KAMAILIO WORLD
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KAMAILIO

KAMAILIO CONFIGURATION OPTIMIZATIONS

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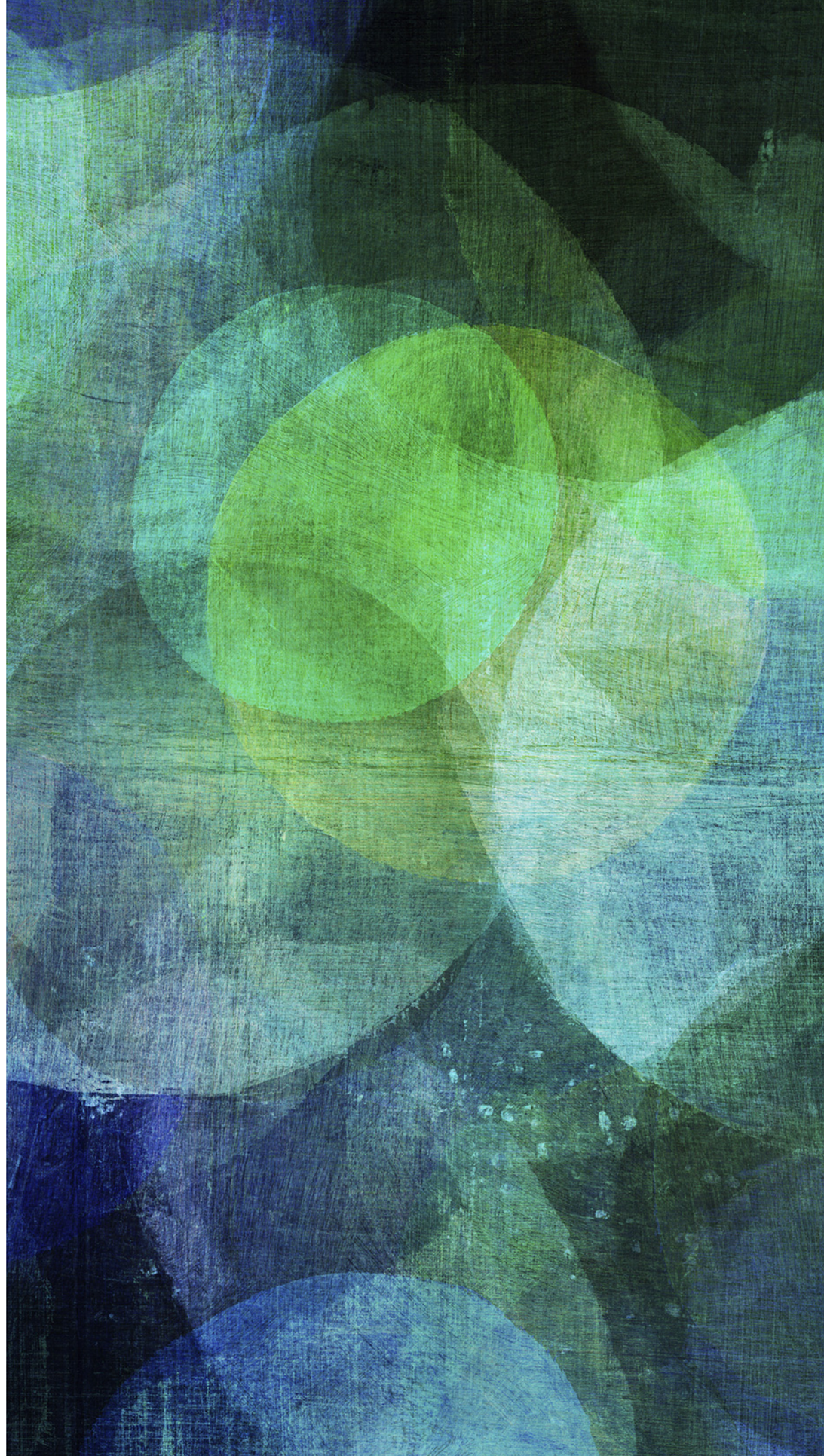
KAMAILIO

LATENCY

what is slowing down



CORE LATENCY PARAMETERS

- latency_cfg_log - print execution time for root request or response route blocks
- latency_limit_action - set the limit in milliseconds for execution time of actions and if exceeded, then log the duration
- latency_limit_db - set the limit in milliseconds for execution time of database queries and if exceeded, then log the duration
- latency_log - the log level for printing latency limit log messages

BENCHMARK MODULE

- track the duration of executing parts of configuration file
  - report the minimum, maximum and the average
- your choice of what part to be measured
- can measure many parts at the same time

```
...
bm_start_timer("usrloc-lookup");
lookup("location");
bm_log_timer("usrloc-lookup");
...
```

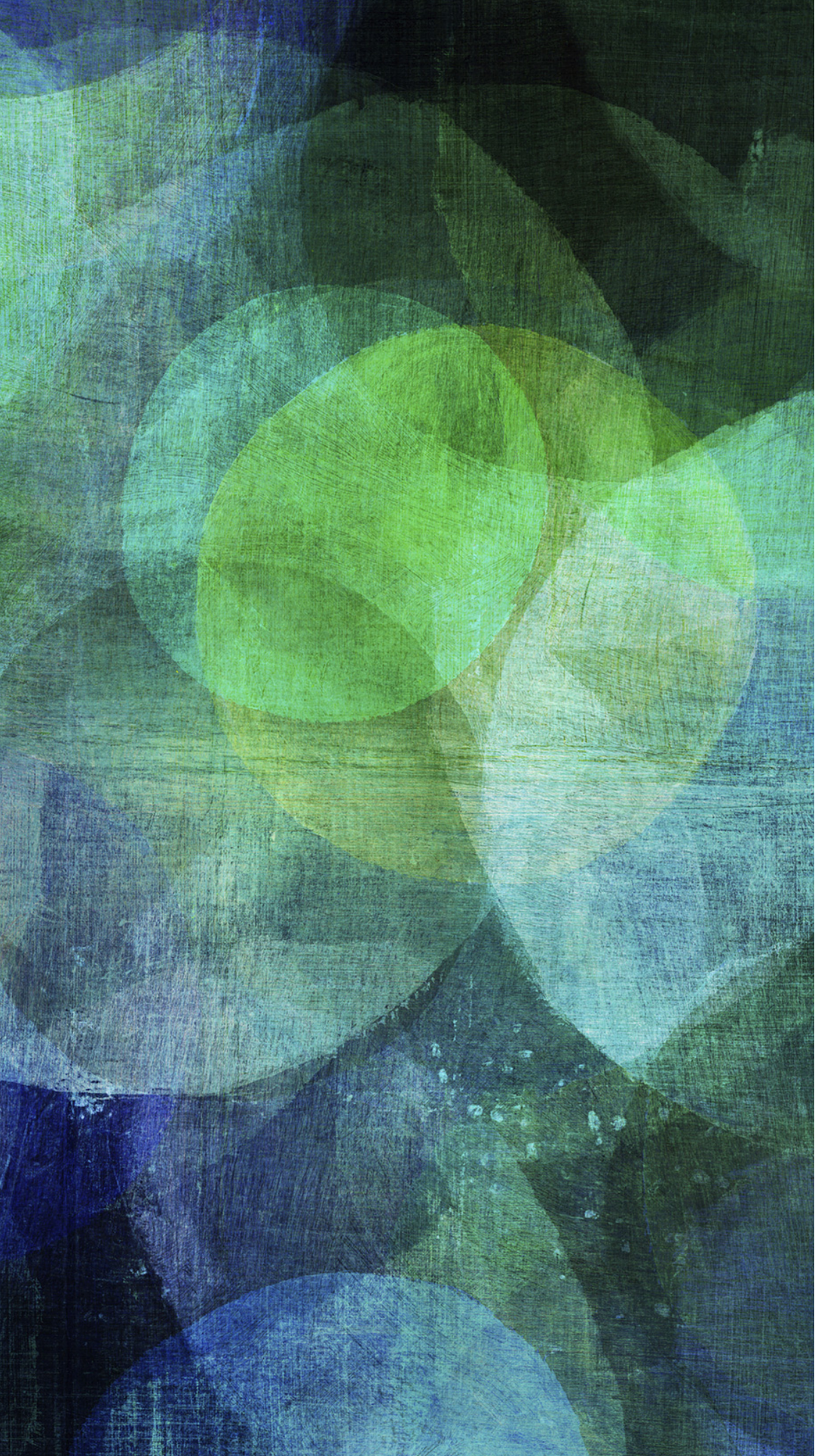
https://www.kamailio.org/docs/modules/stable/modules/benchmark.html

SYSLOG IN ASYNCHRONOUS MODE

- it is slowing down a lot otherwise
- direct logs from kamailio to a dedicated file via log facility

```
...
#
# don't log messages with LOG_LOCAL0 in /var/log/syslog anymore
*.*;auth,authpriv.none,local0.none              -/var/log/syslog

#
# log messages with LOG_LOCAL0 in /var/log/kamailio.log
local0.*                          -/var/log/kamailio.log
...
```

https://www.kamailio.org/wiki/tutorials/3.2.x/syslog



KAMAILIO

CACHING

speed up data access

“

Cache = Cash

- Stefan Wintermeyer

former VoIP enthusiast

a quote from the web world

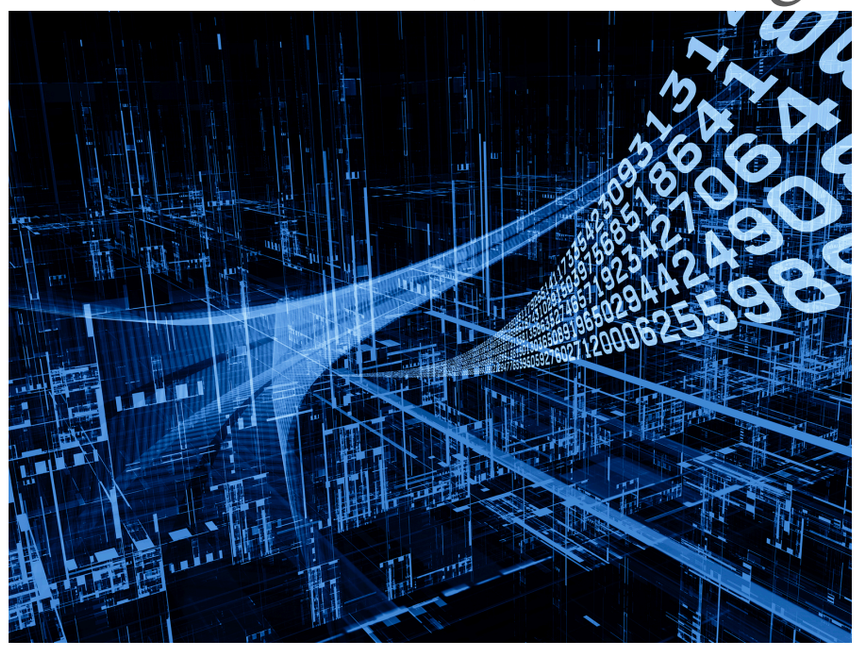
MODULES WITH DATABASE ACCESS ONLY

- auth_db - use authentication
- alias_db - global aliases
- group - group membership management
- speed_dial - short dialing

- sqlops - generic sql operations
- avpops - per user attribute value pairs

DATABASE LEVEL OPTIMIZATIONS

- indexes and unique keys - optimize based on your custom queries from provisioning portals or sqlops from kamailio.cfg
- keep only required records - move old or unused records, such as accounting records or inactive users
- declare table in memory - set the limit in milliseconds for execution time of database queries and if exceeded, then log the duration
- local and remote database servers

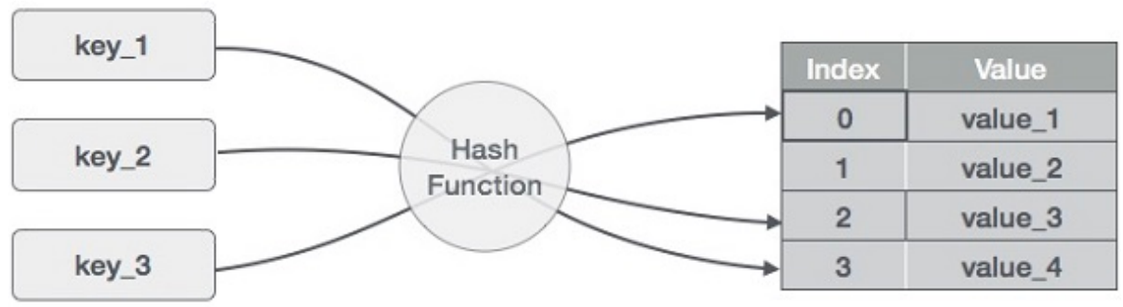


HTABLE MODULE

- (key, value) items stored in shared memory
- many hash tables at the same time
- auto-expire for items
- count items by matching name or value

```
...
modparam("htable", "htable", "a=>size=4;autoexpire=7200;dbtable=htable_a;")
modparam("htable", "htable", "b=>size=5;")
modparam("htable", "htable", "c=>size=4;autoexpire=7200;initval=1;dmqreplicate=1;")
...
```

```
...
event_route[htable:mod-init] {
    $sht(a=>x) = 1;
}
...
```

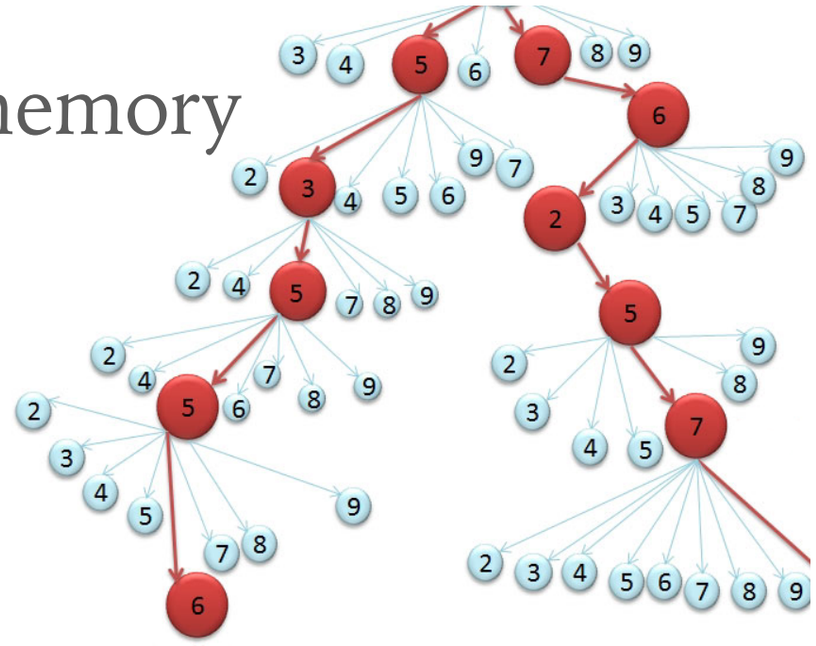


AUTH WITH CACHING

```
# authentication with password caching using htable

modparam("htable", "htable", "auth=>size=10;autoexpire=300;")
modparam("auth_db", "load_credentials", "$avp(password)=password")

route[AUTHCACHE] {
    if($sht(auth=>$au::passwd)!=$null) {
        if (!pv_auth_check("$fd", "$sht(auth=>$au::passwd)", "0", "1")) {
            auth_challenge("$fd", “1”);
            exit;
        }
    } else {
        # authenticate requests
        if (!auth_check("$fd", "subscriber", "1")) {
            auth_challenge("$fd", "0");
            exit;
        }
        $sht(auth=>$au::passwd) = $avp(password);
    }
    # user authenticated - remove auth header
    if(!is_method("REGISTER|PUBLISH"))
        consume_credentials();

}
```

MTREE MODULE

- in memory tree structure
- (prefix, value) items stored in shared memory
- optimized for DID/prefix matching
- best with a limited set of characters



```
...
modparam("mtree", "mtree", "name=mytree1;dbtable=routes1;type=0")
modparam("mtree", "mtree", "name=mytree2;dbtable=routes2;type=0;multi=1")
modparam("mtree", "mtree",
    "name=mytree1;dbtable=routes1;cols='key1,val1,val2,val3'")
...
```

```
...
mt_match("mytree", "$rU", "0");
...
```

NDB_REDIS MODULE

- well established APIs
- share between many kamailio instances
- redis cluster for distribution
- easy to access from other applications

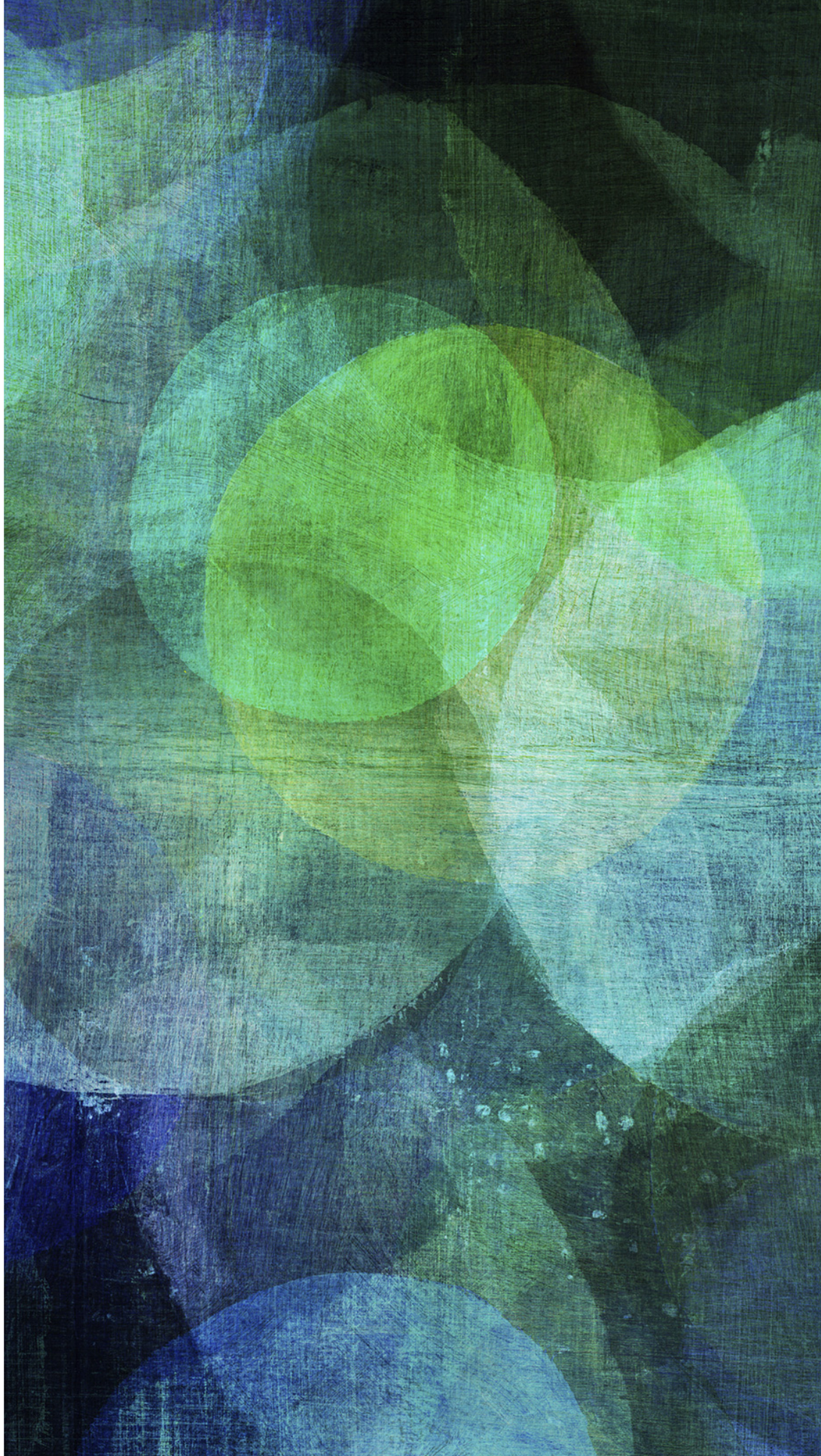

```
...
modparam("ndb_redis", "server", "name=srvN;addr=127.0.0.1;port=6379;db=1")
modparam("ndb_redis", "server", "name=srvX;addr=127.0.0.2;port=6379;db=4;pass=mypassword")

# Unix domain socket
modparam("ndb_redis", "server", "name=srvY;unix=/tmp/redis.sock;db=3")
...
```

```
...
if(redis_cmd("srvN", "INCR cnt", "r")) {
    # success - the incremented value is in $redis(r=>value)
    xlog("===== $redis(r=>type) * $redis(r=>value)\n");
}

# set a value
redis_cmd("srvN", "SET foo bar", "r");
```

KAMAILIO

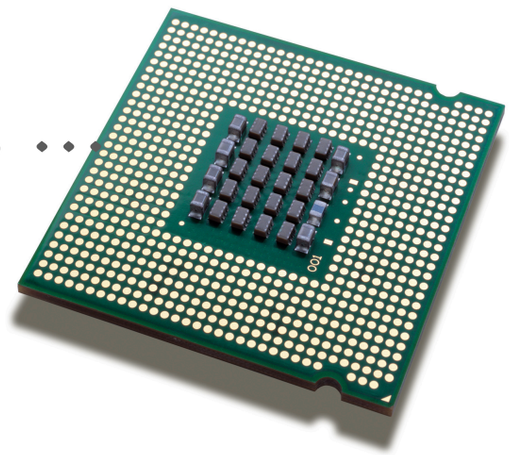
ROUTING CONFIG

execution rules



CORE PARAMETERS – WORKERS

- sip worker processes
  - children - UDP receivers
  - tcp_children - TCP/TLS receivers (HTTP/S, WebSocket)
  - sctp_children - SCTP receivers
  - socket_workers - per socket worker processes
- asynchronous worker processes
  - async_workers - modules: async, db_mysql, …



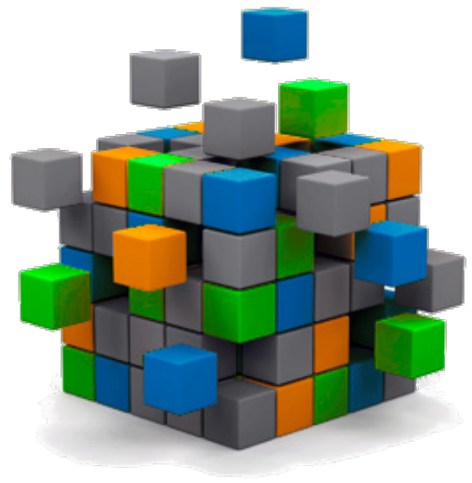
MEMORY MANAGEMENT

- command line parameters
  - -x - shared memory manager (qm, fm or tlsf)
  - -X - private memory manager
  - -m & -M - shared and private memory pools size
- core parameters
  - memlog
  - memdbg
  - mem_join
  - mem_safety

MODULE SETTINGS

- internal hash sizes
  - htable
  - usrloc
  - dialog

```
...
modparam("usrloc", "hash_size", 12)
...
```

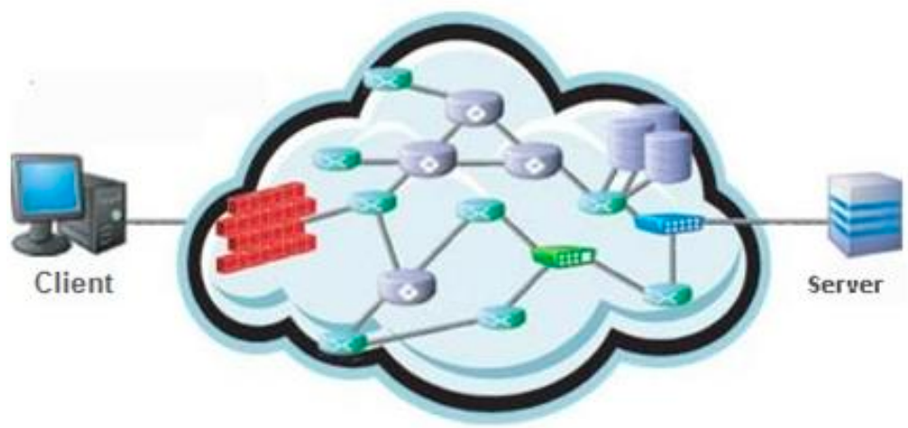


- timers
  - use of timers from core or create dedicated ones
  - e.g., usrloc - nathelper

```
...
modparam("usrloc", "timer_procs", 4)
...
```

ROUTING LOGIC

- early detections of attacks
- early detections of “garbage traffic”
  - keepalives
- early detection of retransmissions
  - t_precheck_trans()

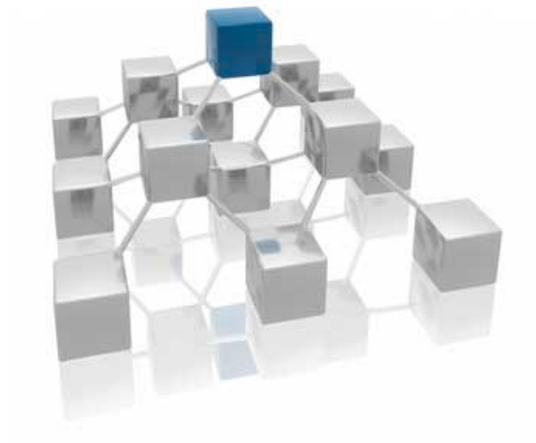



```
473         # handle retransmissions
474         if (!is_method("ACK")) {
475                 if(t_precheck_trans()) {
476                         t_check_trans();
477                         exit;
478                 }
479                 t_check_trans();
480         }
481
482         # handle requests within SIP dialogs
483         route(WITHINDLG);
```

- authentication and authorization
  - before any expensive database or DNS operations

MODULES

- delegate execution to another process
  - mqueue
  - + rtimer
  - async



- delegate execution to another application
  - evapi
  - http_async_client, jsonrpcc
  - rabbitmq, nsq
  - *rtjson*

MQUEUE + RTIMER

```
# do SQL insert from a rtimer module

# message queue definition
modparam("mqueue", "mqueue", "name=sql")

# timer interval set to 100 mili-seconds
modparam("rtimer", "timer", "name=tsql;interval=100000u;mode=1;")
modparam("rtimer", "exec", "timer=tsql;route=FROMQUEUE")

# sql connection definition
modparam("sqlops","sqlcon","csql=>mysql://kamailio:xyz@localhost/kamailio")
```

```
# to be executed for an initial INVITE request from request_route { … }
route[TOQUEUE] {
    mq_add("sql", "$fU", "INSERT INTO call_activity('caller', 'callee',"
            " 'call_time') VALUES ('$fU', '$rU', $Ts)");
}

# to be executed by the rtimer process
route[FROMQUEUE] {
    while(mq_fetch("sql")) {
        xdbg("$mqk(sql) - $mqv(sql)\n");
        sql_query("csql", "$mqv(sql)");
    }
}
```


flowroute
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sip:wise
Fraunhofer
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Thank you!

Questions?

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