NAME

rrdgraph_examples – Examples for rrdtool graph

SYNOPSIS

rrdtool graph /home/httpd/html/test.png −−imgformat PNG

followed by any of the examples below

DESCRIPTION

For your convenience some of the commands are explained here by using detailed examples. They are not always cut-and-paste ready because comments are intermixed with the examples.

EXAMPLES

Data with multiple resolutions

```
−−end now −−start end−120000s −−width 400
DEF:ds0a=/home/rrdtool/data/router1.rrd:ds0:AVERAGE
DEF:ds0b=/home/rrdtool/data/router1.rrd:ds0:AVERAGE:step=1800
DEF:ds0c=/home/rrdtool/data/router1.rrd:ds0:AVERAGE:step=7200
LINE1:ds0a#0000FF:"default resolution\l"
LINE1:ds0b#00CCFF:"resolution 1800 seconds per interval\l"
LINE1:ds0c#FF00FF:"resolution 7200 seconds per interval\l"
```

Nicely formatted legend section

```
DEF:ds0=/home/rrdtool/data/router1.rrd:ds0:AVERAGE
DEF:ds1=/home/rrdtool/data/router1.rrd:ds1:AVERAGE
VDEF:ds0max=ds0,MAXIMUM
VDEF:ds0avg=ds0,AVERAGE
VDEF:ds0min=ds0,MINIMUM
VDEF:ds0pct=ds0,95,PERCENT
VDEF:ds1max=ds1,MAXIMUM
VDEF:ds1avg=ds1,AVERAGE
VDEF:ds1min=ds1,MINIMUM
VDEF:ds1pct=ds1,95,PERCENT
```

Note: consolidation occurs here.

```
CDEF:ds0bits=ds0,8,*
CDEF:ds1bits=ds1,8,*
```

Note: 10 spaces to move text to the right

```
COMMENT:"          "
```

Note: the column titles have to be as wide as the columns

```
COMMENT:"Maximum    "
COMMENT:"Average    "
COMMENT:"Minimum    "

COMMENT:"95th percentile\l"
AREA:ds0bits#00C000:"Inbound "
GPRINT:ds0max:"%6.2lf %Sbps"
GPRINT:ds0avg:"%6.2lf %Sbps"
GPRINT:ds0min:"%6.2lf %Sbps"
GPRINT:ds0pct:"%6.2lf %Sbps\l"
LINE1:ds1bits#0000FF:"Outbound"
GPRINT:ds1max:"%6.2lf %Sbps"
GPRINT:ds1avg:"%6.2lf %Sbps"
GPRINT:ds1min:"%6.2lf %Sbps"
GPRINT:ds1pct:"%6.2lf %Sbps\l"
```

Offsetting a line on the y−axis

Depending on your needs you can do this in two ways:

- Offset the data, then graph this

    ```
    DEF:mydata=my.rrd:ds:AVERAGE
    ```

    Note: this will also influence any other command that uses ''data''

    ```
    CDEF:data=mydata,100,+
    LINE1:data#FF0000:"Data with offset"
    ```

- Graph the original data, with an offset

    ```
    DEF:mydata=my.rrd:ds:AVERAGE
    ```

    Note: no color in the first line so it is not visible

    ```
    LINE1:100
    ```

    Note: the second line gets stacked on top of the first one

    ```
    LINE1:mydata#FF0000:"Data with offset":STACK
    ```

Drawing dashed lines

Also works for HRULE and VRULE

- default style: − − − − −

    ```
    LINE1:data#FF0000:"dashed line":dashes
    ```

- more fancy style with offset: − − −−− − −−− −

    ```
    LINE1:data#FF0000:"another dashed line":dashes=15,5,5,10:dash−offset=10
    ```

Time ranges

```
Last four weeks: −−start end−4w −−end 00:00
January 2001:    −−start 20010101 −−end start+31d
January 2001:    −−start 20010101 −−end 20010201
Last hour:       −−start end−1h
Last 24 hours:   <nothing at all>
Yesterday:       −−end 00:00
```

Viewing the current and previous week together

```
−−end now −−start end−1w
DEF:thisweek=router.rrd:ds0:AVERAGE
DEF:lastweek=router.rrd:ds0:AVERAGE:end=now−1w:start=end−1w
```

Shift the data forward by one week (604800 seconds)

```
SHIFT:lastweek:604800
[ more of the usual VDEF and CDEF stuff if you like ]
AREA:lastweek#0000FF:Last\ week
LINE1:thisweek#FF0000:This\ week
```

Aberrant Behaviour Detection

If the specialized function **RRAs** exist for aberrant behavior detection, they can be used to generate the graph of a time series with confidence bands and failures.

```
rrdtool graph example.png \
        DEF:obs=monitor.rrd:ifOutOctets:AVERAGE \
        DEF:pred=monitor.rrd:ifOutOctets:HWPREDICT \
        DEF:dev=monitor.rrd:ifOutOctets:DEVPREDICT \
        DEF:fail=monitor.rrd:ifOutOctets:FAILURES \
        TICK:fail#ffffa0:1.0:"Failures\: Average bits out" \
        CDEF:scaledobs=obs,8,* \
        CDEF:upper=pred,dev,2,*,+ \
        CDEF:lower=pred,dev,2,*,- \
        CDEF:scaledupper=upper,8,* \
        CDEF:scaledlower=lower,8,* \
        LINE2:scaledobs#0000ff:"Average bits out" \
        LINE1:scaledupper#ff0000:"Upper Confidence Bound: Average bits out" \
        LINE1:scaledlower#ff0000:"Lower Confidence Bound: Average bits out"
```

This example generates a graph of the data series in blue (LINE2 with the scaledobs virtual data source), confidence bounds in red (scaledupper and scaledlower virtual data sources), and potential failures (i.e. potential aberrant behavior) marked by vertical yellow lines (the fail data source).

The raw data comes from an AVERAGE **RRA**, the finest resolution of the observed time series (one consolidated data point per primary data point). The predicted (or smoothed) values are stored in the HWPREDICT **RRA**. The predicted deviations (think standard deviation) values are stored in the DEVPREDICT **RRA**. Finally, the FAILURES **RRA** contains indicators, with 1 denoting a potential failure.

All of the data is rescaled to bits (instead of Octets) by multiplying by 8. The confidence bounds are computed by an offset of 2 deviations both above and below the predicted values (the CDEFs upper and lower). Vertical lines indicated potential failures are graphed via the TICK graph element, which converts non-zero values in an **RRA** into tick marks. Here an axis-fraction argument of 1.0 means the tick marks span the entire y−axis, and hence become vertical lines on the graph.

The choice of 2 deviations (a scaling factor) matches the default used internally by the FAILURES **RRA**. If the internal value is changed (see rrdtune), this graphing command should be changed to be consistent.

A note on data reduction:

The **rrdtool** *graph* command is designed to plot data at a specified temporal resolution, regardless of the actually resolution of the data in the RRD file. This can present a problem for the specialized consolidation functions which maintain a one-to-one mapping between primary data points and consolidated data points. If a graph insists on viewing the contents of these **RRAs** on a coarser temporal scale, the *graph* command tries to do something intelligent, but the confidence bands and failures no longer have the same meaning and may be misleading.

SEE ALSO

rrdgraph gives an overview of how **rrdtool graph** works. rrdgraph_data describes **DEF**,**CDEF** and **VDEF** in detail. rrdgraph_rpn describes the **RPN** language used in the **xDEF** statements. rrdgraph_graph page describes all the graph and print functions.

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