repoze.debug Documentation

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CHAPTER 1

Using the repoze.debug Response Logger

The repoze.debug response logger allows the developer to record information about each request / response pair, and to analyze that information to identify parts of the application which are performing badly.

This support comes as two separate components:

- The *responselogger Middleware* performs the actual logging of request / response data.
- The *wsgirequestprofiler script* console script generates various reports using those logs.

1.1 responselogger Middleware

The responslogger middleware creates two logs: the *Verbose logger* and the *Trace logger*.

The verbose log is human-readable.

The trace log is meant to be processed by the *wsgirequestprofiler script* (included).

1.1.1 Configuration via Python

To wire up the middleware in your application in imperative Python code:

```
from repoze.debug.responselogger import ResponseLoggingMiddleware
from logging import getLogger
middleware = ResponseLoggingMiddleware(
               app,
               max_bodylen=3072,
               keep=100,
               verbose_logger=getLogger('foo'),
               trace_logger=getLogger('bar'),
              )
```

The configuration options are as follows:

- max_bodylen should be the max size in bytes of the response body that should be logged.
- keep is the number of request entries to keep around in memory to service the *Debug UI*.
- verbose_logger is a PEP 282 logger instance (any).
- trace_logger is a PEP 282 logger instance (any).

1.1.2 Configuration via Paste

Wire the middleware into a pipeline in your Paste configuration, for example:

```
[filter:responselogger]
use = egg:repoze.debug#responselogger
verbose_log = %(here)s/response.log
trace_log = %(here)s/trace.log
# if max_bodylen is unset or is 0, it means do not limit body logging
# default is 3KB
max_bodylen = 3KB
# if max_logsize is unset or is 0, it means do not limit logsize; default is
# 100MB
max_logsize = 100MB
# if backup_count is 0, do not rotate the logfile.  Default is 10.
backup_count = 10
# "keep" is the the number of entries to keep around to show in the
# GUI. If keep is 0, no entries are kept (keeping entries around
# to show in the UI may be a security issue, as access to the GUI
# isn't authenticated)
keep = 100
...

[pipeline:main]
pipeline = egg:Paste#cgitb
           responselogger
           myapp
```

The middleware will log verbose response data to `response.log` and will log trace data to `trace.log`.

1.2 Viewing Request / Response Data

1.2.1 Verbose logger

Once the middleware is in the pipeline, it will log human-readable information about requests and responses to the verbose logger. For example, the logged information for a request might be:

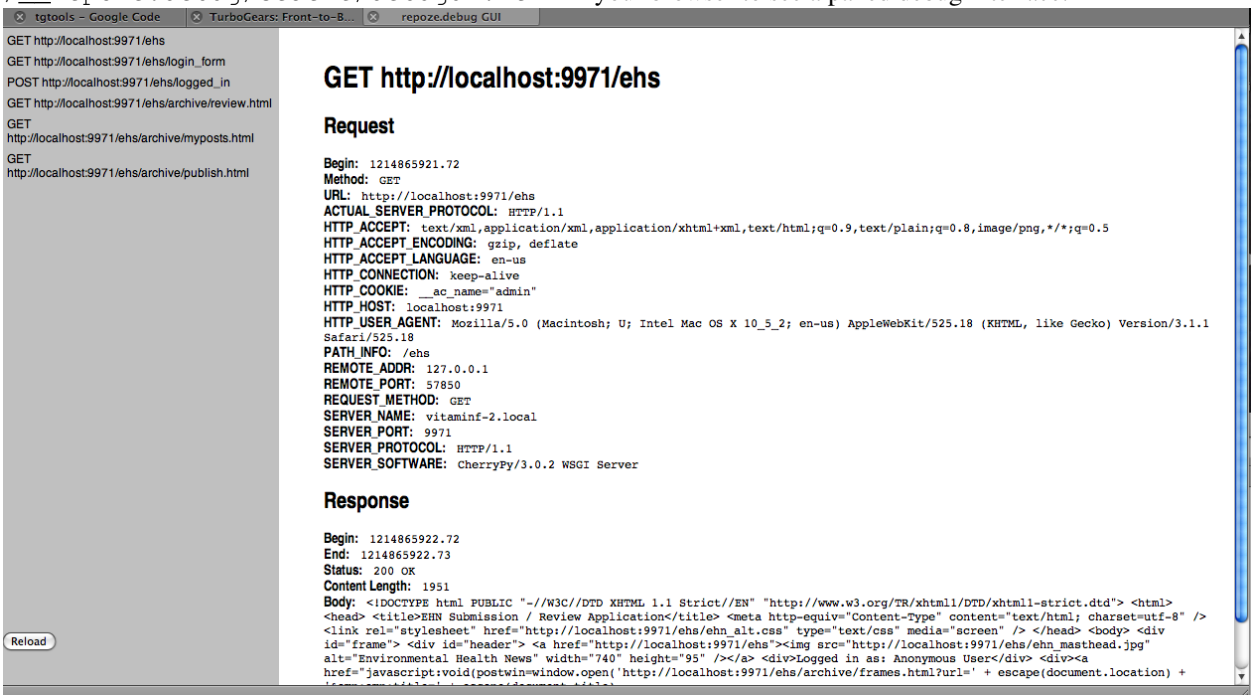
```
--- begin REQUEST for 5930704 at Mon Jun 30 13:37:51 2008 ---
URL: GET http://127.0.0.1:9971/favicon.ico
CGI Variables
  ACTUAL_SERVER_PROTOCOL: HTTP/1.1
  HTTP_ACCEPT: */*
  HTTP_HOST: 127.0.0.1:9971
  HTTP_USER_AGENT: ApacheBench/2.0.40-dev
  PATH_INFO: /favicon.ico
  REMOTE_ADDR: 127.0.0.1
  REMOTE_PORT: 56527
  REQUEST_METHOD: GET
  SERVER_NAME: vitaminf-2.local
  SERVER_PORT: 9971
  SERVER_PROTOCOL: HTTP/1.0
  SERVER_SOFTWARE: CherryPy/3.0.2 WSGI Server
WSGI Variables
  application: <paste.httpexceptions.HTTPExceptionHandler object at 0x17c4b10>
  wsgi process: Multithreaded
--- end REQUEST for 5930704 ---
```

Each request is tagged with a (random) identifier. A response is also written to the verbose log, and can be matched up to the request that generated it via the identifier. If `max_bodylen` is specified and is nonzero, only the leading bytes of the body up to `max_bodylen` are logged, otherwise the entire body is logged. Here's an example of a response in the log:

```
--- begin RESPONSE for 5930704 at Mon Jun 30 13:37:51 2008 ---
URL: GET http://127.0.0.1:9971/favicon.ico
Status: 200 OK
Response Headers
  Accept-Ranges: bytes
  Content-Length: 112
  Content-Type: application/octet-stream
  Last-Modified: Thu, 29 May 2008 23:47:57 GMT
Body:
^@^@^A^@^F^@^P^P^@^@^A^@ ^@h^D^@^@f^@^@^@^P^P^@^@^A^@^H^@h^E^@^@<CE>^D^@^@
^@^@^A^@ ^@<A8>^P^@^@6
Bodylen: 112
--- end RESPONSE for 5930704 (0.03 seconds) ---
```

1.2.2 Debug UI

If your application pipline includes the `repoze.debug` responselogger middleware, you can vist the path `/__repoze.debug/static/debugui.html` in your browser to see a paned debug interface:



This page shows recent requests and responses, up to as many request/response pairs are kept around as specified by the `keep` value in the middleware configuration.

1.3 Analyzing the Log Data

1.3.1 Trace logger

The trace logger logs detailed debugging information about WSGI requests and responses. This logging can be turned on while the server is in production. It can then be postprocessed to help locate troublesome application code.

The format of a log message is:

```
{code} {pid} {request id} {time} {data}
```

Where:

```
{code} is B for begin, A for received output from the application,
E for finished sending output to the client.  A special code
exists, U, that is not really tied to any particular request.  It
is written to the log upon the first request after the server
is started.

{request id} is a unique request id.

{time} is the local time as seconds past the epoch.

{data} is the HTTP method and the URL for B, the HTTP status code
and the value of the content-length header for A, the actual
content length for E, and nothing for U.
```

For example:

```
U 91978 5930704 1214847471.97
B 91978 5930704 1214847471.97 GET http://127.0.0.1:9971/favicon.ico
B 91978 17963168 1214847471.97 GET http://127.0.0.1:9971/favicon.ico
A 91978 17963168 1214847471.99 200 112
A 91978 5930704 1214847471.99 200 112
E 91978 17963168 1214847471.99 112
E 91978 5930704 1214847471.99 112
B 91978 18022448 1214847472.0 GET http://127.0.0.1:9971/favicon.ico
A 91978 18022448 1214847472.01 200 112
B 91978 48634016 1214847472.01 GET http://127.0.0.1:9971/favicon.ico
E 91978 18022448 1214847472.01 112
B 91978 7805232 1214847472.01 GET http://127.0.0.1:9971/favicon.ico
A 91978 48634016 1214847472.01 200 112
E 91978 48634016 1214847472.01 112
A 91978 7805232 1214847472.02 200 112
E 91978 7805232 1214847472.02 112
```

This information is meant to be parsed with the included `wsgirequestprofiler` console script to help in debugging hangs or requests that take "too long". Run the `wsgirequestprofiler` script with the –help flag for more information.

1.3.2 wsgirequestprofiler script

Usage:

```
$ bin/wsgirequestprofiler filename1 [filename2 ...]
       [--cumulative | --detailed | [--timed --resolution=seconds]]
       [--sort=spec]
```

```
        [--top=n]
        [--verbose]
        [--today | [--start=date] [--end=date] | --daysago=n ]
        [--writestats=filename | --readstats=filename]
        [--urlfocus=url]
        [--urlfocustime=seconds]
        [--help]
```

Provides a profile of one or more repoze.debug "trace" log files. Note that this script is a port of the Zope2 `requestprofiler` script (written originally in 2001!)

Reports are of four types: `cumulative`, `detailed`, `timed`, or `urlfocus`. By default, the script produces a `cumulative` report. Data is taken from one or more *Trace logger* files, or from a preprocessed statistics file.

For `cumulative` reports, each line in the profile indicates information about a URL collected via a detailed request log.

For `detailed` reports, each line in the profile indicates information about a single request.

For `timed` reports, each line in the profile indicates information about the number of requests and the number of requests/second for a period of time.

For `urlfocus` reports, the report contains ad-hoc information about requests which precede or follow requests for specified URL.

Each `filename` is a path to a trace log that contains detailed request data. Multiple input files can be analyzed at the same time by providing the path to each file. Analyzing multiple trace log files at once is useful if you have more than one machine running your application and you'd like to get an overview of all logs on those machines.

If you wish to make multiple analysis runs against the same input data, you may want to use the `--writestats` option. The `--writestats` option creates a file which holds preprocessed data representing the specfified input files. Running subsequent reports (for example with different sort specs) will be much faster using the `--readstats` option with that saved file, rather than re-parsing the log files.

If a `sort` value is specified, sort the profile info by the spec. The sort order is descending unless indicated. The default cumulative sort spec is `total`. The default detailed sort spec is `start`.

`cumulative` reports understand following sort specs:

`hits` the number of hits against the method

`hangs` the number of unfinished requests to the method

`max` the maximum time in secs taken by a request to this method

`min` the minimum time in secs taken by a request to this method

`mean` the mean time in secs taken by a request to this method

`median` the median time in secs taken by a request to this method

`total` the total time in secs across all requests to this method

`url` the URL/method name (ascending)

detailed (non-cumulative) reports understand the following sort specs:

`start` the start time of the request to repoze.debug (ascending)

`win` the num of secs repoze.debug spent waiting for input

`wout` the secs repoze.debug spent waiting for output from app

`wend` the secs repoze.debug spent sending data to server

`total` the secs taken for the request from begin to end

endstage the last successfully completed request stage (B, I, A, E)

osize the size in bytes of output provided by repoze.debug

httpcode the HTTP response code provided by the app (ascending)

active total num of requests pending at the end of this request

url the URL (ascending)

timed and *urlfocus* reports do not allow any sort specs.

The `top` option restricts the report to the top `n` entries in the profile (as per the sort). By default, each report shows all data in the profile.

The `verbose` argument prevents the report from trimming URLs to fit into 80 columns.

The `today` argument limit results to hits received today.

The `daysago` argument limits results to hits received since `n` days ago.

The `resolution` argument is used only for timed reports: it specifies the number of seconds between consecutive lines in the report. The default value is 60 seconds.

The `urlfocustime` argument is used only for urlfocus reports: it specifies the number of seconds to target before and after the URL provided in urlfocus mode. The default value is 10 seconds.

The `start` argument limits results to hits received after the specified date/time, given in the form `DD/MM/YYYY HH:MM:SS` (local time)

The `end` argument limits results to hits received before the specified date/time, given in the form 'DD/MM/YYYY HH:MM:SS' (local time),

The `start` and `end` arguments are not honored when request statistics are obtained via the `--readstats` argument.

1.3.3 wsgirequestprofiler Examples

Show cumulative report statistics for information in the file 'debug.log', by default sorted by 'total':

```
$ bin/wsgirequestprofiler debug.log
```

Show detailed report statistics sorted by 'start' (by default):

```
$ bin/wsgirequestprofiler debug.log --detailed
```

Show detailed report statistics for both logs sorted by 'start' (by default):

```
$ bin/wsgirequestprofiler debug.log debug2.log --detailed
```

Show cumulative report statistics sorted by mean for entries in the log which happened today; do not trim the URL in the resulting report:

```
$ bin/wsgirequestprofiler debug.log \
  --cumulative --sort=mean --today --verbose
```

Show cumulative report statistics, sorted by mean, for entries in the log which happened three days ago; do not trim the URL in the resulting report:

```
$ bin/wsgirequestprofiler debug.log \
  --cumulative --sort=mean --daysago=3 --verbose
```

Show a `urlfocus` report which displays statistics about requests surrounding the invocation of `/manage_main`. Focus on the time periods 60 seconds before and after each invocation of the `/manage_main` URL:

```
$ bin/wsgirequestprofiler debug.log \
  --urlfocus='/manage_main' --urlfocustime=60
```

Show detailed report statistics for entries in `debug.log` which begin after 6am local time on May 10, 2001 and which end before 11pm local time on May 11, 2001:

```
$ bin/wsgirequestprofiler debug.log \
  --detailed --start='2001/05/10 06:00:00' --end='2001/05/11 23:00:00'
```

Show timed report statistics for entries in the log for one day, using a resolution of 5 minutes:

```
$ bin/wsgirequestprofiler debug.log \
  --timed --resolution=300 --start='2001/05/10 06:00:00'
  --end='2001/05/11 23:00:00'
```

Show cumulative report of the the `top` 100 methods sorted by maximum elapsed time:

```
$ bin/wsgirequestprofiler debug.log --top=100 --sort=max
```

Write a stats file for debug.log and debug2.log into `requests.stat` and show the default report:

```
$ bin/wsgirequestprofiler debug.log debug2.log --writestats='requests.stat'
```

Read from the `requests.stat` stats file (instead of actual log files) and show the detailed report against this data:

```
$ bin/wsgirequestprofiler --readstats='requests.stat' --detailed
```

1.3.4 Sample wsgirequestprofiler output

Sample output from `wsgirequestprofiler trace.log`:

```
Hangs  Hits     Total   Max    Min    Med  Mean URL
    0   848     88.58  2.14   0.02   0.10  0.10 http://127.0.0.1:9971/ehs
    0   737     73.24  1.45   0.02   0.10  0.10 http://127.0.0.1:9971/ehs/login_f
    0     2     13.83 12.41   1.42   6.92  6.92 http://localhost:9971/ehs/archive
    0     1      0.55  0.55   0.55   0.55  0.55 http://localhost:9971/ehs/archive
    0     1      0.49  0.49   0.49   0.49  0.49 http://localhost:9971/ehs/archive
    0     1      0.29  0.29   0.29   0.29  0.29 http://localhost:9971/ehs
    0     1      0.19  0.19   0.19   0.19  0.19 http://localhost:9971/ehs/archive
    0     1      0.13  0.13   0.13   0.13  0.13 http://localhost:9971/ehs/archive
    0     1      0.06  0.06   0.06   0.06  0.06 http://localhost:9971/ehs/archive
    0     1      0.06  0.06   0.06   0.06  0.06 http://localhost:9971/ehs/archive
    0     1      0.02  0.02   0.02   0.02  0.02 http://localhost:9971/empty.css
    0     1      0.01  0.01   0.01   0.01  0.01 http://localhost:9971/ehs/archive
    0     1      0.01  0.01   0.01   0.01  0.01 http://localhost:9971/ehs/ehn_alt
```

CHAPTER 2

repoze.debug canary middleware

The canary middleware is middleware helps figure out if your application is leaking WSGI environment dictionary objects.

2.1 Configuration via Python

Wire up the middleware in your application:

```
from repoze.debug.canary import CanaryMiddleware
middleware = CanaryMiddleware(app)
```

2.2 Configuration via Paste

Wire the canary middleware up into your pipeline:

```
[pipeline:main]
pipeline = egg:Paste#cgitb
           egg:repoze.debug#canary
           myapp
```

2.3 Usage

If refcounts to repoze.debug.canary.Canary grow without bound, you know you are leaking WSGI environment dictionaries. Use e.g. Dozer to find the reference leaks.

CHAPTER 3

repoze.debug pdbpm middleware

If installed in the WSGI pipeline, the pdbpm middleware monitors your application for uncaught exceptions: when one occurs, it drops your (foregrounded) server process into the pdb post-mortem debugger to allow you to debug the error.

3.1 Configuration via Python

Wire up the middleware in your application:

```
from repoze.debug.pdbpm import PostMortemDebug
middleware = PostMortemDebug(app)
```

3.2 Configuration via Paste

Use the 'egg:repoze.debug#pdbpm' entry point in your Paste configuration, e.g.:

```
[pipeline:main]
pipeline = egg:Paste#cgitb
           egg:repoze.debug#pdbpm
           myapp
```

3.3 Ignored Exceptions

By default, the pdbpm middleware ignores exceptions from the paste.httpexceptions package. To disable this feature, configure the middlware using the ignore_http_exceptions flag (set to False).

CHAPTER 4

repoze.debug threads middleware

The threads middleware, when put into the pipeline, allows you to visit a /debug_threads URL, which provides a plaintext report representing the state of each currently running thread in the process. This is useful for debugging deadlocks. The threads middleware uses code from the Deadlock Debugger package by Florent Guillame.

4.1 Configuration via Python

Wire up the middleware in your application:

```
from repoze.debug.threads import MonitoringMiddleware
middleware = MonitoringMiddleware(app)
```

4.2 Configuration via Paste

Use the 'egg:repoze.debug#threads' entry point in your Paste configuration, e.g.:

```
[pipeline:main]
pipeline = egg:Paste#cgitb
           egg:repoze.debug#threads
           myapp
```

The middleware accepts no configuration parameters.

CHAPTER 5

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