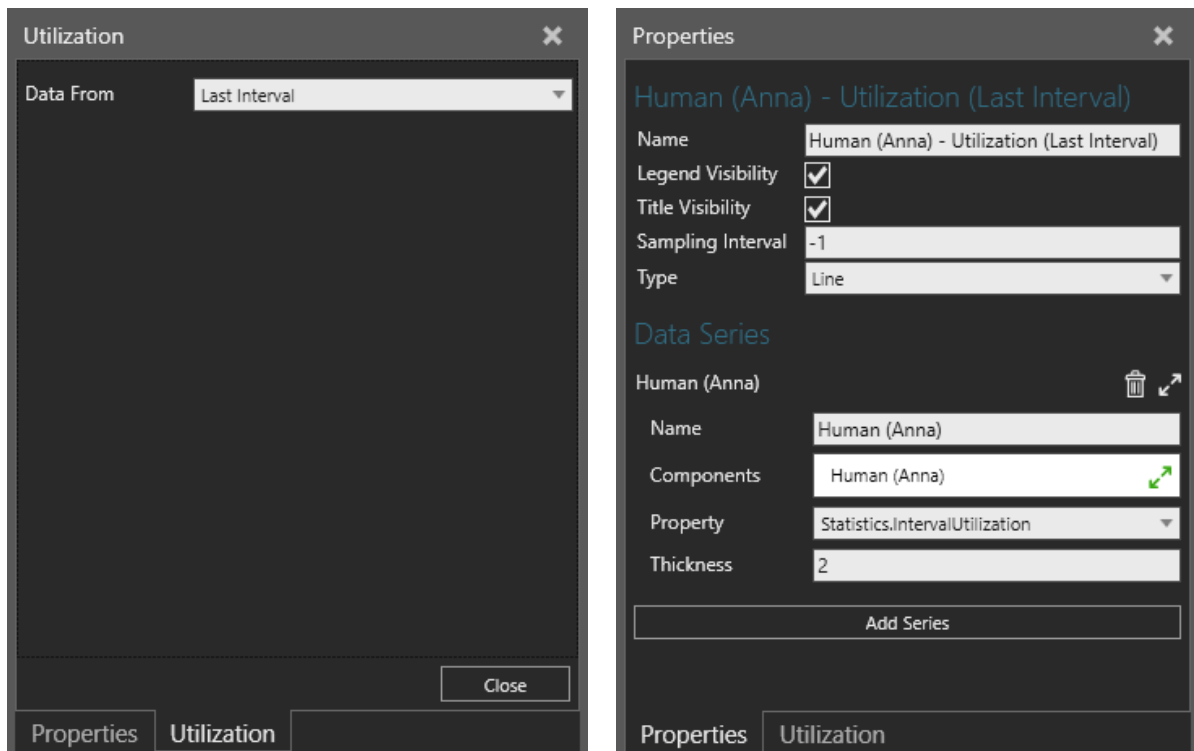
Battery Level – Current power capacity of the selected component(s).

If the required property or Statistics behavior is not found in the selected component, an error message pops up. For our *Human (Anna)* example, there is no battery level properties in the component, and thus selecting Battery Level would give the following message.



4. Configure the Chart

After the template is selected, the chart is created. Some templates also have option to configure the chart after it has been created. For example, selecting *Utilization* chart for *Human (Anna)*, opens an action panel on right-hand side. There is a *Data From* property, which allows you to define whether the chart shows data of the last interval period or the whole simulation run. Some templates might have more options to configure what data the chart is showing.

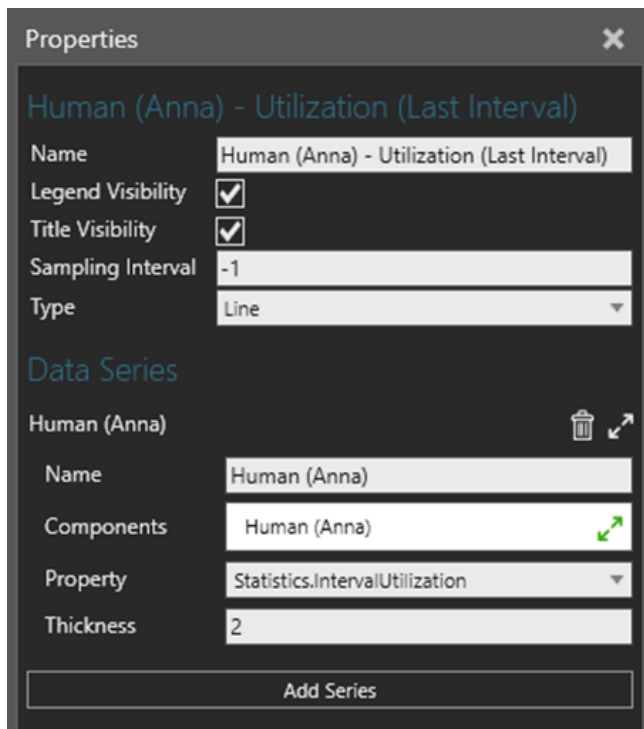


If you now select the chart that has been created, you will have two menus on top of each other: Properties (chart properties) and State (chart configuration).

Note: Once you have configured the chart, you will not see the configuration menu anymore. So, make sure that everything is ok, before you close the window.

5. Edit Chart Properties

You can always go back to the Statistics Dashboard, select chart, and then edit the chart properties. A chart plots a data series or the values of a property in a component. A data series can contain data from multiple components that have a common property. A chart can plot more than one data series and have its own sampling interval. A sampling interval defines how often the value of a data series is plotted in a chart. By default, all charts use a global sampling interval, defined with the value -1.



Note that you cannot configure the chart anymore (step 4). To change the data of the chart coming from the whole simulation run instead of last interval, you need to either delete the chart or configure manually with chart properties.

Create a new template

To create a new template, use the example add-on files that are shared with this tutorial. Extract all the files under My Commands folder. You can use a subfolder name *Statistics Templates* to include all your statistics templates:

```
C:\Users\~\USERNAME\Documents\Visual Components\4.3\My Commands\Statistics Templates\
```

There are three files in the package; one application file (`__init__.py`) and two command files. Use *ComponentProperty_Template.py* for reporting a component property and *StatisticsProperty_Template.py* for reporting a statistics behavior property.

Report a Component Property

Open a text editor, for example Notepad, and then open **ComponentProperty_Template.py** to modify it. In the file, there are two steps that you need to define:

1. **REPORT_PROPERTY_LABEL** – The label of the chart, use for example “My Component Property Template”. Highlighted with **green** color in the picture below.
2. **REPORT_PROPERTY_NAMES** – A list of possible property names of each selected component that can be used for reporting. The first property in the list that is found in each component is used for reporting data of that component. Highlighted with **turquoise** color in the picture below.

```
from vcCommand import *
from vcHelpers.Selection import *

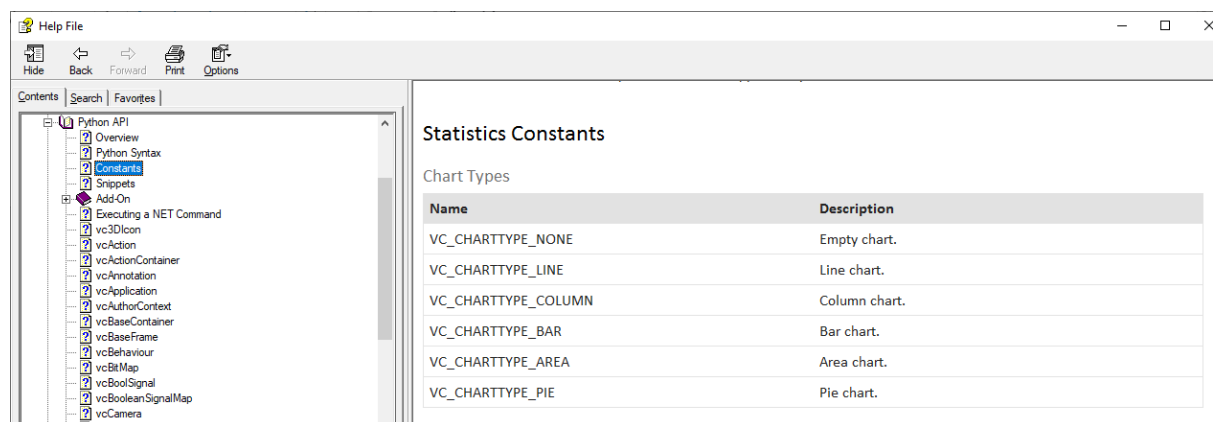
REPORT_PROPERTY_LABEL = "Component Property Template" # <-- 1. DEFINE LABEL
HERE
LAST_INTERVAL_NAME =
app.getLocalizedString("ComboKey::Python.__ComponentPartsAverageCountReport
__.DataFrom.Last Interval")

###
REPORT_PROPERTY_NAMES = ["MyProperty1", "MyProperty2"] # <-- 2. ADD
COMPONENT PROPERTY NAMES HERE IN THIS LIST
### FOR EXAMPLE:
### REPORT_PROPERTY_NAMES = ["MyProperty1", "MyProperty2"]
### => THE FIRST PROPERTY FOUND IS USED FOR EACH COMPONENT.
```

To change the default chart type, change the **VC_CHARTTYPE_LINE** on line 124 to desired type.

```
chart = tab.createChart(selChart, VC_CHARTTYPE_LINE, False)
```

There are all possible types listed in the Help file.



Then save the command with a new name the same location.

Report a Statistics Behavior Property

Open a text editor, for example Notepad, and then open **StatisticsProperty_Template.py** to modify it. In the file, there are two steps that you need to define:

1. **REPORT_PROPERTY_LABEL** – The label of the chart, use for example “My Statistics Property Template”. Highlighted with **green** color in the picture below.
2. **REPORT_STATISTICS_PROPERTY_NAMES** – A list of a statistics behavior property names that are used for reporting. The length of the list must be two. The first property in the list should be interval-based statistics behavior property name and the second its corresponding statistics behavior property that is collecting the data from the whole simulation. Highlighted with **turquoise** color in the picture below.

```
from vcCommand import *
from vcHelpers.Selection import *

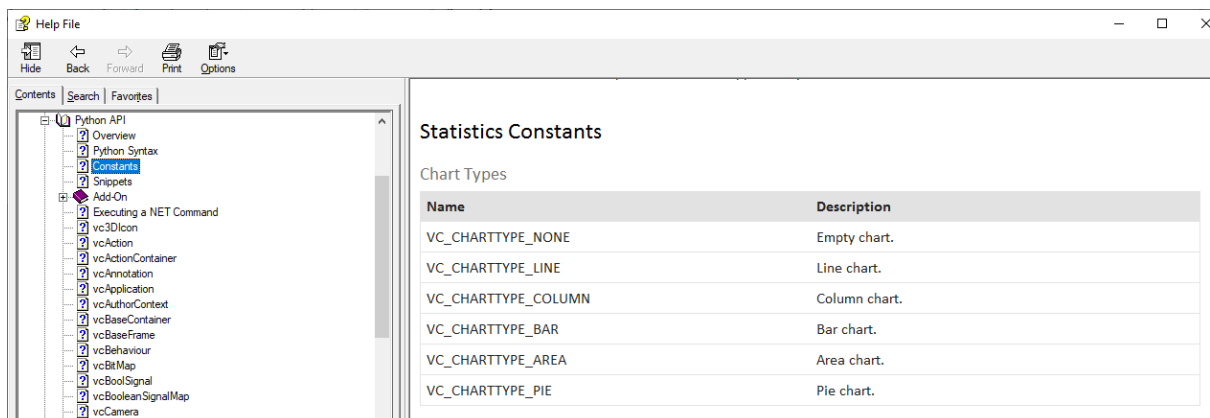
REPORT_PROPERTY_LABEL = "Statistics Property Template" # <-- 1. DEFINE LABEL HERE
LAST_INTERVAL_NAME =
app.getLocalizedString("ComboKey::Python.__ComponentPartsAverageCountReport___.DataFrom.Last Interval")

###
REPORT_STATISTICS_PROPERTY_NAMES = ["PartsIntervalEntered", "PartsEntered"]
# <-- 2. DEFINE STATISTICS BEHAVIOR PROPERTIES HERE IN THIS LIST
### FOR EXAMPLE:
### REPORT_STATISTICS_PROPERTY_NAMES = ["PartsIntervalEntered",
"PartsEntered"]
### => FIRST INTERVAL TYPE AND THEN THE ONE OF THE WHOLE SIMULATION.
```

To change the default chart type, change the **VC_CHARTTYPE_LINE** on line 124 to desired type.

```
chart = tab.createChart(selChart, VC_CHARTTYPE_LINE, False)
```

There are all possible types listed in the Help file.



Then save the command with a new name the same location.

Define Initialization File

Open a text editor, for example Notepad, and then open `__init__.py` to modify it. This is the application file that contains instructions for loading and displaying your statistics template when you start the application.

In the file, there are two commands already defined. You can modify the ones that are there already. If you want to add another component or statistics property template chart, proceed the last steps, and add that third command in the application file.

Each command has the following attributes:

1. `cmd_name` – The command argument specifies a command by name that is executed when you interact with the menu item. You can come up with a meaningful name.
2. `file_name` – The name of the .py -file.
3. `Icon` – Specifies the icon of the menu item. It must be in SVG format or a string that provides the points of a path needed to generate an SVG. The application references the Icons folder in its program files, so you can refer to any image there by its relative path.
4. `cmd_title` – Specifies a default label for the menu item.
5. `Tooltip` – Description of a command shown when hovering mouse on top of the menu item.

Once you have defined all the attributes, save the file, and then restart the application. Now you should see the new templates appearing in the Statistics Dashboard.

