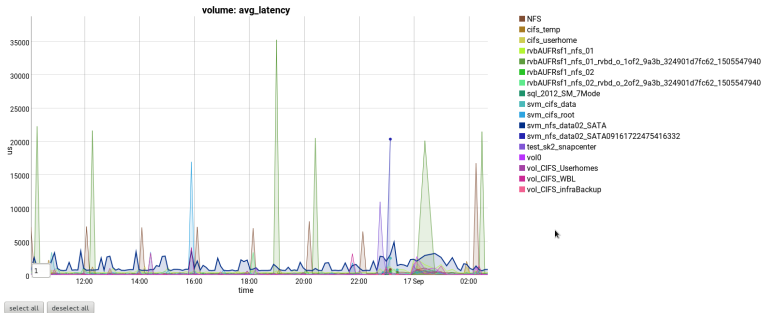


PicDat – Instruction



The aim of PicDat is to provide better insight to performance data from NetApp controllers. The command line tool is able to visualize data from both PerfStat output and ASUP files.

PicDat selects some counters of such files which are typically sufficient for the analysis and writes them to several csv tables. Then it generates a HTML file using a JavaScript library called dygraphs to visualize those tables. Open the HTML in a browser to get your performance charts.

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Can't see any graphs?

Running PicDat

You can run PicDat without any parameters. After you start it, it'll ask you for some performance input. Additionally, PicDat will ask you to enter a directory for its results. Be aware, that content might become overwritten if this directory is not empty. After this, PicDat will start working.

Alternatively, you can pass input and output specifications as command line parameters. Therefore, use the options `--inputfile` and `--outputdir` or `-i` and `-o` respectively.

Run example

This is how a run could look like on your command line:

```
python picdat.py -i"</path/to/input>" -o"</path/to/output>"
2018-03-09 12:00:35,195 INFO: inputfile: </path/to/input>, outputdir: </path/to/output>
2018-03-09 12:00:35,196 INFO: Prepare directory...
2018-03-09 12:00:35,202 INFO: Running PicDat in PerfStat mode
2018-03-09 12:00:35,202 INFO: Did not find a console.log file to extract perfstat's cluster and node name.
2018-03-09 12:00:35,202 INFO: Read data...
2018-03-09 12:00:37,796 INFO: Planned number of iterations was executed correctly.
2018-03-09 12:00:37,798 INFO: Create csv tables...
2018-03-09 12:00:37,799 INFO: Wrote chart values into
    /path/to/output/tables/aggregate_total_transfers_chart_values.csv
2018-03-09 12:00:37,799 INFO: Wrote chart values into
    /path/to/output/tables/processor_processor_busy_chart_values.csv
2018-03-09 12:00:37,799 INFO: Wrote chart values into /path/to/output/tables/volume_read_ops_chart_values.csv
2018-03-09 12:00:37,801 INFO: Wrote chart values into /path/to/output/tables/volume_write_ops_chart_values.csv
2018-03-09 12:00:37,801 INFO: Wrote chart values into /path/to/output/tables/volume_other_ops_chart_values.csv
2018-03-09 12:00:37,801 INFO: Wrote chart values into /path/to/output/tables/volume_total_ops_chart_values.csv
2018-03-09 12:00:37,802 INFO: Wrote chart values into /path/to/output/tables/volume_avg_latency_chart_values.csv
2018-03-09 12:00:37,802 INFO: Wrote chart values into /path/to/output/tables/volume_read_data_chart_values.csv
2018-03-09 12:00:37,802 INFO: Wrote chart values into /path/to/output/tables/volume_write_data_chart_values.csv
2018-03-09 12:00:37,807 INFO: Wrote chart values into /path/to/output/tables/sysstat_1sec_percent_chart_values.csv
2018-03-09 12:00:37,819 INFO: Wrote chart values into /path/to/output/tables/sysstat_1sec_MBs_chart_values.csv
2018-03-09 12:00:37,828 INFO: Wrote chart values into /path/to/output/tables/sysstat_1sec_IOPS_chart_values.csv
2018-03-09 12:00:37,830 INFO: Wrote chart values into
    /path/to/output/tables/statit_disk_statistics_chart_values.csv
2018-03-09 12:00:37,831 INFO: Create html file...
2018-03-09 12:00:37,833 INFO: Generated html file at /path/to/output/charts.html
2018-03-09 12:00:37,843 INFO: Done. You will find charts under: </path/to/output>
```

General usage:

```
picdat [--help] [--sortbyname] [--inputfile "input"] [--outputdir "output"] [--debug "level"] [--logfile]
```

Command line options

Additional to `--inputfile` and `--outputdir`, there are following command line options available:

The `--debug` or `-d` option specifies the filtering level for command line output. Pass it together with a string out of those: `debug`, `info`, `warning`, `error`, `critical`. Default is `info`.

If you want to redirect the command line output into a log file for further analysis, use the flag `--logfile` or `-l`. This will create a `picdat.log` file inside your output directory.

By default, PicDat sorts the most data series by relevance. This means, the graph with the highest sum of values will be displayed at the top of a chart's legend. If you rather wants them to be sorted alphanumeric, use the flag `--sortbyname` or `-s`.

As the security settings from some browsers like Google Chrome or Edge prevent the execution of external JavaScript code, PicDat charts stay empty when you try to open them with those browsers from your file system. As workaround, PicDat provides the flag `--webserver` or `-w`. This will start a simple local HTTP server at the end of PicDat's execution. With this, you should be able to view the charts from `http://localhost:8000`. You will need to terminate the server after you're done.

To get an overview about all command line option, try option `--help` or `-h`.

Input format – PerfStat mode

As mentioned, PicDat can handle different kinds of performance data.

If you want to visualize **PerfStat data**, you have following options: Either you can pass single PerfStat data files (they have to end with **.data** or **.out**) or you can pass a **directory**, containing such files. Furthermore, you can pass a **.zip** file containing PerfStat output. If you transmit a single file, be aware, that some meta data which are usually packed together with PerfStats, will not be readable. If you transmit several PerfStats (within a directory or zip), PicDat will generate **one HTML** with charts **for each PerfStat**.

Input format – ASUP mode

ASUP XML data is usually packed in tar files with file extension **.tgz**. You can pass them as input in a whole. It is also possible to transmit the unpacked tars, i.e. a **directory**. There is nothing as a single file transmission available, because PicDat needs at least two files, a CM-STATS-HOURLY-INFO.XML and a CM-STATS-HOURLY-DATA.XML file for its analysis.

Working with ASUPs, it might be useful to visualize data for several consecutive ASUP files together. To do so, just pack **several ASUP .tgz archives into one directory** and pass the directory to PicDat. Therefore, the alphabetical order of the archive names should go with the chronological order. PicDat will stick the results for the different data files together. This means, different from visualizing PerfStats, only **one HTML for all data** will be generated. So don't mess around and pack ASUP files into one folder, which don't belong together! Don't mix nodes.

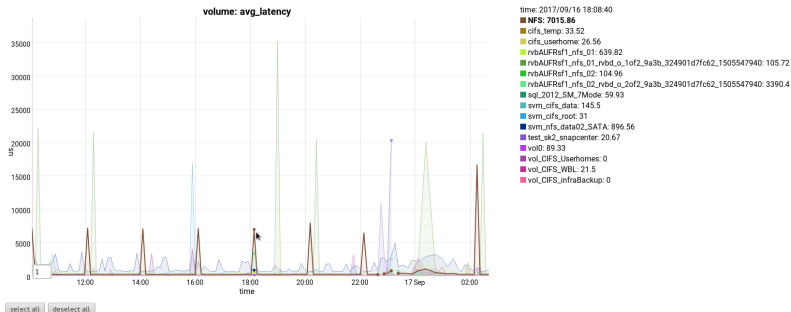
Input format – ASUP mode

After os version ontap 9.1, ASUPs don't provide performance data in XML format anymore. Instead, there are files with a ccma file extension. Luckily, you can transform them into JSON. Therefore, PicDat provides another mode: **ASUP JSON**. To use this mode, give PicDat either a single **.json** file as input or a **directory with JSON files inside**. If you give several JSONs, make sure they all belong to the same cluster and node! Besides this, it doesn't matter a lot how the information is splitted over the several files. As each JSON object contains all necessary information about a value, PicDat will read one after another without caring about their order.

Before switching to JSON, PicDat tried to deal with performance data which was converted from ccma to HDF5. As the HDF5 files don't contain essential information, there is no use for the **ASUP HDF5** mode anymore. It is fully replaced by the JSON mode. But, technically, it still works, so it is mentioned here. To use it, give PicDat a single **.h5** file as input; something like directory or archive transmission is not possible. PicDat will create **one HTML** per input file.

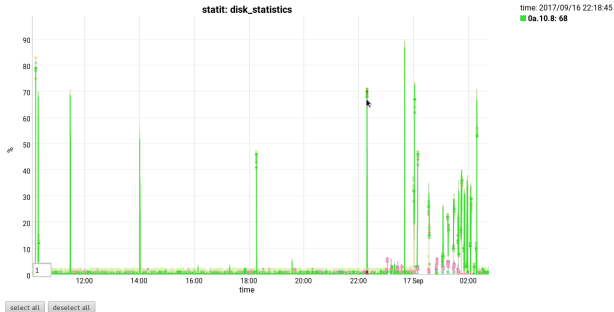
Interactive charts – legend

The Job of PicDat is to pick and visualize some of the various information given with the input. The charts.html files contain multiple labeled charts offering some interaction. They are arranged in several Tabs.



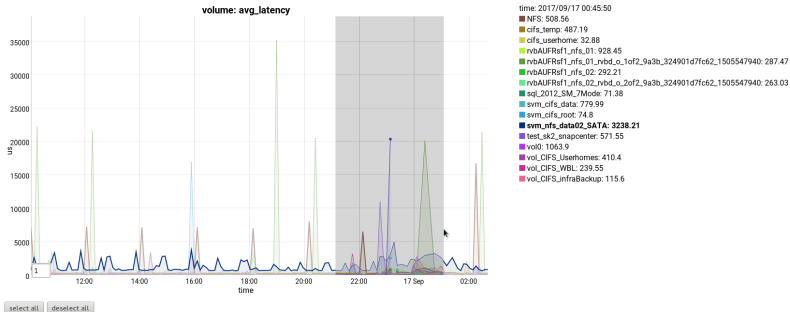
Mouse-over the charts to display the values in the legend. You'll notice as well, that the graph, your cursor is next to, will be highlighted. The corresponding entry in the legend will be highlighted simultaneously.

Interactive charts – legend



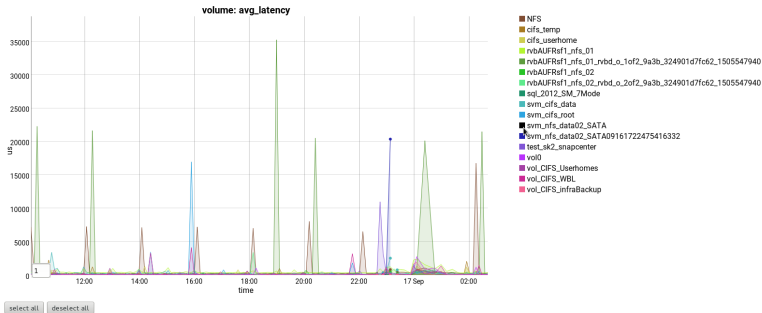
If there are so many graphs in one chart that the legend can't display them all without a scroll bar, the legend will change to display only one value at once as soon as your mouse enters the chart.

Interactive charts – zoom



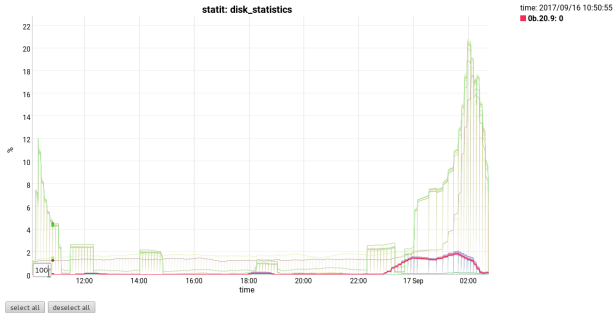
To zoom inside the charts, just click and drag them in x or y direction. Once zoomed in, you can also change the displayed range by holding shift and click and drag again. To go back into original view, just double-click the chart.

Interactive charts – select and deselect



You might wish to take some graph lines out of view. Therefore, click one of the colored boxes inside the legend. It'll turn to black and the corresponding graph will disappear from sight. Click it again and the graph will come back. To select or deselect all lines at once, use the buttons beneath the chart. Note, that disabled graphs disappear from the legend whereas your cursor is on the chart. Entries, belonging to graphs with a gap at the place your cursor recently is, will disappear as well. So don't be confused if the legend will bounce a bit as you move your mouse.

Interactive charts – rolling average



If your values are very close and unsteady, you might get a better overview using a rolling average. Therefore, type a natural number into the small textfield appearing at the lower left corner of most charts. After hitting 'enter', the data will get averaged over this number of measuring points.

Can't see any graphs?

If PicDat seems to ran correctly, but all charts inside the charts.html are empty, see whether one of the following applies:

If you are running the charts.html from your file system, the browsers Chrome and Internet Explorer/Edge will block external files for security reasons. So, the dygraph.js can't be loaded. As workaround, PicDat provides the command line option `--webserver`, which will start a local web server (See 'Command line options'). Alternatively, use Firefox instead or try to change security settings.

If this is not the problem, make sure that dygraphs is available at all. A folder called 'dygraphs', containing the dygraph.js and dygraph.css, must be in the same location as your charts.html file. Of course, a folder called 'tables' which contains all chart data within csv tables must be available too.