How to add charts to PicDat

Adding search keys to PicDat so that they are included in the analysis and create new charts might be very easy and very hard as well. This depends on how the respective data is constructed and whether this is similar to data which is already considered. This piece of text tries to explain which options you have doing so.

In any case you need to go into the python source code. You will find two packages, called `perfstat_mode` and `asup_mode`. As PerfStat files and ASUP files are very different, search keys have to be established for each mode independently. Both modes work with container classes. The docstrings for the classes and the modules containing them give further description. Read them to understand which container is the right one for your concern.

The general rule is that most container modules are holding constant lists (UPPER_CASE_LETTERS) at the top which define the search keys in some way. The format is described locally in the code. If a key about the chart you wish to include can be formulated like the keys in one of those lists, you are lucky. Just append it to the respective list. If not, you have to go deeper into the code.

For PerfStat mode

In `perfstat_mode`, there are three different classes holding search keys. As PerfStat data is pretty unhomogenious, the approach of gaining data about the keys is fundamentally different among the three classes. You find the classes inside the modules `per_iteration_container`, `sysstat_container` and `statit_container`.

per iteration container

The `per_iteration_container` has four key lists (and one additional single key). The lists are about the four different objects 'aggregate', 'processor', 'volume', and 'lun'. If you want an additional chart for one of those objects, just append to the respective list. If you want a chart for similar data, but for a different object, you need to create a new list. Furthermore, you need to append at least to following methods: init (declare an emtpy list for the new chart's table), `process_per_iteration_keys` (call `process_object_type` for your object), `rework_per_iteration_data` (flat your tables if it is not empty), and `get_labels` (append appropriate information to `identifiers`, `units` and `is_histo`). Pay attention that the order in the `flat_tables` list from `rework_per_iteration_data` must be equivalent to the orders of the lists in `get_labels`.

sysstat container

The `sysstat_container` has three key lists. The sysstat blocks in PerfStats are table-like structures; PicDat reads some of the columns. The considered columns are categorized after the units belonging to them. All considered columns having either the unit '%' or 'MB/s' or no unit at all. Each of the three key lists in `sysstat_container` is about one of these three categories. The column names are defined in the keys. Values for the same unit can be visualized in the same chart, so each key list is collecting data for exactly one chart. Some of the keys are tuples. This is because the sysstat table headers are spread over two lines and sometimes several key words are necessary to determine a column. To better understand why the keys have the format they have, just look into a PerfStat's sysstat block. If you want to evaluate more columns from a sysstat block, try if it makes sense to append to one of the existing key lists which will add a graph line to the respective chart. Otherwise, a more extensive adaption of PicDat is necessary.

statit container

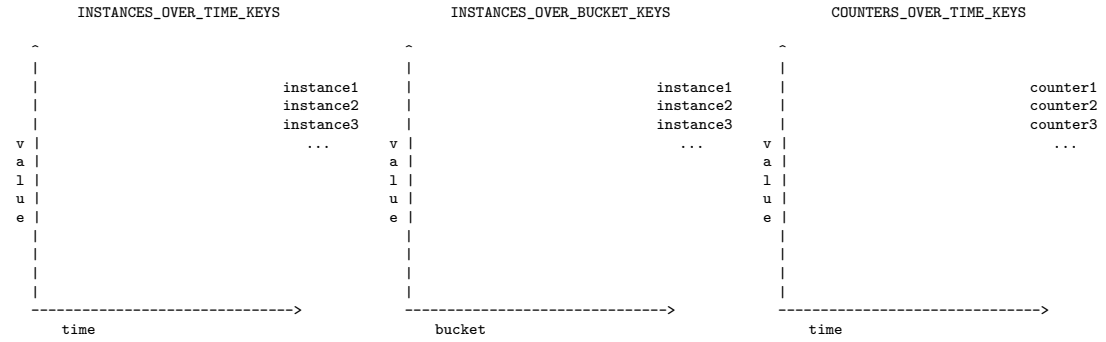
The `statit_container` is responsible for collecting data for a single chart from a specific PerfStat block. This is not really flexible; the container does not even have any kind of key list. So there is no true chance to easily add a new search key to this container.

For ASUP mode

Data from ASUP is much more homogenious than PerfStats, so life is somewhat easier with them. As the package `asup_mode` provides support for two different kinds of input data – XML and JSON – there are two container classes. Their names are, unsurprisingly, `XmlContainer` inside the `xml_container` module and `JsonContainer` inside the `json_container` module. Both modules have again several lists with search keys. Fortunately, the key lists' structures in both modules are exactly the same. Only the content differs a bit. So, the following applies to both container modules.

search keys

The key lists `INSTANCES_OVER_TIME_KEYS`, `INSTANCES_OVER_BUCKET_KEYS`, and `COUNTERS_OVER_TIME_KEYS` are each for a different kind of charts. The difference is about the charts' x-axis and whether the single graph lines in one chart are about different instances or different counters. Again, read the list descriptions inside the code. Additionally, the following drawing might help your imagination:



If one of the lists fits your needs, append your key and your chart will be drawn. Otherwise, you will need to reimplement most of the methods.

When you add keys to the `json_container`, be aware that you probably **also need to change the config.yml for the convert_ccma_to_json script!** Otherwise, PicDat will search for your new objects and counters in your JSON files, but has no chance to find anything, because you didn't ask Trafero to convert this information at all.

Finally, it is to mention, that there is a third container module named `hdf5_container` inside the asup mode package. It is deprecated, but it still works. You can manipulate its keys in the same way as them in the other two asup container modules.

calculate further charts

The general approach of PicDat is to collect and visualise data given in some kind of performance files. But sometimes, it is also helpful to do some math with the collected values before visualising them. For

example, PicDat performs a unit conversion with some charts.

Beyond that, there are other use cases to perform some more complex math. The use case, this section deals with, is if you want a chart which values are not from the original performance data, but can get caluculated from it. As example there is the chart *aggregate: free_space_fragmentation* which represents the quotient *user_writes/cp_reads*. 'free_space_fragmentation' itself is not a counter of ASUP performance files, but 'user_writes' and 'cp_reads' are.

If you want to include such a new, calculated chart, you have to add some code to the method `calculate_further_charts()` in `xml_container` or `json_container`. This code needs to create a new `Table` object, which holds the data for your new chart. It's on you to fill the table with the values you want. `calculate_further_charts()` gets called *after* PicDat searched the performance files, so you can refer to all other tables. The function `table.do_table_operation` might be useful.

In order that PicDat treats your new table, you have to add it to the container's dict `self.tables`. Further, add the applicable unit to `self.units`. In parallel, you need to append the dict key you used for `self.tables` and `self.units` to the list `FURTHER_CHARTS` at the top of the container module. This is important, because outer modules obtain the information, which 'further' charts to create, from this list, analog as they do for each key list. This is also why each element of the `FURTHER_CHARTS` list must observe a specific format: It has to be a tuple of two strings.

There are plenty of code comments for the `FURTHER_CHARTS` list and the `calculate_further_charts()` method. In order to calculate a new chart, follow the example given in `calculate_further_charts()`.