



debugging kamailio.cfg

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KAMAILIO WORLD

CONFERENCE & EXHIBITION

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KAMAILIO.CFG

```
#!/KAMAILIO

debug=2
log_stderror=yes
listen=udp:127.0.0.1

loadmodule "rr.so"
loadmodule "sl.so"
loadmodule "pv.so"
loadmodule "textops.so"
loadmodule "siputils.so"

modparam("rr", "append_fromtag", 1)

# load modules
request_route {
    route(WITHINDLG);
    if(is_method("INVITE")) {
        $du = "sip:127.0.0.1:9";
        record_route();
        forward();
        exit;
    }
    sl_send_reply("403", "Not allowed");
    exit;
}

route[WITHINDLG] {
    if(!has_totag()) return;
    if(loose_route()) {
        forward();
        exit;
    }
    sl_send_reply("404", "Not here");
    exit;
}
```

- ⦿ comments
- ⦿ preprocessor directive
- ⦿ core parameters
- ⦿ custom core parameters
- ⦿ load modules
- ⦿ module parameters
- ⦿ routing blocks
 - ➔ *expressions*
 - ➔ *conditions*
 - ➔ *actions*
 - ➔ *control statements*
 - ➔ *subroutes*

- core
- xlog module
- kex module
- debugger module
- cfgutils module
- benchmark module
- external tools



CORE

◎ **debug** - printing level threshold

- -5 (alert)
- -4 (bug)
- -3 (critical - no prefix)
- -2 (critical)
- -1 (error)
- 0 (warning)
- 1 (notice)
- 2 (info)
- 3 (debug)

```
debug=2
```

can be set via `-d` command line parameter

```
/usr/sbin/kamailio -ddd ...
```

CORE

- ◎ **log_stderr** - output selection
 - yes - print log messages to terminal
 - no - print log messages to syslog
- ◎ **log_facility** - syslog facility selection
 - LOG_LOCAL0, LOG_LOCAL1, ...
 - allows diverting log messages from Kamailio to dedicated file
- ◎ **log_name** - name of the application for syslog
 - “kamailio-proxy”, “kamailio-lb”

LATENCY TRACKING

- ◎ **latency_log** - log level for latency messages
 - -5...3 (alert ... debug)
- ◎ **latency_limit_action**
 - log actions that take longer to execute (duration in milliseconds)
 - 500 - log message for each action taking longer than 500ms
- ◎ **latency_limit_db**
 - log database queries that take longer to execute
 - 300 - log message for each db query taking longer than 300ms
- ◎ **latency_cfg_log**
 - log level for printing how long it takes to execute request_route or reply_route

LOG MESSAGE PREFIX

◎ **log_prefix**

- a text with variables that will be used as prefix to all log messages while processing sip traffic
- `log_prefix="{ $mt $hdr(CSeq) $ci} "`

◎ **log_prefix_mode**

- control when the **log_prefix** is evaluated
- 0 - when a sip message is received
- 1 - for each action in configuration file (useful if you want to print configuration file line for the action)

COMMAND LINE PARAMETERS

kamailio -h

- ◎ **-d** - control the value of **debug** core parameter
 - `-dd <=> debug=2`
- ◎ **-E** - print to standard error
 - to terminal, not to syslog file
 - equivalent to `log_stderr=yes`
- ◎ **-e** - enable colours for log levels
 - nice when printing to terminal
 - error messages are red, info messages are light blue, etc...
- ◎ **-D** - daemonize mode
 - `-D` (don't fork); `-DD` (don't daemonize parent); `-DDD` (fork)
- ◎ **-A** - define a token from command line
 - `-A WITH_DEBUG -A WITH_MYSQL -A WITH_AUTH`
- ◎ **-c** - check configuration file for syntax errors

XLOG

- print log messages from configuration file
 - `xlog("request $rm received from $si\n")`
- options to control:
 - syslog facility
 - log message prefix
 - colours for log levels
- exports variables to set background and foreground colours
 - `xerr("time $C(bx)[$Tf]$C(xx) method ($rm) r-uri ($ru)\n");`
- set of functions with method filtering
- generic log functions with level parameter and dedicated functions for various log levels

XLOG

```
if(is_method("INVITE") && !has_totag()) {  
    xlog("L_INFO", "new call received from $si ($fu => $ru)\n");  
}
```

KEX MODULE

- **setdebug(level)**
 - set the log level inside routing blocks
 - `setlog("2")` - log level set to INFO
 - the parameter can be a variable
- **resetdebug()**
 - set back the log level to the value of **debug** core parameter

KEX MODULE

- **rpc commands**

- print global statistics
- print pkg statistics
- print memory statistics per module

```
kamcmd stats.get_statistics all
```

```
kamcmd pkg.stats
```

```
kamcmd mod.stats core all
```

```
kamcmd mod.stats userblacklist shm
```

```
kamcmd mod.stats kex pkg
```

```
kamcmd mod.stats all all
```

DEBUGGER MODULE

- ◎ **interactive debugging**

- interact with Kamailio via **kamcmd** tool
- the **ctl** and **cfg_rpc modules** are required as well

- ◎ **hints**

- set children=1
- avoid it in production

```
loadmodule "debugger.so"  
modparam("debugger", "breakpoint", 1)
```

```
kamcmd> dbg.bp show 6402  
at bkp [/etc/kamailio/debugger.cfg:369] a=6 n=route
```

```
kamcmd> dbg.bp next 6402  
exec [/etc/kamailio/debugger.cfg:369] a=6 n=route
```

```
kamcmd> dbg.bp next 6402  
exec [/etc/kamailio/debugger.cfg:462] a=17 n=if
```

```
kamcmd> dbg.bp eval 6402 $fu  
$fu : t=str v=sip:test@kamailio.org
```

```
kamcmd> dbg.bp move 6402  
200 ok
```

DEBUGGER MODULE

- **configuration file execution trace**

- log message for each action executed in configuration file
- useful to analyze what is executed for a specific SIP message

```
loadmodule "debugger.so"  
modparam("debugger", "cfgtrace", 1)
```

- **features**

- control log level
- control prefix
- control syslog facility
- enable/disable at runtime

```
9(6285) ERROR: *** cfgtrace: c=[/etc/kamailio/debugger.cfg] l=501 a=17 n=if  
9(6285) ERROR: *** cfgtrace: c=[/etc/kamailio/debugger.cfg] l=470 a=25 n=has_totag  
9(6285) ERROR: *** cfgtrace: c=[/etc/kamailio/debugger.cfg] l=386 a=17 n=if  
9(6285) ERROR: *** cfgtrace: c=[/etc/kamailio/debugger.cfg] l=379 a=26 n=is_method  
9(6285) ERROR: *** cfgtrace: c=[/etc/kamailio/debugger.cfg] l=386 a=25 n=t_check_trans  
9(6285) ERROR: *** cfgtrace: c=[/etc/kamailio/debugger.cfg] l=389 a=6 n=route  
9(6285) ERROR: *** cfgtrace: c=[/etc/kamailio/debugger.cfg] l=643 a=3 n=return  
9(6285) ERROR: *** cfgtrace: c=[/etc/kamailio/debugger.cfg] l=393 a=26 n=remove_hf
```

DEBUGGER MODULE

- ◎ **per module-component log level**
 - set a specific log for core or modules
 - can be changed at runtime via rpc commands

```
loadmodule "debugger.so"
```

```
modparam("debugger", "mod_hash_size", 5)  
modparam("debugger", "mod_level_mode", 1)  
modparam("debugger", "mod_level", "core=3")  
modparam("debugger", "mod_level", "tm=3")  
modparam("debugger", "mod_facility_mode", 1)  
modparam("debugger", "mod_facility", "core=LOG_LOCAL0")  
modparam("debugger", "mod_facility", "debugger=LOG_LOCAL1")
```


DEBUGGER MODULE

- ◎ **memory checks for actions**
 - discover buffer overflows
- ◎ **log assign operations**
 - print details about assign operations
 - track the values involved in the expressions
- ◎ **print the values for pseudo-variables**
 - print details about the variables used in configuration file
- ◎ **print the outgoing sip message**
 - how it would look if it would be sent at that moment
- ◎ **interact with cfgt module**
 - unit testing framework for configuration file

CFGUTILS MODULE

- **abort()**
 - crash kamailio with core dump file
- **pkg_status() and pkg_summary()**
 - log details about the usage of pkg memory
- **shm_status() and shm_summary()**
 - log details about the usage of shm memory

BENCHMARK MODULE

- **bm_start_timer(name)**
 - start measuring the duration of execution
- **bm_log_timer(name)**
 - stop measuring the duration of execution and write to syslog
- **\$BM_time_diff**
 - the time difference between `bm_start_timer()` and `bm_log_timer()`

```
bm_start_timer("auth");  
if (!auth_check("$fd", "subscriber", "1")) {  
    bm_log_timer("auth");  
    auth_challenge("$fd", "0");  
    exit;  
}  
bm_log_timer("auth");
```

EXTERNAL TOOLS

- ◎ **route_graph**
 - ascii graph of routing blocks relations
- ◎ **gdb**
 - gnu debugger
- ◎ **sip cli tools**
 - sipsak, sipp, protoshoot, pjsua, baresip
- ◎ **network traffic sniffers**
 - wireshark, ngrep, sngrep, sipgrep, sipcapture



TIME FOR SOME PRACTICAL EXAMPLES



LINKS AND RESOURCES

www.kamailio.org

www.kamailio.org/w/documentation

www.kamailio.org/wiki

www.kamailio.org/wiki/cookbooks/devel/core

www.kamailio.org/wiki/cookbooks/devel/pseudovariables

www.kamailio.org/docs/modules/stable/modules/xlog.html

www.kamailio.org/docs/modules/stable/modules/debugger.html

www.kamailio.org/docs/modules/stable/modules/kex.html

www.kamailio.org/docs/modules/stable/modules/cfgutils.html

www.kamailio.org/docs/modules/stable/modules/benchmark.html

THANK YOU!!!

QUESTIONS?

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