

HAProxy
Configuration Manual
version 1.4.19

Willy Tarreau

2012/01/08

Contents

Contents	i
Preface	1
1 Quick reminder about HTTP	5
1.1 The HTTP transaction model	5
1.2 HTTP request	6
1.2.1 The Request line	7
1.2.2 The request headers	8
1.3 HTTP response	9
1.3.1 The Response line	9
1.3.2 The response headers	10
2 Configuring HAProxy	11
2.1 Configuration file format	11
2.2 Time format	11
2.3 Examples	12
3 Global parameters	14
3.1 Process management and security	15
3.2 Performance tuning	18
3.3 Debugging	21
3.4 Userlists	21
4 Proxies	23
4.1 Proxy keywords matrix	24
4.2 Alphabetically sorted keywords reference	27
5 Server and default-server options	135
6 HTTP header manipulation	142

7	Using ACLs and pattern extraction	145
7.1	Matching integers	146
7.2	Matching strings	147
7.3	Matching regular expressions (regexes)	148
7.4	Matching IPv4 addresses	148
7.5	Available matching criteria	148
7.5.1	Matching at Layer 4 and below	148
7.5.2	Matching contents at Layer 4	152
7.5.3	Matching at Layer 7	154
7.6	Pre-defined ACLs	158
7.7	Using ACLs to form conditions	159
7.8	Pattern extraction	161
8	Logging	163
8.1	Log levels	164
8.2	Log formats	164
8.2.1	Default log format	165
8.2.2	TCP log format	166
8.2.3	HTTP log format	169
8.3	Advanced logging options	175
8.3.1	Disabling logging of external tests	175
8.3.2	Logging before waiting for the session to terminate	175
8.3.3	Raising log level upon errors	176
8.3.4	Disabling logging of successful connections	176
8.4	Timing events	176
8.5	Session state at disconnection	179
8.6	Non-printable characters	186
8.7	Capturing HTTP cookies	187
8.8	Capturing HTTP headers	187
8.9	Examples of logs	189
9	Statistics and monitoring	191
9.1	CSV format	191
9.2	Unix Socket commands	193

Preface

Summary

HAProxy
Configuration Manual

version 1.4.19
willy tarreau
2012/01/08

This document covers the configuration language as implemented in the version specified above. It does not provide any hint, example or advice. For such documentation, please refer to the Reference Manual or the Architecture Manual. The summary below is meant to help you search sections by name and navigate through the document.

Note to documentation contributors :

This document is formatted with 80 columns per line, with even number of spaces for indentation and without tabs. Please follow these rules strictly so that it remains easily printable everywhere. If a line needs to be printed verbatim and does not fit, please end each line with a backslash ('\') and continue on next line. If you add sections, please update the summary below for easier searching.

Summary

- 1. Quick reminder about HTTP
 - 1.1. The HTTP transaction model
 - 1.2. HTTP request
 - 1.2.1. The Request line
 - 1.2.2. The request headers
 - 1.3. HTTP response
 - 1.3.1. The Response line
 - 1.3.2. The response headers

- 2. Configuring HAProxy
 - 2.1. Configuration file format
 - 2.2. Time format
 - 2.3. Examples
- 3. Global parameters
 - 3.1. Process management and security
 - 3.2. Performance tuning
 - 3.3. Debugging
 - 3.4. Userlists
- 4. Proxies
 - 4.1. Proxy keywords matrix
 - 4.2. Alphabetically sorted keywords reference
- 5. Server and default-server options
- 6. HTTP header manipulation
- 7. Using ACLs and pattern extraction
 - 7.1. Matching integers
 - 7.2. Matching strings
 - 7.3. Matching regular expressions (regexes)
 - 7.4. Matching IPv4 addresses
 - 7.5. Available matching criteria
 - 7.5.1. Matching at Layer 4 and below
 - 7.5.2. Matching contents at Layer 4
 - 7.5.3. Matching at Layer 7
 - 7.6. Pre-defined ACLs
 - 7.7. Using ACLs to form conditions
 - 7.8. Pattern extraction
- 8. Logging
 - 8.1. Log levels
 - 8.2. Log formats
 - 8.2.1. Default log format
 - 8.2.2. TCP log format
 - 8.2.3. HTTP log format
 - 8.3. Advanced logging options
 - 8.3.1. Disabling logging of external tests
 - 8.3.2. Logging before waiting for the session to terminate
 - 8.3.3. Raising log level upon errors
 - 8.3.4. Disabling logging of successful connections
 - 8.4. Timing events
 - 8.5. Session state at disconnection

- 8.6. Non-printable characters
- 8.7. Capturing HTTP cookies
- 8.8. Capturing HTTP headers
- 8.9. Examples of logs

- 9. Statistics and monitoring
 - 9.1. CSV format
 - 9.2. Unix Socket commands

Chapter 1

Quick reminder about HTTP

When haproxy is running in HTTP mode, both the request and the response are fully analyzed and indexed, thus it becomes possible to build matching criteria on almost anything found in the contents.

However, it is important to understand how HTTP requests and responses are formed, and how HAProxy decomposes them. It will then become easier to write correct rules and to debug existing configurations.

1.1 The HTTP transaction model

The HTTP protocol is transaction-driven. This means that each request will lead to one and only one response. Traditionally, a TCP connection is established from the client to the server, a request is sent by the client on the connection, the server responds and the connection is closed. A new request will involve a new connection :

```
[CON1] [REQ1] ... [RESP1] [CLO1] [CON2] [REQ2] ... [RESP2] [CLO2] ...
```

In this mode, called the "HTTP close" mode, there are as many connection establishments as there are HTTP transactions. Since the connection is closed by the server after the response, the client does not need to know the content length.

Due to the transactional nature of the protocol, it was possible to improve it

to avoid closing a connection between two subsequent transactions. In this mode however, it is mandatory that the server indicates the content length for each response so that the client does not wait indefinitely. For this, a special header is used: "Content-length". This mode is called the "keep-alive" mode :

```
[CON] [REQ1] ... [RESP1] [REQ2] ... [RESP2] [CLO] ...
```

Its advantages are a reduced latency between transactions, and less processing power required on the server side. It is generally better than the close mode, but not always because the clients often limit their concurrent connections to a smaller value.

A last improvement in the communications is the pipelining mode. It still uses keep-alive, but the client does not wait for the first response to send the second request. This is useful for fetching large number of images composing a page :

```
[CON] [REQ1] [REQ2] ... [RESP1] [RESP2] [CLO] ...
```

This can obviously have a tremendous benefit on performance because the network latency is eliminated between subsequent requests. Many HTTP agents do not correctly support pipelining since there is no way to associate a response with the corresponding request in HTTP. For this reason, it is mandatory for the server to reply in the exact same order as the requests were received.

By default HAProxy operates in a tunnel-like mode with regards to persistent connections: for each connection it processes the first request and forwards everything else (including additional requests) to selected server. Once established, the connection is persisted both on the client and server sides. Use "option http-server-close" to preserve client persistent connections while handling every incoming request individually, dispatching them one after another to servers, in HTTP close mode. Use "option httpclose" to switch both sides to HTTP close mode. "option forceclose" and "option http-pretend-keepalive" help working around servers misbehaving in HTTP close mode.

1.2 HTTP request

First, let's consider this HTTP request :

Line number	Contents
----------------	----------

```
1  GET /serv/login.php?lang=en&profile=2 HTTP/1.1
2  Host: www.mydomain.com
3  User-agent: my small browser
4  Accept: image/jpeg, image/gif
5  Accept: image/png
```

1.2.1 The Request line

Line 1 is the "request line". It is always composed of 3 fields :

```
- a METHOD      : GET
- a URI        : /serv/login.php?lang=en&profile=2
- a version tag : HTTP/1.1
```

All of them are delimited by what the standard calls LWS (linear white spaces), which are commonly spaces, but can also be tabs or line feeds/carriage returns followed by spaces/tabs. The method itself cannot contain any colon (':') and is limited to alphabetic letters. All those various combinations make it desirable that HAProxy performs the splitting itself rather than leaving it to the user to write a complex or inaccurate regular expression.

The URI itself can have several forms :

- A "relative URI" :

```
/serv/login.php?lang=en&profile=2
```

It is a complete URL without the host part. This is generally what is received by servers, reverse proxies and transparent proxies.

- An "absolute URI", also called a "URL" :

```
http://192.168.0.12:8080/serv/login.php?lang=en&profile=2
```

It is composed of a "scheme" (the protocol name followed by '://'), a host name or address, optionally a colon (':') followed by a port number, then a relative URI beginning at the first slash ('/') after the address part. This is generally what proxies receive, but a server supporting HTTP/1.1 must accept this form too.

- a star ('*') : this form is only accepted in association with the OPTIONS method and is not relayable. It is used to inquiry a next hop's capabilities.

- an address:port combination : 192.168.0.12:80
This is used with the CONNECT method, which is used to establish TCP tunnels through HTTP proxies, generally for HTTPS, but sometimes for other protocols too.

In a relative URI, two sub-parts are identified. The part before the question mark is called the "path". It is typically the relative path to static objects on the server. The part after the question mark is called the "query string". It is mostly used with GET requests sent to dynamic scripts and is very specific to the language, framework or application in use.

1.2.2 The request headers

The headers start at the second line. They are composed of a name at the beginning of the line, immediately followed by a colon (':'). Traditionally, an LWS is added after the colon but that's not required. Then come the values. Multiple identical headers may be folded into one single line, delimiting the values with commas, provided that their order is respected. This is commonly encountered in the "Cookie:" field. A header may span over multiple lines if the subsequent lines begin with an LWS. In the example in 1.2, lines 4 and 5 define a total of 3 values for the "Accept:" header.

Contrary to a common mis-conception, header names are not case-sensitive, and their values are not either if they refer to other header names (such as the "Connection:" header).

The end of the headers is indicated by the first empty line. People often say that it's a double line feed, which is not exact, even if a double line feed is one valid form of empty line.

Fortunately, HAProxy takes care of all these complex combinations when indexing headers, checking values and counting them, so there is no reason to worry about the way they could be written, but it is important not to accuse an application of being buggy if it does unusual, valid things.

Important note:

As suggested by RFC2616, HAProxy normalizes headers by replacing line breaks in the middle of headers by LWS in order to join multi-line headers. This is necessary for proper analysis and helps less capable HTTP parsers to work correctly and not to be fooled by such complex constructs.

1.3 HTTP response

An HTTP response looks very much like an HTTP request. Both are called HTTP messages. Let's consider this HTTP response :

Line number	Contents
1	HTTP/1.1 200 OK
2	Content-length: 350
3	Content-Type: text/html

As a special case, HTTP supports so called "Informational responses" as status codes 1xx. These messages are special in that they don't convey any part of the response, they're just used as sort of a signaling message to ask a client to continue to post its request for instance. In the case of a status 100 response the requested information will be carried by the next non-100 response message following the informational one. This implies that multiple responses may be sent to a single request, and that this only works when keep-alive is enabled (1xx messages are HTTP/1.1 only). HAProxy handles these messages and is able to correctly forward and skip them, and only process the next non-100 response. As such, these messages are neither logged nor transformed, unless explicitly state otherwise. Status 101 messages indicate that the protocol is changing over the same connection and that haproxy must switch to tunnel mode, just as if a CONNECT had occurred. Then the Upgrade header would contain additional information about the type of protocol the connection is switching to.

1.3.1 The Response line

Line 1 is the "response line". It is always composed of 3 fields :

- a version tag : HTTP/1.1
- a status code : 200
- a reason : OK

The status code is always 3-digit. The first digit indicates a general status :

- 1xx = informational message to be skipped (eg: 100, 101)
- 2xx = OK, content is following (eg: 200, 206)
- 3xx = OK, no content following (eg: 302, 304)
- 4xx = error caused by the client (eg: 401, 403, 404)
- 5xx = error caused by the server (eg: 500, 502, 503)

Please refer to RFC2616 for the detailed meaning of all such codes. The

"reason" field is just a hint, but is not parsed by clients. Anything can be found there, but it's a common practice to respect the well-established messages. It can be composed of one or multiple words, such as "OK", "Found", or "Authentication Required".

Haproxy may emit the following status codes by itself :

Code	When / reason
200	access to stats page, and when replying to monitoring requests
301	when performing a redirection, depending on the configured code
302	when performing a redirection, depending on the configured code
303	when performing a redirection, depending on the configured code
400	for an invalid or too large request
401	when an authentication is required to perform the action (when accessing the stats page)
403	when a request is forbidden by a "block" ACL or "reqdeny" filter
408	when the request timeout strikes before the request is complete
500	when haproxy encounters an unrecoverable internal error, such as a memory allocation failure, which should never happen
502	when the server returns an empty, invalid or incomplete response, or when an "rspdeny" filter blocks the response.
503	when no server was available to handle the request, or in response to monitoring requests which match the "monitor fail" condition
504	when the response timeout strikes before the server responds

The error 4xx and 5xx codes above may be customized (see "errorloc" in section 4.2).

1.3.2 The response headers

Response headers work exactly like request headers, and as such, HAProxy uses the same parsing function for both. Please refer to paragraph 1.2.2 for more details.

Chapter 2

Configuring HAProxy

2.1 Configuration file format

HAProxy's configuration process involves 3 major sources of parameters :

- the arguments from the command-line, which always take precedence
- the "global" section, which sets process-wide parameters
- the proxies sections which can take form of "defaults", "listen", "frontend" and "backend".

The configuration file syntax consists in lines beginning with a keyword referenced in this manual, optionally followed by one or several parameters delimited by spaces. If spaces have to be entered in strings, then they must be preceded by a backslash ('\') to be escaped. Backslashes also have to be escaped by doubling them.

2.2 Time format

Some parameters involve values representing time, such as timeouts. These values are generally expressed in milliseconds (unless explicitly stated otherwise) but may be expressed in any other unit by suffixing the unit to the numeric value. It is important to consider this because it will not be repeated for every keyword. Supported units are :

- us : microseconds. 1 microsecond = 1/1000000 second

- ms : milliseconds. 1 millisecond = 1/1000 second. This is the default.
- s : seconds. 1s = 1000ms
- m : minutes. 1m = 60s = 60000ms
- h : hours. 1h = 60m = 3600s = 3600000ms
- d : days. 1d = 24h = 1440m = 86400s = 86400000ms

2.3 Examples

```
# Simple configuration for an HTTP proxy listening on port 80 on all
# interfaces and forwarding requests to a single backend "servers" with a
# single server "server1" listening on 127.0.0.1:8000
global
    daemon
    maxconn 256

defaults
    mode http
    timeout connect 5000ms
    timeout client 50000ms
    timeout server 50000ms

frontend http-in
    bind *:80
    default_backend servers

backend servers
    server server1 127.0.0.1:8000 maxconn 32

# The same configuration defined with a single listen block. Shorter but
# less expressive, especially in HTTP mode.
global
    daemon
    maxconn 256

defaults
    mode http
    timeout connect 5000ms
    timeout client 50000ms
    timeout server 50000ms

listen http-in
```

```
bind *:80
server server1 127.0.0.1:8000 maxconn 32
```

Assuming haproxy is in \$PATH, test these configurations in a shell with:

```
$ sudo haproxy -f configuration.conf -c
```


Chapter 3

Global parameters

Parameters in the "global" section are process-wide and often OS-specific. They are generally set once for all and do not need being changed once correct. Some of them have command-line equivalents.

The following keywords are supported in the "global" section :

- * Process management and security

- chroot
- daemon
- gid
- group
- log
- log-send-hostname
- nbproc
- pidfile
- uid
- ulimit-n
- user
- stats
- node
- description

- * Performance tuning

- maxconn
- maxpipes
- noepoll
- nokqueue
- nopoll
- nosepoll
- nosplice

- spread-checks
 - tune.bufsize
 - tune.chksize
 - tune.maxaccept
 - tune.maxpollevents
 - tune.maxrewrite
 - tune.rcvbuf.client
 - tune.rcvbuf.server
 - tune.sndbuf.client
 - tune.sndbuf.server
- * Debugging
- debug
 - quiet

3.1 Process management and security

chroot <jail dir>

Changes current directory to <jail dir> and performs a chroot() there before dropping privileges. This increases the security level in case an unknown vulnerability would be exploited, since it would make it very hard for the attacker to exploit the system. This only works when the process is started with superuser privileges. It is important to ensure that <jail_dir> is both empty and unwritable to anyone.

daemon

Makes the process fork into background. This is the recommended mode of operation. It is equivalent to the command line "-D" argument. It can be disabled by the command line "-db" argument.

gid <number>

Changes the process' group ID to <number>. It is recommended that the group ID is dedicated to HAProxy or to a small set of similar daemons. HAProxy must be started with a user belonging to this group, or with superuser privileges. See also "group" and "uid".

group <group name>

Similar to "gid" but uses the GID of group name <group name> from /etc/group. See also "gid" and "user".

log <address> <facility> [max level [min level]]

Adds a global syslog server. Up to two global servers can be defined. They

will receive logs for startups and exits, as well as all logs from proxies configured with "log global".

<address> can be one of:

- An IPv4 address optionally followed by a colon and a UDP port. If no port is specified, 514 is used by default (the standard syslog port).
- A filesystem path to a UNIX domain socket, keeping in mind considerations for chroot (be sure the path is accessible inside the chroot) and uid/gid (be sure the path is appropriately writeable).

<facility> must be one of the 24 standard syslog facilities :

```
kern  user  mail  daemon auth  syslog lpr   news
uucp  cron  auth2 ftp   ntp   audit alert cron2
local0 local1 local2 local3 local4 local5 local6 local7
```

An optional level can be specified to filter outgoing messages. By default, all messages are sent. If a maximum level is specified, only messages with a severity at least as important as this level will be sent. An optional minimum level can be specified. If it is set, logs emitted with a more severe level than this one will be capped to this level. This is used to avoid sending "emerg" messages on all terminals on some default syslog configurations. Eight levels are known :

```
emerg alert crit  err   warning notice info  debug
```

log-send-hostname [<string>]

Sets the hostname field in the syslog header. If optional "string" parameter is set the header is set to the string contents, otherwise uses the hostname of the system. Generally used if one is not relaying logs through an intermediate syslog server or for simply customizing the hostname printed in the logs.

log-tag <string>

Sets the tag field in the syslog header to this string. It defaults to the program name as launched from the command line, which usually is "haproxy". Sometimes it can be useful to differentiate between multiple processes running on the same host.

nbproc <number>

Creates <number> processes when going daemon. This requires the "daemon" mode. By default, only one process is created, which is the recommended mode

of operation. For systems limited to small sets of file descriptors per process, it may be needed to fork multiple daemons. USING MULTIPLE PROCESSES IS HARDER TO DEBUG AND IS REALLY DISCOURAGED. See also "daemon".

pidfile <pidfile>

Writes pids of all daemons into file <pidfile>. This option is equivalent to the "-p" command line argument. The file must be accessible to the user starting the process. See also "daemon".

stats socket <path> [{uid | user} <uid>] [{gid | group} <gid>] [mode <mode>]
[level <level>]

Creates a UNIX socket in stream mode at location <path>. Any previously existing socket will be backed up then replaced. Connections to this socket will return various statistics outputs and even allow some commands to be issued. Please consult section 9.2 "Unix Socket commands" for more details.

An optional "level" parameter can be specified to restrict the nature of the commands that can be issued on the socket :

- "user" is the least privileged level ; only non-sensitive stats can be read, and no change is allowed. It would make sense on systems where it is not easy to restrict access to the socket.
- "operator" is the default level and fits most common uses. All data can be read, and only non-sensitive changes are permitted (eg: clear max counters).
- "admin" should be used with care, as everything is permitted (eg: clear all counters).

On platforms which support it, it is possible to restrict access to this socket by specifying numerical IDs after "uid" and "gid", or valid user and group names after the "user" and "group" keywords. It is also possible to restrict permissions on the socket by passing an octal value after the "mode" keyword (same syntax as chmod). Depending on the platform, the permissions on the socket will be inherited from the directory which hosts it, or from the user the process is started with.

stats timeout <timeout, in milliseconds>

The default timeout on the stats socket is set to 10 seconds. It is possible to change this value with "stats timeout". The value must be passed in milliseconds, or be suffixed by a time unit among { us, ms, s, m, h, d }.

stats maxconn <connections>

By default, the stats socket is limited to 10 concurrent connections. It is possible to change this value with "stats maxconn".

`uid <number>`

Changes the process' user ID to `<number>`. It is recommended that the user ID is dedicated to HAProxy or to a small set of similar daemons. HAProxy must be started with superuser privileges in order to be able to switch to another one. See also "gid" and "user".

`ulimit-n <number>`

Sets the maximum number of per-process file-descriptors to `<number>`. By default, it is automatically computed, so it is recommended not to use this option.

`user <user name>`

Similar to "uid" but uses the UID of user name `<user name>` from `/etc/passwd`. See also "uid" and "group".

`node <name>`

Only letters, digits, hyphen and underscore are allowed, like in DNS names.

This statement is useful in HA configurations where two or more processes or servers share the same IP address. By setting a different node-name on all nodes, it becomes easy to immediately spot what server is handling the traffic.

`description <text>`

Add a text that describes the instance.

Please note that it is required to escape certain characters (# for example) and this text is inserted into a html page so you should avoid using "<" and ">" characters.

3.2 Performance tuning

`maxconn <number>`

Sets the maximum per-process number of concurrent connections to `<number>`. It is equivalent to the command-line argument "-n". Proxies will stop accepting connections when this limit is reached. The "ulimit-n" parameter is automatically adjusted according to this value. See also "ulimit-n".

`maxpipes <number>`

Sets the maximum per-process number of pipes to `<number>`. Currently, pipes are only used by kernel-based tcp splicing. Since a pipe contains two file

descriptors, the "ulimit-n" value will be increased accordingly. The default value is `maxconn/4`, which seems to be more than enough for most heavy usages. The splice code dynamically allocates and releases pipes, and can fall back to standard copy, so setting this value too low may only impact performance.

`noepoll`

Disables the use of the "epoll" event polling system on Linux. It is equivalent to the command-line argument "-de". The next polling system used will generally be "poll". See also "nosepoll", and "nopoll".

`nokqueue`

Disables the use of the "kqueue" event polling system on BSD. It is equivalent to the command-line argument "-dk". The next polling system used will generally be "poll". See also "nopoll".

`nopoll`

Disables the use of the "poll" event polling system. It is equivalent to the command-line argument "-dp". The next polling system used will be "select". It should never be needed to disable "poll" since it's available on all platforms supported by HAProxy. See also "nosepoll", and "nopoll" and "nokqueue".

`nosepoll`

Disables the use of the "speculative epoll" event polling system on Linux. It is equivalent to the command-line argument "-ds". The next polling system used will generally be "epoll". See also "nosepoll", and "nopoll".

`nossplice`

Disables the use of kernel tcp splicing between sockets on Linux. It is equivalent to the command line argument "-dS". Data will then be copied using conventional and more portable `recv/send` calls. Kernel tcp splicing is limited to some very recent instances of kernel 2.6. Most versions between 2.6.25 and 2.6.28 are buggy and will forward corrupted data, so they must not be used. This option makes it easier to globally disable kernel splicing in case of doubt. See also "option splice-auto", "option splice-request" and "option splice-response".

`spread-checks <0..50, in percent>`

Sometimes it is desirable to avoid sending health checks to servers at exact intervals, for instance when many logical servers are located on the same physical server. With the help of this parameter, it becomes possible to add some randomness in the check interval between 0 and +/- 50%. A value between 2 and 5 seems to show good results. The default value remains at 0.

`tune.bufsize <number>`

Sets the buffer size to this size (in bytes). Lower values allow more

sessions to coexist in the same amount of RAM, and higher values allow some applications with very large cookies to work. The default value is 16384 and can be changed at build time. It is strongly recommended not to change this from the default value, as very low values will break some services such as statistics, and values larger than default size will increase memory usage, possibly causing the system to run out of memory. At least the global `maxconn` parameter should be decreased by the same factor as this one is increased.

`tune.chksize <number>`

Sets the check buffer size to this size (in bytes). Higher values may help find string or regex patterns in very large pages, though doing so may imply more memory and CPU usage. The default value is 16384 and can be changed at build time. It is not recommended to change this value, but to use better checks whenever possible.

`tune.maxaccept <number>`

Sets the maximum number of consecutive accepts that a process may perform on a single wake up. High values give higher priority to high connection rates, while lower values give higher priority to already established connections. This value is limited to 100 by default in single process mode. However, in multi-process mode (`nbproc > 1`), it defaults to 8 so that when one process wakes up, it does not take all incoming connections for itself and leaves a part of them to other processes. Setting this value to -1 completely disables the limitation. It should normally not be needed to tweak this value.

`tune.maxpollevents <number>`

Sets the maximum amount of events that can be processed at once in a call to the polling system. The default value is adapted to the operating system. It has been noticed that reducing it below 200 tends to slightly decrease latency at the expense of network bandwidth, and increasing it above 200 tends to trade latency for slightly increased bandwidth.

`tune.maxrewrite <number>`

Sets the reserved buffer space to this size in bytes. The reserved space is used for header rewriting or appending. The first reads on sockets will never fill more than `bufsize-maxrewrite`. Historically it has defaulted to half of `bufsize`, though that does not make much sense since there are rarely large numbers of headers to add. Setting it too high prevents processing of large requests or responses. Setting it too low prevents addition of new headers to already large requests or to POST requests. It is generally wise to set it to about 1024. It is automatically readjusted to half of `bufsize` if it is larger than that. This means you don't have to worry about it when changing `bufsize`.

`tune.rcvbuf.client <number>`

`tune.rcvbuf.server <number>`

Forces the kernel socket receive buffer size on the client or the server side to the specified value in bytes. This value applies to all TCP/HTTP frontends and backends. It should normally never be set, and the default size (0) lets the kernel autotune this value depending on the amount of available memory. However it can sometimes help to set it to very low values (eg: 4096) in order to save kernel memory by preventing it from buffering too large amounts of received data. Lower values will significantly increase CPU usage though.

`tune.sndbuf.client <number>`

`tune.sndbuf.server <number>`

Forces the kernel socket send buffer size on the client or the server side to the specified value in bytes. This value applies to all TCP/HTTP frontends and backends. It should normally never be set, and the default size (0) lets the kernel autotune this value depending on the amount of available memory. However it can sometimes help to set it to very low values (eg: 4096) in order to save kernel memory by preventing it from buffering too large amounts of received data. Lower values will significantly increase CPU usage though. Another use case is to prevent write timeouts with extremely slow clients due to the kernel waiting for a large part of the buffer to be read before notifying haproxy again.

3.3 Debugging

`debug`

Enables debug mode which dumps to stdout all exchanges, and disables forking into background. It is the equivalent of the command-line argument "-d". It should never be used in a production configuration since it may prevent full system startup.

`quiet`

Do not display any message during startup. It is equivalent to the command-line argument "-q".

3.4 Userlists

It is possible to control access to frontend/backend/listen sections or to http stats by allowing only authenticated and authorized users. To do this, it is required to create at least one userlist and to define users.

`userlist <listname>`

Creates new userlist with name <listname>. Many independent userlists can be used to store authentication & authorization data for independent customers.

```
group <groupname> [users <user>,<user>,...]
```

Adds group <groupname> to the current userlist. It is also possible to attach users to this group by using a comma separated list of names proceeded by "users" keyword.

```
user <username> [password|insecure-password <password>]
                [groups <group>,<group>,...]
```

Adds user <username> to the current userlist. Both secure (encrypted) and insecure (unencrypted) passwords can be used. Encrypted passwords are evaluated using the crypt(3) function so depending of the system's capabilities, different algorithms are supported. For example modern Glibc based Linux system supports MD5, SHA-256, SHA-512 and of course classic, DES-based method of crypting passwords.

Example:

```
userlist L1
  group G1 users tiger,scott
  group G2 users xdb,scott

  user tiger password $6$k6y3o.eP$JlKBx9za9667qe4(...)xHSwRv6J.CO/D7cV91
  user scott insecure-password elgato
  user xdb insecure-password hello

userlist L2
  group G1
  group G2

  user tiger password $6$k6y3o.eP$JlKBx(...)xHSwRv6J.CO/D7cV91 groups G1
  user scott insecure-password elgato groups G1,G2
  user xdb insecure-password hello groups G2
```

Please note that both lists are functionally identical.

Chapter 4

Proxies

Proxy configuration can be located in a set of sections :

- defaults <name>
- frontend <name>
- backend <name>
- listen <name>

A "defaults" section sets default parameters for all other sections following its declaration. Those default parameters are reset by the next "defaults" section. See below for the list of parameters which can be set in a "defaults" section. The name is optional but its use is encouraged for better readability.

A "frontend" section describes a set of listening sockets accepting client connections.

A "backend" section describes a set of servers to which the proxy will connect to forward incoming connections.

A "listen" section defines a complete proxy with its frontend and backend parts combined in one section. It is generally useful for TCP-only traffic.

All proxy names must be formed from upper and lower case letters, digits, '-' (dash), '_' (underscore) , '.' (dot) and ':' (colon). ACL names are case-sensitive, which means that "www" and "WWW" are two different proxies.

Historically, all proxy names could overlap, it just caused troubles in the logs. Since the introduction of content switching, it is mandatory that two proxies with overlapping capabilities (frontend/backend) have different names. However, it is still permitted that a frontend and a backend share the same name, as this configuration seems to be commonly encountered.

Right now, two major proxy modes are supported : "tcp", also known as layer 4, and "http", also known as layer 7. In layer 4 mode, HAProxy simply forwards bidirectional traffic between two sides. In layer 7 mode, HAProxy analyzes the protocol, and can interact with it by allowing, blocking, switching, adding, modifying, or removing arbitrary contents in requests or responses, based on arbitrary criteria.

4.1 Proxy keywords matrix

The following list of keywords is supported. Most of them may only be used in a limited set of section types. Some of them are marked as "deprecated" because they are inherited from an old syntax which may be confusing or functionally limited, and there are new recommended keywords to replace them. Keywords marked with "(*)" can be optionally inverted using the "no" prefix, eg. "no option contstats". This makes sense when the option has been enabled by default and must be disabled for a specific instance. Such options may also be prefixed with "default" in order to restore default settings regardless of what has been specified in a previous "defaults" section.

keyword		defaults	frontend	listen	backend
acl		-	X	X	X
appsession		-	-	X	X
backlog		X	X	X	-
balance		X	-	X	X
bind		-	X	X	-
bind-process		X	X	X	X
block		-	X	X	X
capture cookie		-	X	X	-
capture request header		-	X	X	-
capture response header		-	X	X	-
clitimeout	(deprecated)	X	X	X	-
contimeout	(deprecated)	X	-	X	X
cookie		X	-	X	X
default-server		X	-	X	X
default_backend		X	X	X	-
description		-	X	X	X
disabled		X	X	X	X
dispatch		-	-	X	X
enabled		X	X	X	X
errorfile		X	X	X	X

errorloc	X	X	X	X
errorloc302	X	X	X	X
-- keyword -----	defaults	-	frontend	- listen -- backend -
errorloc303	X	X	X	X
force-persist	-	X	X	X
fullconn	X	-	X	X
grace	X	X	X	X
hash-type	X	-	X	X
http-check disable-on-404	X	-	X	X
http-check expect	-	-	X	X
http-check send-state	X	-	X	X
http-request	-	X	X	X
id	-	X	X	X
ignore-persist	-	X	X	X
log	X	X	X	X
maxconn	X	X	X	-
mode	X	X	X	X
monitor fail	-	X	X	-
monitor-net	X	X	X	-
monitor-uri	X	X	X	-
option abortonclose	(*) X	-	X	X
option accept-invalid-http-request	(*) X	X	X	-
option accept-invalid-http-response	(*) X	-	X	X
option allbackups	(*) X	-	X	X
option checkcache	(*) X	-	X	X
option cliticpka	(*) X	X	X	-
option contstats	(*) X	X	X	-
option dontlog-normal	(*) X	X	X	-
option dontlognull	(*) X	X	X	-
option forceclose	(*) X	X	X	X
-- keyword -----	defaults	-	frontend	- listen -- backend -
option forwardfor	X	X	X	X
option http-no-delay	(*) X	X	X	X
option http-pretend-keepalive	(*) X	X	X	X
option http-server-close	(*) X	X	X	X
option http-use-proxy-header	(*) X	X	X	-
option httpchk	X	-	X	X
option httpclose	(*) X	X	X	X
option httplog	X	X	X	X
option http_proxy	(*) X	X	X	X
option independant-streams	(*) X	X	X	X
option ldap-check	X	-	X	X
option log-health-checks	(*) X	-	X	X
option log-separate-errors	(*) X	X	X	-
option logasap	(*) X	X	X	-
option mysql-check	X	-	X	X

option nolinger	(*)	X	X	X	X
option originalto		X	X	X	X
option persist	(*)	X	-	X	X
option redispatch	(*)	X	-	X	X
option smtpchk		X	-	X	X
option socket-stats	(*)	X	X	X	-
option splice-auto	(*)	X	X	X	X
option splice-request	(*)	X	X	X	X
option splice-response	(*)	X	X	X	X
option srvtcpka	(*)	X	-	X	X
option ssl-hello-chk		X	-	X	X
-- keyword ----- defaults - frontend - listen -- backend -					
option tcp-smart-accept	(*)	X	X	X	-
option tcp-smart-connect	(*)	X	-	X	X
option tcpka		X	X	X	X
option tcplog		X	X	X	X
option transparent	(*)	X	-	X	X
persist rdp-cookie		X	-	X	X
rate-limit sessions		X	X	X	-
redirect		-	X	X	X
redis	(deprecated)	X	-	X	X
redispatch	(deprecated)	X	-	X	X
reqadd		-	X	X	X
reqallow		-	X	X	X
reqdel		-	X	X	X
reqdeny		-	X	X	X
reqiallow		-	X	X	X
reqidel		-	X	X	X
reqideny		-	X	X	X
reqipass		-	X	X	X
requirep		-	X	X	X
reqisetbe		-	X	X	X
reqitarpit		-	X	X	X
reqpass		-	X	X	X
reqrep		-	X	X	X
-- keyword ----- defaults - frontend - listen -- backend -					
reqsetbe		-	X	X	X
reqtarpit		-	X	X	X
retries		X	-	X	X
rspadd		-	X	X	X
rspdel		-	X	X	X
rspdeny		-	X	X	X
rspidel		-	X	X	X
rspideny		-	X	X	X
rspirep		-	X	X	X
rsprep		-	X	X	X

server	-	-	X	X
source	X	-	X	X
srvtimeout	(deprecated) X	-	X	X
stats admin	-	-	X	X
stats auth	X	-	X	X
stats enable	X	-	X	X
stats hide-version	X	-	X	X
stats http-request	-	-	X	X
stats realm	X	-	X	X
stats refresh	X	-	X	X
stats scope	X	-	X	X
stats show-desc	X	-	X	X
stats show-legends	X	-	X	X
stats show-node	X	-	X	X
stats uri	X	-	X	X
-- keyword ----- defaults - frontend - listen -- backend -				
stick match	-	-	X	X
stick on	-	-	X	X
stick store-request	-	-	X	X
stick-table	-	-	X	X
tcp-request content accept	-	X	X	-
tcp-request content reject	-	X	X	-
tcp-request inspect-delay	-	X	X	-
timeout check	X	-	X	X
timeout client	X	X	X	-
timeout clitimeout	(deprecated) X	X	X	-
timeout connect	X	-	X	X
timeout contimeout	(deprecated) X	-	X	X
timeout http-keep-alive	X	X	X	X
timeout http-request	X	X	X	X
timeout queue	X	-	X	X
timeout server	X	-	X	X
timeout srvtimeout	(deprecated) X	-	X	X
timeout tarpit	X	X	X	X
transparent	(deprecated) X	-	X	X
use_backend	-	X	X	-
-----+-----+-----+-----+-----				
keyword	defaults	frontend	listen	backend

4.2 Alphabetically sorted keywords reference

This section provides a description of each keyword and its usage.

```
acl <aclname> <criterion> [flags] [operator] <value> ...
```

Declare or complete an access list.

May be used in sections :

	defaults	frontend	listen	backend
	no	yes	yes	yes

Example:

```
acl invalid_src src 0.0.0.0/7 224.0.0.0/3
acl invalid_src src_port 0:1023
acl local_dst hdr(host) -i localhost
```

See section 7 about ACL usage.

```
appsession <cookie> len <length> timeout <holdtime>
```

```
[request-learn] [prefix] [mode <path-parameters|query-string>]
```

Define session stickiness on an existing application cookie.

May be used in sections :

	defaults	frontend	listen	backend
	no	no	yes	yes

Arguments :

<cookie> this is the name of the cookie used by the application and which HAProxy will have to learn for each new session.

<length> this is the max number of characters that will be memorized and checked in each cookie value.

<holdtime> this is the time after which the cookie will be removed from memory if unused. If no unit is specified, this time is in milliseconds.

request-learn

If this option is specified, then haproxy will be able to learn the cookie found in the request in case the server does not specify any in response. This is typically what happens with PHPSESSID cookies, or when haproxy's session expires before the application's session and the correct server is selected. It is recommended to specify this option to improve reliability.

prefix When this option is specified, haproxy will match on the cookie prefix (or URL parameter prefix). The appsession value is the data following this prefix.

Example :

```
appsession ASPSESSIONID len 64 timeout 3h prefix
```

This will match the cookie ASPSESSIONIDXXXX=XXXXX,

the appsession value will be XXXX=XXXXX.

mode This option allows to change the URL parser mode.
 2 modes are currently supported :

- path-parameters :
 The parser looks for the appsession in the path parameters part (each parameter is separated by a semi-colon), which is convenient for JSESSIONID for example.
 This is the default mode if the option is not set.
- query-string :
 In this mode, the parser will look for the appsession in the query string.

When an application cookie is defined in a backend, HAProxy will check when the server sets such a cookie, and will store its value in a table, and associate it with the server's identifier. Up to <length> characters from the value will be retained. On each connection, haproxy will look for this cookie both in the "Cookie:" headers, and as a URL parameter (depending on the mode used). If a known value is found, the client will be directed to the server associated with this value. Otherwise, the load balancing algorithm is applied. Cookies are automatically removed from memory when they have been unused for a duration longer than <holdtime>.

The definition of an application cookie is limited to one per backend.

Note : Consider not using this feature in multi-process mode (nbproc > 1) unless you know what you do : memory is not shared between the processes, which can result in random behaviours.

Example :

```
appsession JSESSIONID len 52 timeout 3h
```

See also : "cookie", "capture cookie", "balance", "stick", "stick-table", "ignore-persist", "nbproc" and "bind-process".

backlog <conns>

Give hints to the system about the approximate listen backlog desired size

May be used in sections : defaults | frontend | listen | backend

 yes | yes | yes | no

Arguments :

<conns> is the number of pending connections. Depending on the operating system, it may represent the number of already acknowledged connections, of non-acknowledged ones, or both.

In order to protect against SYN flood attacks, one solution is to increase

the system's SYN backlog size. Depending on the system, sometimes it is just tunable via a system parameter, sometimes it is not adjustable at all, and sometimes the system relies on hints given by the application at the time of the `listen()` syscall. By default, HAProxy passes the frontend's `maxconn` value to the `listen()` syscall. On systems which can make use of this value, it can sometimes be useful to be able to specify a different value, hence this backlog parameter.

On Linux 2.4, the parameter is ignored by the system. On Linux 2.6, it is used as a hint and the system accepts up to the smallest greater power of two, and never more than some limits (usually 32768).

See also : "maxconn" and the target operating system's tuning guide.

```
balance <algorithm> [ <arguments> ]
```

```
balance url_param <param> [check_post [<max_wait>]]
```

Define the load balancing algorithm to be used in a backend.

May be used in sections :

	defaults	frontend	listen	backend
	yes	no	yes	yes

Arguments :

`<algorithm>` is the algorithm used to select a server when doing load balancing. This only applies when no persistence information is available, or when a connection is redispached to another server. `<algorithm>` may be one of the following :

roundrobin Each server is used in turns, according to their weights. This is the smoothest and fairest algorithm when the server's processing time remains equally distributed. This algorithm is dynamic, which means that server weights may be adjusted on the fly for slow starts for instance. It is limited by design to 4128 active servers per backend. Note that in some large farms, when a server becomes up after having been down for a very short time, it may sometimes take a few hundreds requests for it to be re-integrated into the farm and start receiving traffic. This is normal, though very rare. It is indicated here in case you would have the chance to observe it, so that you don't worry.

static-rr Each server is used in turns, according to their weights. This algorithm is as similar to roundrobin except that it is static, which means that changing a server's weight on the fly will have no effect. On the other hand, it has no design limitation on the number of servers, and when a server goes up, it is always immediately reintroduced into the farm, once the full map is recomputed. It also uses slightly less CPU to

run (around -1%).

leastconn The server with the lowest number of connections receives the connection. Round-robin is performed within groups of servers of the same load to ensure that all servers will be used. Use of this algorithm is recommended where very long sessions are expected, such as LDAP, SQL, TSE, etc... but is not very well suited for protocols using short sessions such as HTTP. This algorithm is dynamic, which means that server weights may be adjusted on the fly for slow starts for instance.

source The source IP address is hashed and divided by the total weight of the running servers to designate which server will receive the request. This ensures that the same client IP address will always reach the same server as long as no server goes down or up. If the hash result changes due to the number of running servers changing, many clients will be directed to a different server. This algorithm is generally used in TCP mode where no cookie may be inserted. It may also be used on the Internet to provide a best-effort stickiness to clients which refuse session cookies. This algorithm is static by default, which means that changing a server's weight on the fly will have no effect, but this can be changed using "hash-type".

uri The left part of the URI (before the question mark) is hashed and divided by the total weight of the running servers. The result designates which server will receive the request. This ensures that a same URI will always be directed to the same server as long as no server goes up or down. This is used with proxy caches and anti-virus proxies in order to maximize the cache hit rate. Note that this algorithm may only be used in an HTTP backend. This algorithm is static by default, which means that changing a server's weight on the fly will have no effect, but this can be changed using "hash-type".

This algorithm support two optional parameters "len" and "depth", both followed by a positive integer number. These options may be helpful when it is needed to balance servers based on the beginning of the URI only. The "len" parameter indicates that the algorithm should only consider that many characters at the beginning of the URI to compute the hash. Note that having "len" set to 1 rarely makes sense since most URIs start with a leading "/".

The "depth" parameter indicates the maximum directory depth

to be used to compute the hash. One level is counted for each slash in the request. If both parameters are specified, the evaluation stops when either is reached.

`url_param` The URL parameter specified in argument will be looked up in the query string of each HTTP GET request.

If the modifier "check_post" is used, then an HTTP POST request entity will be searched for the parameter argument, when it is not found in a query string after a question mark ('?') in the URL. Optionally, specify a number of octets to wait for before attempting to search the message body. If the entity can not be searched, then round robin is used for each request. For instance, if your clients always send the LB parameter in the first 128 bytes, then specify that. The default is 48. The entity data will not be scanned until the required number of octets have arrived at the gateway, this is the minimum of: (default/max_wait, Content-Length or first chunk length). If Content-Length is missing or zero, it does not need to wait for more data than the client promised to send. When Content-Length is present and larger than <max_wait>, then waiting is limited to <max_wait> and it is assumed that this will be enough data to search for the presence of the parameter. In the unlikely event that Transfer-Encoding: chunked is used, only the first chunk is scanned. Parameter values separated by a chunk boundary, may be randomly balanced if at all.

If the parameter is found followed by an equal sign ('=') and a value, then the value is hashed and divided by the total weight of the running servers. The result designates which server will receive the request.

This is used to track user identifiers in requests and ensure that a same user ID will always be sent to the same server as long as no server goes up or down. If no value is found or if the parameter is not found, then a round robin algorithm is applied. Note that this algorithm may only be used in an HTTP backend. This algorithm is static by default, which means that changing a server's weight on the fly will have no effect, but this can be changed using "hash-type".

`hdr(name)` The HTTP header <name> will be looked up in each HTTP request. Just as with the equivalent ACL 'hdr()' function, the header name in parenthesis is not case sensitive. If the header is absent or if it does not contain any value, the roundrobin

algorithm is applied instead.

An optional 'use_domain_only' parameter is available, for reducing the hash algorithm to the main domain part with some specific headers such as 'Host'. For instance, in the Host value "haproxy.1wt.eu", only "1wt" will be considered.

This algorithm is static by default, which means that changing a server's weight on the fly will have no effect, but this can be changed using "hash-type".

rdp-cookie

rdp-cookie(name)

The RDP cookie <name> (or "msthash" if omitted) will be looked up and hashed for each incoming TCP request. Just as with the equivalent ACL 'req_rdp_cookie()' function, the name is not case-sensitive. This mechanism is useful as a degraded persistence mode, as it makes it possible to always send the same user (or the same session ID) to the same server. If the cookie is not found, the normal roundrobin algorithm is used instead.

Note that for this to work, the frontend must ensure that an RDP cookie is already present in the request buffer. For this you must use 'tcp-request content accept' rule combined with a 'req_rdp_cookie_cnt' ACL.

This algorithm is static by default, which means that changing a server's weight on the fly will have no effect, but this can be changed using "hash-type".

<arguments> is an optional list of arguments which may be needed by some algorithms. Right now, only "url_param" and "uri" support an optional argument.

```
balance uri [len <len>] [depth <depth>]
balance url_param <param> [check_post [<max_wait>]]
```

The load balancing algorithm of a backend is set to roundrobin when no other algorithm, mode nor option have been set. The algorithm may only be set once for each backend.

Examples :

```
balance roundrobin
balance url_param userid
balance url_param session_id check_post 64
```

```

balance hdr(User-Agent)
balance hdr(host)
balance hdr(Host) use_domain_only

```

Note: the following caveats and limitations on using the "check_post" extension with "url_param" must be considered :

- all POST requests are eligible for consideration, because there is no way to determine if the parameters will be found in the body or entity which may contain binary data. Therefore another method may be required to restrict consideration of POST requests that have no URL parameters in the body. (see acl reqideny http_end)
- using a <max_wait> value larger than the request buffer size does not make sense and is useless. The buffer size is set at build time, and defaults to 16 kB.
- Content-Encoding is not supported, the parameter search will probably fail; and load balancing will fall back to Round Robin.
- Expect: 100-continue is not supported, load balancing will fall back to Round Robin.
- Transfer-Encoding (RFC2616 3.6.1) is only supported in the first chunk. If the entire parameter value is not present in the first chunk, the selection of server is undefined (actually, defined by how little actually appeared in the first chunk).
- This feature does not support generation of a 100, 411 or 501 response.
- In some cases, requesting "check_post" MAY attempt to scan the entire contents of a message body. Scanning normally terminates when linear white space or control characters are found, indicating the end of what might be a URL parameter list. This is probably not a concern with SGML type message bodies.

See also : "dispatch", "cookie", "appsession", "transparent", "hash-type" and "http_proxy".

```

bind [<address>]:<port_range> [, ...]
bind [<address>]:<port_range> [, ...] interface <interface>
bind [<address>]:<port_range> [, ...] mss <maxseg>
bind [<address>]:<port_range> [, ...] transparent
bind [<address>]:<port_range> [, ...] id <id>
bind [<address>]:<port_range> [, ...] name <name>

```

`bind [<address>]:<port_range> [, ...] defer-accept`

Define one or several listening addresses and/or ports in a frontend.

May be used in sections :

defaults		frontend		listen		backend
		no		yes		yes no

Arguments :

`<address>` is optional and can be a host name, an IPv4 address, an IPv6 address, or '*'. It designates the address the frontend will listen on. If unset, all IPv4 addresses of the system will be listened on. The same will apply for '*' or the system's special address "0.0.0.0".

`<port_range>` is either a unique TCP port, or a port range for which the proxy will accept connections for the IP address specified above. The port is mandatory. Note that in the case of an IPv6 address, the port is always the number after the last colon (':'). A range can either be :

- a numerical port (ex: '80')
- a dash-delimited ports range explicitly stating the lower and upper bounds (ex: '2000-2100') which are included in the range.

Particular care must be taken against port ranges, because every `<address:port>` couple consumes one socket (= a file descriptor), so it's easy to consume lots of descriptors with a simple range, and to run out of sockets. Also, each `<address:port>` couple must be used only once among all instances running on a same system. Please note that binding to ports lower than 1024 generally require particular privileges to start the program, which are independant of the 'uid' parameter.

`<interface>` is an optional physical interface name. This is currently only supported on Linux. The interface must be a physical interface, not an aliased interface. When specified, all addresses on the same line will only be accepted if the incoming packet physically come through the designated interface. It is also possible to bind multiple frontends to the same address if they are bound to different interfaces. Note that binding to a physical interface requires root privileges.

`<maxseg>` is an optional TCP Maximum Segment Size (MSS) value to be advertised on incoming connections. This can be used to force a lower MSS for certain specific ports, for instance for connections passing through a VPN. Note that this relies on a kernel feature which is theoretically supported under Linux but

was buggy in all versions prior to 2.6.28. It may or may not work on other operating systems. The commonly advertised value on Ethernet networks is $1460 = 1500(\text{MTU}) - 40(\text{IP}+\text{TCP})$.

`<id>` is a persistent value for socket ID. Must be positive and unique in the proxy. An unused value will automatically be assigned if unset. Can only be used when defining only a single socket.

`<name>` is an optional name provided for stats

`transparent` is an optional keyword which is supported only on certain Linux kernels. It indicates that the addresses will be bound even if they do not belong to the local machine. Any packet targeting any of these addresses will be caught just as if the address was locally configured. This normally requires that IP forwarding is enabled. Caution! do not use this with the default address '*', as it would redirect any traffic for the specified port. This keyword is available only when HAProxy is built with `USE_LINUX_TPROXY=1`.

`defer-accept` is an optional keyword which is supported only on certain Linux kernels. It states that a connection will only be accepted once some data arrive on it, or at worst after the first retransmit. This should be used only on protocols for which the client talks first (eg: HTTP). It can slightly improve performance by ensuring that most of the request is already available when the connection is accepted. On the other hand, it will not be able to detect connections which don't talk. It is important to note that this option is broken in all kernels up to 2.6.31, as the connection is never accepted until the client talks. This can cause issues with front firewalls which would see an established connection while the proxy will only see it in `SYN_RECV`.

It is possible to specify a list of address:port combinations delimited by commas. The frontend will then listen on all of these addresses. There is no fixed limit to the number of addresses and ports which can be listened on in a frontend, as well as there is no limit to the number of "bind" statements in a frontend.

Example :

```
listen http_proxy
    bind :80,:443
    bind 10.0.0.1:10080,10.0.0.1:10443
```

```
bind-process [ all | odd | even | <number 1-32> ] ...
```

May be used in sections : defaults | frontend | listen | backend

yes | yes | yes | yes

all	All process will see this instance. This is the default. It may be used to override a default value.
-----	--

odd This instance will be enabled on processes 1,3,5,...31. This option may be combined with other numbers.

even This instance will be enabled on processes 2,4,6,...32. This option may be combined with other numbers. Do not use it with less than 2 processes otherwise some instances might be missing from all processes.

number The instance will be enabled on this process number, between 1 and 32. You must be careful not to reference a process number greater than the configured global.nbproc, otherwise some instances might be missing from all processes.

At the moment, it is not possible to reference more than 32 processes using this keyword, but this should be more than enough for most setups. Please note that 'all' really means all processes and is not limited to the first 32.

Example :

```
listen app_ip1
    bind 10.0.0.1:80
    bind-process odd
```

```
listen app_ip2
    bind 10.0.0.2:80
    bind-process even
```



```
listen management
    bind 10.0.0.3:80
    bind-process 1 2 3 4
```

See also : "nbproc" in global section.

block { if | unless } <condition>

Block a layer 7 request if/unless a condition is matched

May be used in sections : defaults | frontend | listen | backend
 no | yes | yes | yes

The HTTP request will be blocked very early in the layer 7 processing if/unless <condition> is matched. A 403 error will be returned if the request is blocked. The condition has to reference ACLs (see section 7). This is typically used to deny access to certain sensitive resources if some conditions are met or not met. There is no fixed limit to the number of "block" statements per instance.

Example:

```
acl invalid_src src 0.0.0.0/7 224.0.0.0/3
acl invalid_src src_port 0:1023
acl local_dst hdr(host) -i localhost
block if invalid_src || local_dst
```

See section 7 about ACL usage.

capture cookie <name> len <length>

Capture and log a cookie in the request and in the response.

May be used in sections : defaults | frontend | listen | backend
 no | yes | yes | no

Arguments :

<name> is the beginning of the name of the cookie to capture. In order to match the exact name, simply suffix the name with an equal sign ('='). The full name will appear in the logs, which is useful with application servers which adjust both the cookie name and value (eg: ASPSESSIONXXXXX).

<length> is the maximum number of characters to report in the logs, which include the cookie name, the equal sign and the value, all in the standard "name=value" form. The string will be truncated on the right if it exceeds <length>.

Only the first cookie is captured. Both the "cookie" request headers and the

"set-cookie" response headers are monitored. This is particularly useful to check for application bugs causing session crossing or stealing between users, because generally the user's cookies can only change on a login page.

When the cookie was not presented by the client, the associated log column will report "-". When a request does not cause a cookie to be assigned by the server, a "-" is reported in the response column.

The capture is performed in the frontend only because it is necessary that the log format does not change for a given frontend depending on the backends. This may change in the future. Note that there can be only one "capture cookie" statement in a frontend. The maximum capture length is configured in the sources by default to 64 characters. It is not possible to specify a capture in a "defaults" section.

Example:

```
capture cookie ASPSESSION len 32
```

See also : "capture request header", "capture response header" as well as section 8 about logging.

capture request header <name> len <length>

Capture and log the first occurrence of the specified request header.

May be used in sections :

defaults		frontend		listen		backend
no		yes		yes		no

Arguments :

<name> is the name of the header to capture. The header names are not case-sensitive, but it is a common practice to write them as they appear in the requests, with the first letter of each word in upper case. The header name will not appear in the logs, only the value is reported, but the position in the logs is respected.

<length> is the maximum number of characters to extract from the value and report in the logs. The string will be truncated on the right if it exceeds <length>.

Only the first value of the last occurrence of the header is captured. The value will be added to the logs between braces ('{}'). If multiple headers are captured, they will be delimited by a vertical bar ('|') and will appear in the same order they were declared in the configuration. Non-existent headers will be logged just as an empty string. Common uses for request header captures include the "Host" field in virtual hosting environments, the "Content-length" when uploads are supported, "User-agent" to quickly differentiate between real users and robots, and "X-Forwarded-For" in proxied environments to find where the request came from.

Note that when capturing headers such as "User-agent", some spaces may be logged, making the log analysis more difficult. Thus be careful about what you log if you know your log parser is not smart enough to rely on the braces.

There is no limit to the number of captured request headers, but each capture is limited to 64 characters. In order to keep log format consistent for a same frontend, header captures can only be declared in a frontend. It is not possible to specify a capture in a "defaults" section.

Example:

```
capture request header Host len 15
capture request header X-Forwarded-For len 15
capture request header Referrer len 15
```

See also : "capture cookie", "capture response header" as well as section 8 about logging.

capture response header <name> len <length>

Capture and log the first occurrence of the specified response header.

May be used in sections :	defaults		frontend		listen		backend
	no		yes		yes		no

Arguments :

<name> is the name of the header to capture. The header names are not case-sensitive, but it is a common practice to write them as they appear in the response, with the first letter of each word in upper case. The header name will not appear in the logs, only the value is reported, but the position in the logs is respected.

<length> is the maximum number of characters to extract from the value and report in the logs. The string will be truncated on the right if it exceeds <length>.

Only the first value of the last occurrence of the header is captured. The result will be added to the logs between braces ('{ }') after the captured request headers. If multiple headers are captured, they will be delimited by a vertical bar ('|') and will appear in the same order they were declared in the configuration. Non-existent headers will be logged just as an empty string. Common uses for response header captures include the "Content-length" header which indicates how many bytes are expected to be returned, the "Location" header to track redirections.

There is no limit to the number of captured response headers, but each capture is limited to 64 characters. In order to keep log format consistent

for a same frontend, header captures can only be declared in a frontend. It is not possible to specify a capture in a "defaults" section.

Example:

```
capture response header Content-length len 9
capture response header Location len 15
```

See also : "capture cookie", "capture request header" as well as section 8 about logging.

`clitimeout <timeout>` (deprecated)

Set the maximum inactivity time on the client side.

May be used in sections :

defaults		frontend		listen		backend
yes		yes		yes		no

Arguments :

`<timeout>` is the timeout value is specified in milliseconds by default, but can be in any other unit if the number is suffixed by the unit, as explained at the top of this document.

The inactivity timeout applies when the client is expected to acknowledge or send data. In HTTP mode, this timeout is particularly important to consider during the first phase, when the client sends the request, and during the response while it is reading data sent by the server. The value is specified in milliseconds by default, but can be in any other unit if the number is suffixed by the unit, as specified at the top of this document. In TCP mode (and to a lesser extent, in HTTP mode), it is highly recommended that the client timeout remains equal to the server timeout in order to avoid complex situations to debug. It is a good practice to cover one or several TCP packet losses by specifying timeouts that are slightly above multiples of 3 seconds (eg: 4 or 5 seconds).

This parameter is specific to frontends, but can be specified once for all in "defaults" sections. This is in fact one of the easiest solutions not to forget about it. An unspecified timeout results in an infinite timeout, which is not recommended. Such a usage is accepted and works but reports a warning during startup because it may results in accumulation of expired sessions in the system if the system's timeouts are not configured either.

This parameter is provided for compatibility but is currently deprecated. Please use "timeout client" instead.

See also : "timeout client", "timeout http-request", "timeout server", and "srvtimeout".

<name> is the name of the cookie which will be monitored, modified or inserted in order to bring persistence. This cookie is sent to the client via a "Set-Cookie" header in the response, and is brought back by the client in a "Cookie" header in all requests. Special care should be taken to choose a name which does not conflict with any likely application cookie. Also, if the same backends are subject to be used by the same clients (eg:

HTTP/HTTPS), care should be taken to use different cookie names between all backends if persistence between them is not desired.

- rewrite** This keyword indicates that the cookie will be provided by the server and that haproxy will have to modify its value to set the server's identifier in it. This mode is handy when the management of complex combinations of "Set-cookie" and "Cache-control" headers is left to the application. The application can then decide whether or not it is appropriate to emit a persistence cookie. Since all responses should be monitored, this mode only works in HTTP close mode. Unless the application behaviour is very complex and/or broken, it is advised not to start with this mode for new deployments. This keyword is incompatible with "insert" and "prefix".
- insert** This keyword indicates that the persistence cookie will have to be inserted by haproxy in server responses if the client did not already have a cookie that would have permitted it to access this server. When used without the "preserve" option, if the server emits a cookie with the same name, it will be removed before processing. For this reason, this mode can be used to upgrade existing configurations running in the "rewrite" mode. The cookie will only be a session cookie and will not be stored on the client's disk. By default, unless the "indirect" option is added, the server will see the cookies emitted by the client. Due to caching effects, it is generally wise to add the "nocache" or "postonly" keywords (see below). The "insert" keyword is not compatible with "rewrite" and "prefix".
- prefix** This keyword indicates that instead of relying on a dedicated cookie for the persistence, an existing one will be completed. This may be needed in some specific environments where the client does not support more than one single cookie and the application already needs it. In this case, whenever the server sets a cookie named <name>, it will be prefixed with the server's identifier and a delimiter. The prefix will be removed from all client requests so that the server still finds the cookie it emitted. Since all requests and responses are subject to being modified, this mode requires the HTTP close mode. The "prefix" keyword is not compatible with "rewrite" and "insert".
- indirect** When this option is specified, no cookie will be emitted to a client which already has a valid one for the server which has processed the request. If the server sets such a cookie itself, it will be removed, unless the "preserve" option is also set. In

"insert" mode, this will additionally remove cookies from the requests transmitted to the server, making the persistence mechanism totally transparent from an application point of view.

- nocache** This option is recommended in conjunction with the insert mode when there is a cache between the client and HAProxy, as it ensures that a cacheable response will be tagged non-cacheable if a cookie needs to be inserted. This is important because if all persistence cookies are added on a cacheable home page for instance, then all customers will then fetch the page from an outer cache and will all share the same persistence cookie, leading to one server receiving much more traffic than others. See also the "insert" and "postonly" options.
- postonly** This option ensures that cookie insertion will only be performed on responses to POST requests. It is an alternative to the "nocache" option, because POST responses are not cacheable, so this ensures that the persistence cookie will never get cached. Since most sites do not need any sort of persistence before the first POST which generally is a login request, this is a very efficient method to optimize caching without risking to find a persistence cookie in the cache. See also the "insert" and "nocache" options.
- preserve** This option may only be used with "insert" and/or "indirect". It allows the server to emit the persistence cookie itself. In this case, if a cookie is found in the response, haproxy will leave it untouched. This is useful in order to end persistence after a logout request for instance. For this, the server just has to emit a cookie with an invalid value (eg: empty) or with a date in the past. By combining this mechanism with the "disable-on-404" check option, it is possible to perform a completely graceful shutdown because users will definitely leave the server after they logout.
- domain** This option allows to specify the domain at which a cookie is inserted. It requires exactly one parameter: a valid domain name. If the domain begins with a dot, the browser is allowed to use it for any host ending with that name. It is also possible to specify several domain names by invoking this option multiple times. Some browsers might have small limits on the number of domains, so be careful when doing that. For the record, sending 10 domains to MSIE 6 or Firefox 2 works as expected.
- maxidle** This option allows inserted cookies to be ignored after some idle time. It only works with insert-mode cookies. When a cookie is

sent to the client, the date this cookie was emitted is sent too. Upon further presentations of this cookie, if the date is older than the delay indicated by the parameter (in seconds), it will be ignored. Otherwise, it will be refreshed if needed when the response is sent to the client. This is particularly useful to prevent users who never close their browsers from remaining for too long on the same server (eg: after a farm size change). When this option is set and a cookie has no date, it is always accepted, but gets refreshed in the response. This maintains the ability for admins to access their sites. Cookies that have a date in the future further than 24 hours are ignored. Doing so lets admins fix timezone issues without risking kicking users off the site.

maxlife This option allows inserted cookies to be ignored after some life time, whether they're in use or not. It only works with insert mode cookies. When a cookie is first sent to the client, the date this cookie was emitted is sent too. Upon further presentations of this cookie, if the date is older than the delay indicated by the parameter (in seconds), it will be ignored. If the cookie in the request has no date, it is accepted and a date will be set. Cookies that have a date in the future further than 24 hours are ignored. Doing so lets admins fix timezone issues without risking kicking users off the site. Contrary to maxidle, this value is not refreshed, only the first visit date counts. Both maxidle and maxlife may be used at the time. This is particularly useful to prevent users who never close their browsers from remaining for too long on the same server (eg: after a farm size change). This is stronger than the maxidle method in that it forces a redispatch after some absolute delay.

There can be only one persistence cookie per HTTP backend, and it can be declared in a defaults section. The value of the cookie will be the value indicated after the "cookie" keyword in a "server" statement. If no cookie is declared for a given server, the cookie is not set.

Examples :

```
cookie JSESSIONID prefix
cookie SRV insert indirect nocache
cookie SRV insert postonly indirect
cookie SRV insert indirect nocache maxidle 30m maxlife 8h
```

See also : "appsession", "balance source", "capture cookie", "server" and "ignore-persist".

Change default options for a server in a backend				
May be used in sections :	defaults	frontend	listen	backend
	yes	no	yes	yes

`<param*>` is a list of parameters for this server. The "default-server" keyword accepts an important number of options and has a complete section dedicated to it. Please refer to section 5 for more details.

```
default-server inter 1000 weight 13
```

See also: "server" and section 5 about server options

May be used in sections :	defaults	frontend	listen	backend
	yes	yes	yes	no

`<backend>` is the name of the backend to use.

When doing content-switching between frontend and backends using the "use_backend" keyword, it is often useful to indicate which backend will be used when no rule has matched. It generally is the dynamic backend which will catch all undetermined requests.

```
use_backend    dynamic  if  url_dyn
use_backend    static   if  url_css url_img extension_img
default backend dynamic
```

See also : "use_backend", "reqsetbe", "reqisetbe"

May be used in sections :	defaults	frontend	listen	backend
	yes	yes	yes	yes

The "disabled" keyword is used to disable an instance, mainly in order to liberate a listening port or to temporarily disable a service. The instance will still be created and its configuration will be checked, but it will be

created in the "stopped" state and will appear as such in the statistics. It will not receive any traffic nor will it send any health-checks or logs. It is possible to disable many instances at once by adding the "disabled" keyword in a "defaults" section.

See also : "enabled"

```
dispatch <address>:<port>
```

Set a default server address

May be used in sections :	defaults	frontend	listen	backend
	no	no	yes	yes

Arguments : none

<address> is the IPv4 address of the default server. Alternatively, a resolvable hostname is supported, but this name will be resolved during start-up.

<ports> is a mandatory port specification. All connections will be sent to this port, and it is not permitted to use port offsets as is possible with normal servers.

The "dispatch" keyword designates a default server for use when no other server can take the connection. In the past it was used to forward non persistent connections to an auxiliary load balancer. Due to its simple syntax, it has also been used for simple TCP relays. It is recommended not to use it for more clarity, and to use the "server" directive instead.

See also : "server"

enabled

Enable a proxy, frontend or backend.

May be used in sections :	defaults	frontend	listen	backend
	yes	yes	yes	yes

Arguments : none

The "enabled" keyword is used to explicitly enable an instance, when the defaults has been set to "disabled". This is very rarely used.

See also : "disabled"

```
errorfile <code> <file>
```

Return a file contents instead of errors generated by HAProxy

May be used in sections : defaults | frontend | listen | backend

yes | yes | yes | yes

Arguments :

`<code>` is the HTTP status code. Currently, HAProxy is capable of generating codes 200, 400, 403, 408, 500, 502, 503, and 504.

`<file>` designates a file containing the full HTTP response. It is recommended to follow the common practice of appending ".http" to the filename so that people do not confuse the response with HTML error pages, and to use absolute paths, since files are read before any chroot is performed.

It is important to understand that this keyword is not meant to rewrite errors returned by the server, but errors detected and returned by HAProxy. This is why the list of supported errors is limited to a small set.

Code 200 is emitted in response to requests matching a "monitor-uri" rule.

The files are returned verbatim on the TCP socket. This allows any trick such as redirections to another URL or site, as well as tricks to clean cookies, force enable or disable caching, etc... The package provides default error files returning the same contents as default errors.

The files should not exceed the configured buffer size (BUFSIZE), which generally is 8 or 16 kB, otherwise they will be truncated. It is also wise not to put any reference to local contents (eg: images) in order to avoid loops between the client and HAProxy when all servers are down, causing an error to be returned instead of an image. For better HTTP compliance, it is recommended that all header lines end with CR-LF and not LF alone.

The files are read at the same time as the configuration and kept in memory. For this reason, the errors continue to be returned even when the process is chrooted, and no file change is considered while the process is running. A simple method for developing those files consists in associating them to the 403 status code and interrogating a blocked URL.

See also : "errorloc", "errorloc302", "errorloc303"

Example :

```
errorfile 400 /etc/haproxy/errorfiles/400badreq.http
errorfile 403 /etc/haproxy/errorfiles/403forbid.http
errorfile 503 /etc/haproxy/errorfiles/503sorry.http
```

`errorloc <code> <url>`

`errorloc302 <code> <url>`

Return an HTTP redirection to a URL instead of errors generated by HAProxy

It is important to understand that this keyword is not meant to rewrite errors returned by the server, but errors detected and returned by HAProxy. This is why the list of supported errors is limited to a small set.

Code 200 is emitted in response to requests matching a "monitor-uri" rule.

Note that both keyword return the HTTP 303 status code, which tells the client to fetch the designated URL using the same HTTP GET method. This solves the usual problems associated with "errorloc" and the 302 code. It is possible that some very old browsers designed before HTTP/1.1 do not support it, but no such problem has been reported till now.

See also : "errorfile", "errorloc", "errorloc302"

force-persist { if | unless } <condition>

Declare a condition to force persistence on down servers

May be used in sections:	defaults		frontend		listen		backend
	no		yes		yes		yes

By default, requests are not dispatched to down servers. It is possible to force this using "option persist", but it is unconditional and redispaches to a valid server if "option redispatch" is set. That leaves with very little possibilities to force some requests to reach a server which is artificially marked down for maintenance operations.

The "force-persist" statement allows one to declare various ACL-based conditions which, when met, will cause a request to ignore the down status of a server and still try to connect to it. That makes it possible to start a server, still replying an error to the health checks, and run a specially configured browser to test the service. Among the handy methods, one could use a specific source IP address, or a specific cookie. The cookie also has the advantage that it can easily be added/removed on the browser from a test page. Once the service is validated, it is then possible to open the service to the world by returning a valid response to health checks.

The forced persistence is enabled when an "if" condition is met, or unless an "unless" condition is met. The final redispatch is always disabled when this is used.

See also : "option redispatch", "ignore-persist", "persist",
and section 7 about ACL usage.

fullconn <conns>

Specify at what backend load the servers will reach their maxconn

May be used in sections :	defaults		frontend		listen		backend
	yes		no		yes		yes

Arguments :

`<conns>` is the number of connections on the backend which will make the servers use the maximal number of connections.

When a server has a "maxconn" parameter specified, it means that its number of concurrent connections will never go higher. Additionally, if it has a "minconn" parameter, it indicates a dynamic limit following the backend's load. The server will then always accept at least `<minconn>` connections, never more than `<maxconn>`, and the limit will be on the ramp between both values when the backend has less than `<conns>` concurrent connections. This makes it possible to limit the load on the servers during normal loads, but push it further for important loads without overloading the servers during exceptional loads.

Example :

```
# The servers will accept between 100 and 1000 concurrent connections each
# and the maximum of 1000 will be reached when the backend reaches 10000
# connections.
backend dynamic
    fullconn 10000
    server    srv1    dyn1:80 minconn 100 maxconn 1000
    server    srv2    dyn2:80 minconn 100 maxconn 1000
```

See also : "maxconn", "server"

`grace <time>`

Maintain a proxy operational for some time after a soft stop

May be used in sections :	defaults		frontend		listen		backend
	yes		yes		yes		yes

Arguments :

`<time>` is the time (by default in milliseconds) for which the instance will remain operational with the frontend sockets still listening when a soft-stop is received via the SIGUSR1 signal.

This may be used to ensure that the services disappear in a certain order. This was designed so that frontends which are dedicated to monitoring by an external equipment fail immediately while other ones remain up for the time needed by the equipment to detect the failure.

Note that currently, there is very little benefit in using this parameter, and it may in fact complicate the soft-reconfiguration process more than simplify it.

`hash-type <method>`

Specify a method to use for mapping hashes to servers

May be used in sections :	defaults	frontend	listen	backend
	yes	no	yes	yes

Arguments :

map-based the hash table is a static array containing all alive servers. The hashes will be very smooth, will consider weights, but will be static in that weight changes while a server is up will be ignored. This means that there will be no slow start. Also, since a server is selected by its position in the array, most mappings are changed when the server count changes. This means that when a server goes up or down, or when a server is added to a farm, most connections will be redistributed to different servers. This can be inconvenient with caches for instance.

consistent the hash table is a tree filled with many occurrences of each server. The hash key is looked up in the tree and the closest server is chosen. This hash is dynamic, it supports changing weights while the servers are up, so it is compatible with the slow start feature. It has the advantage that when a server goes up or down, only its associations are moved. When a server is added to the farm, only a few part of the mappings are redistributed, making it an ideal algorithm for caches. However, due to its principle, the algorithm will never be very smooth and it may sometimes be necessary to adjust a server's weight or its ID to get a more balanced distribution. In order to get the same distribution on multiple load balancers, it is important that all servers have the same IDs.

The default hash type is "map-based" and is recommended for most usages.

See also : "balance", "server"

```
http-check disable-on-404
```

Enable a maintenance mode upon HTTP/404 response to health-checks

May be used in sections :	defaults	frontend	listen	backend
	yes	no	yes	yes

Arguments : none

When this option is set, a server which returns an HTTP code 404 will be excluded from further load-balancing, but will still receive persistent connections. This provides a very convenient method for Web administrators to perform a graceful shutdown of their servers. It is also important to note that a server which is detected as failed while it was in this mode will not generate an alert, just a notice. If the server responds 2xx or 3xx again, it will immediately be reinserted into the farm. The status on the stats page reports "NOLB" for a server in this mode. It is important to note that this

option only works in conjunction with the "httpchk" option. If this option is used with "http-check expect", then it has precedence over it so that 404 responses will still be considered as soft-stop.

See also : "option httpchk", "http-check expect"

http-check expect [!] <match> <pattern>

Make HTTP health checks consider reponse contents or specific status codes

May be used in sections : defaults | frontend | listen | backend
 yes | no | yes | yes

Arguments :

<match> is a keyword indicating how to look for a specific pattern in the response. The keyword may be one of "status", "rstatus", "string", or "rstring". The keyword may be preceded by an exclamation mark ("!") to negate the match. Spaces are allowed between the exclamation mark and the keyword. See below for more details on the supported keywords.

<pattern> is the pattern to look for. It may be a string or a regular expression. If the pattern contains spaces, they must be escaped with the usual backslash ('\').

By default, "option httpchk" considers that response statuses 2xx and 3xx are valid, and that others are invalid. When "http-check expect" is used, it defines what is considered valid or invalid. Only one "http-check" statement is supported in a backend. If a server fails to respond or times out, the check obviously fails. The available matches are :

status <string> : test the exact string match for the HTTP status code.
 A health check response will be considered valid if the response's status code is exactly this string. If the "status" keyword is prefixed with "!", then the response will be considered invalid if the status code matches.

rstatus <regex> : test a regular expression for the HTTP status code.
 A health check response will be considered valid if the response's status code matches the expression. If the "rstatus" keyword is prefixed with "!", then the response will be considered invalid if the status code matches.
 This is mostly used to check for multiple codes.

string <string> : test the exact string match in the HTTP response body.
 A health check response will be considered valid if the response's body contains this exact string. If the "string" keyword is prefixed with "!", then the response

will be considered invalid if the body contains this string. This can be used to look for a mandatory word at the end of a dynamic page, or to detect a failure when a specific error appears on the check page (eg: a stack trace).

`rstring <regex>` : test a regular expression on the HTTP response body. A health check response will be considered valid if the response's body matches this expression. If the "rstring" keyword is prefixed with "!", then the response will be considered invalid if the body matches the expression. This can be used to look for a mandatory word at the end of a dynamic page, or to detect a failure when a specific error appears on the check page (eg: a stack trace).

It is important to note that the responses will be limited to a certain size defined by the global "tune.chksize" option, which defaults to 16384 bytes. Thus, too large responses may not contain the mandatory pattern when using "string" or "rstring". If a large response is absolutely required, it is possible to change the default max size by setting the global variable. However, it is worth keeping in mind that parsing very large responses can waste some CPU cycles, especially when regular expressions are used, and that it is always better to focus the checks on smaller resources.

Last, if "http-check expect" is combined with "http-check disable-on-404", then this last one has precedence when the server responds with 404.

Examples :

```
# only accept status 200 as valid
http-check expect status 200

# consider SQL errors as errors
http-check expect ! string SQL\ Error

# consider status 5xx only as errors
http-check expect ! rstatus ^5

# check that we have a correct hexadecimal tag before /html
http-check expect rstring <!--tag:[0-9a-f]*</html>
```

See also : "option httpchk", "http-check disable-on-404"

`http-check send-state`

Enable emission of a state header with HTTP health checks

May be used in sections : defaults | frontend | listen | backend

yes | no | yes | yes

Arguments : none

When this option is set, haproxy will systematically send a special header "X-Haproxy-Server-State" with a list of parameters indicating to each server how they are seen by haproxy. This can be used for instance when a server is manipulated without access to haproxy and the operator needs to know whether haproxy still sees it up or not, or if the server is the last one in a farm.

The header is composed of fields delimited by semi-colons, the first of which is a word ("UP", "DOWN", "NOLB"), possibly followed by a number of valid checks on the total number before transition, just as appears in the stats interface. Next headers are in the form "<variable>=<value>", indicating in no specific order some values available in the stats interface :

- a variable "name", containing the name of the backend followed by a slash ("/") then the name of the server. This can be used when a server is checked in multiple backends.
- a variable "node" containing the name of the haproxy node, as set in the global "node" variable, otherwise the system's hostname if unspecified.
- a variable "weight" indicating the weight of the server, a slash ("/") and the total weight of the farm (just counting usable servers). This helps to know if other servers are available to handle the load when this one fails.
- a variable "scur" indicating the current number of concurrent connections on the server, followed by a slash ("/") then the total number of connections on all servers of the same backend.
- a variable "qcur" indicating the current number of requests in the server's queue.

Example of a header received by the application server :

```
>>> X-Haproxy-Server-State: UP 2/3; name=bck/srv2; node=lb1; weight=1/2; \
    scur=13/22; qcur=0
```

See also : "option httpchk", "http-check disable-on-404"

```
http-request { allow | deny | auth [realm <realm>] }
               [ { if | unless } <condition> ]
```

Access control for Layer 7 requests

May be used in sections: defaults | frontend | listen | backend
 no | yes | yes | yes

These set of options allow to fine control access to a frontend/listen/backend. Each option may be followed by if/unless and acl. First option with matched condition (or option without condition) is final. For "deny" a 403 error will be returned, for "allow" normal processing is performed, for "auth" a 401/407 error code is returned so the client should be asked to enter a username and password.

There is no fixed limit to the number of http-request statements per instance.

Example:

```
acl nagios src 192.168.129.3
acl local_net src 192.168.0.0/16
acl auth_ok http_auth(L1)

http-request allow if nagios
http-request allow if local_net auth_ok
http-request auth realm Gimme if local_net auth_ok
http-request deny
```

Example:

```
acl auth_ok http_auth_group(L1) G1

http-request auth unless auth_ok
```

See also : "stats http-request", section 3.4 about userlists and section 7 about ACL usage.

http-send-name-header [<header>]

Add the server name to a request. Use the header string given by <header>

May be used in sections:	defaults		frontend		listen		backend
	yes		no		yes		yes

Arguments :

<header> The header string to use to send the server name

The "http-send-name-header" statement causes the name of the target server to be added to the headers of an HTTP request. The name is added with the header string proved.

See also : "server"

id <value>

Set a persistent ID to a proxy.

May be used in sections : defaults | frontend | listen | backend
 no | yes | yes | yes

Arguments : none

Set a persistent ID for the proxy. This ID must be unique and positive. An unused ID will automatically be assigned if unset. The first assigned value will be 1. This ID is currently only returned in statistics.

`ignore-persist { if | unless } <condition>`

Declare a condition to ignore persistence

May be used in sections: defaults | frontend | listen | backend
 no | yes | yes | yes

By default, when cookie persistence is enabled, every requests containing the cookie are unconditionally persistent (assuming the target server is up and running).

The "ignore-persist" statement allows one to declare various ACL-based conditions which, when met, will cause a request to ignore persistence. This is sometimes useful to load balance requests for static files, which often don't require persistence. This can also be used to fully disable persistence for a specific User-Agent (for example, some web crawler bots).

Combined with "appsession", it can also help reduce HAProxy memory usage, as the appsession table won't grow if persistence is ignored.

The persistence is ignored when an "if" condition is met, or unless an "unless" condition is met.

See also : "force-persist", "cookie", and section 7 about ACL usage.

`log global`

`log <address> <facility> [<level> [<minlevel>]]`

Enable per-instance logging of events and traffic.

May be used in sections : defaults | frontend | listen | backend
 yes | yes | yes | yes

Arguments :

`global` should be used when the instance's logging parameters are the same as the global ones. This is the most common usage. "global" replaces <address>, <facility> and <level> with those of the log entries found in the "global" section. Only one "log global" statement may be used per instance, and this form takes no other parameter.

`<address>` indicates where to send the logs. It takes the same format as for the "global" section's logs, and can be one of :

- An IPv4 address optionally followed by a colon (':') and a UDP port. If no port is specified, 514 is used by default (the standard syslog port).
- A filesystem path to a UNIX domain socket, keeping in mind considerations for chroot (be sure the path is accessible inside the chroot) and uid/gid (be sure the path is appropriately writeable).

`<facility>` must be one of the 24 standard syslog facilities :

```
kern  user  mail  daemon auth  syslog lpr   news
uucp  cron  auth2 ftp   ntp   audit alert cron2
local0 local1 local2 local3 local4 local5 local6 local7
```

`<level>` is optional and can be specified to filter outgoing messages. By default, all messages are sent. If a level is specified, only messages with a severity at least as important as this level will be sent. An optional minimum level can be specified. If it is set, logs emitted with a more severe level than this one will be capped to this level. This is used to avoid sending "emerg" messages on all terminals on some default syslog configurations. Eight levels are known :

```
emerg alert crit  err   warning notice info  debug
```

Note that up to two "log" entries may be specified per instance. However, if "log global" is used and if the "global" section already contains 2 log entries, then additional log entries will be ignored.

Also, it is important to keep in mind that it is the frontend which decides what to log from a connection, and that in case of content switching, the log entries from the backend will be ignored. Connections are logged at level "info".

However, backend log declaration define how and where servers status changes will be logged. Level "notice" will be used to indicate a server going up, "warning" will be used for termination signals and definitive service termination, and "alert" will be used for when a server goes down.

Note : According to RFC3164, messages are truncated to 1024 bytes before being emitted.

Example :

```
log global
log 127.0.0.1:514 local0 notice      # only send important events
log 127.0.0.1:514 local0 notice notice # same but limit output level
```

maxconn <conns>

Fix the maximum number of concurrent connections on a frontend

May be used in sections : defaults | frontend | listen | backend
 yes | yes | yes | no

Arguments :

<conns> is the maximum number of concurrent connections the frontend will accept to serve. Excess connections will be queued by the system in the socket's listen queue and will be served once a connection closes.

If the system supports it, it can be useful on big sites to raise this limit very high so that haproxy manages connection queues, instead of leaving the clients with unanswered connection attempts. This value should not exceed the global maxconn. Also, keep in mind that a connection contains two buffers of 8kB each, as well as some other data resulting in about 17 kB of RAM being consumed per established connection. That means that a medium system equipped with 1GB of RAM can withstand around 40000-50000 concurrent connections if properly tuned.

Also, when <conns> is set to large values, it is possible that the servers are not sized to accept such loads, and for this reason it is generally wise to assign them some reasonable connection limits.

See also : "server", global section's "maxconn", "fullconn"

mode { tcp|http|health }

Set the running mode or protocol of the instance

May be used in sections : defaults | frontend | listen | backend
 yes | yes | yes | yes

Arguments :

tcp The instance will work in pure TCP mode. A full-duplex connection will be established between clients and servers, and no layer 7 examination will be performed. This is the default mode. It should be used for SSL, SSH, SMTP, ...

http The instance will work in HTTP mode. The client request will be analyzed in depth before connecting to any server. Any request which is not RFC-compliant will be rejected. Layer 7 filtering, processing and switching will be possible. This is the mode which

brings HAProxy most of its value.

health The instance will work in "health" mode. It will just reply "OK" to incoming connections and close the connection. Nothing will be logged. This mode is used to reply to external components health checks. This mode is deprecated and should not be used anymore as it is possible to do the same and even better by combining TCP or HTTP modes with the "monitor" keyword.

When doing content switching, it is mandatory that the frontend and the backend are in the same mode (generally HTTP), otherwise the configuration will be refused.

Example :

```
defaults http_instances
mode http
```

See also : "monitor", "monitor-net"

monitor fail { if | unless } <condition>

Add a condition to report a failure to a monitor HTTP request.

May be used in sections :

defaults	frontend	listen	backend
no	yes	yes	no

Arguments :

if <cond> the monitor request will fail if the condition is satisfied, and will succeed otherwise. The condition should describe a combined test which must induce a failure if all conditions are met, for instance a low number of servers both in a backend and its backup.

unless <cond> the monitor request will succeed only if the condition is satisfied, and will fail otherwise. Such a condition may be based on a test on the presence of a minimum number of active servers in a list of backends.

This statement adds a condition which can force the response to a monitor request to report a failure. By default, when an external component queries the URI dedicated to monitoring, a 200 response is returned. When one of the conditions above is met, haproxy will return 503 instead of 200. This is very useful to report a site failure to an external component which may base routing advertisements between multiple sites on the availability reported by haproxy. In this case, one would rely on an ACL involving the "nbsrv" criterion. Note that "monitor fail" only works in HTTP mode. Both status messages may be tweaked using "errorfile" or "errorloc" if needed.

Example:

```
frontend www
  mode http
  acl site_dead nbsrv(dynamic) lt 2
  acl site_dead nbsrv(static) lt 2
  monitor-uri /site_alive
  monitor fail if site_dead
```

See also : "monitor-net", "monitor-uri", "errorfile", "errorloc"

monitor-net <source>

Declare a source network which is limited to monitor requests

May be used in sections :

	defaults	frontend	listen	backend
	yes	yes	yes	no

Arguments :

<source> is the source IPv4 address or network which will only be able to get monitor responses to any request. It can be either an IPv4 address, a host name, or an address followed by a slash ('/') followed by a mask.

In TCP mode, any connection coming from a source matching **<source>** will cause the connection to be immediately closed without any log. This allows another equipment to probe the port and verify that it is still listening, without forwarding the connection to a remote server.

In HTTP mode, a connection coming from a source matching **<source>** will be accepted, the following response will be sent without waiting for a request, then the connection will be closed : "HTTP/1.0 200 OK". This is normally enough for any front-end HTTP probe to detect that the service is UP and running without forwarding the request to a backend server.

Monitor requests are processed very early. It is not possible to block nor divert them using ACLs. They cannot be logged either, and it is the intended purpose. They are only used to report HAProxy's health to an upper component, nothing more. Right now, it is not possible to set failure conditions on requests caught by "monitor-net".

Last, please note that only one "monitor-net" statement can be specified in a frontend. If more than one is found, only the last one will be considered.

Example :

```
# addresses .252 and .253 are just probing us.
frontend www
  monitor-net 192.168.0.252/31
```



```
monitor-uri <uri>
  Intercept a URI used by external components' monitor requests
  May be used in sections :   defaults | frontend | listen | backend
                             yes      | yes      | yes  | no
  Arguments :
    <uri>      is the exact URI which we want to intercept to return HAProxy's
                health status instead of forwarding the request.
```

When an HTTP request referencing `<uri>` will be received on a frontend, HAProxy will not forward it nor log it, but instead will return either "HTTP/1.0 200 OK" or "HTTP/1.0 503 Service unavailable", depending on failure conditions defined with "monitor fail". This is normally enough for any front-end HTTP probe to detect that the service is UP and running without forwarding the request to a backend server. Note that the HTTP method, the version and all headers are ignored, but the request must at least be valid at the HTTP level. This keyword may only be used with an HTTP-mode frontend.

Monitor requests are processed very early. It is not possible to block nor divert them using ACLs. They cannot be logged either, and it is the intended purpose. They are only used to report HAProxy's health to an upper component, nothing more. However, it is possible to add any number of conditions using "monitor fail" and ACLs so that the result can be adjusted to whatever check can be imagined (most often the number of available servers in a backend).

```
Example :
# Use /haproxy_test to report haproxy's status
frontend www
    mode http
    monitor-uri /haproxy_test
```

See also : "monitor fail", "monitor-net"

```
option abortonclose
no option abortonclose
    Enable or disable early dropping of aborted requests pending in queues.
    May be used in sections :      defaults | frontend | listen | backend
                                yes      |      no   |   yes  |   yes
    Arguments : none
```

In presence of very high loads, the servers will take some time to respond. The per-instance connection queue will inflate, and the response time will increase respective to the size of the queue times the average per-session

response time. When clients will wait for more than a few seconds, they will often hit the "STOP" button on their browser, leaving a useless request in the queue, and slowing down other users, and the servers as well, because the request will eventually be served, then aborted at the first error encountered while delivering the response.

As there is no way to distinguish between a full STOP and a simple output close on the client side, HTTP agents should be conservative and consider that the client might only have closed its output channel while waiting for the response. However, this introduces risks of congestion when lots of users do the same, and is completely useless nowadays because probably no client at all will close the session while waiting for the response. Some HTTP agents support this behaviour (Squid, Apache, HAProxy), and others do not (TUX, most hardware-based load balancers). So the probability for a closed input channel to represent a user hitting the "STOP" button is close to 100%, and the risk of being the single component to break rare but valid traffic is extremely low, which adds to the temptation to be able to abort a session early while still not served and not pollute the servers.

In HAProxy, the user can choose the desired behaviour using the option "abortonclose". By default (without the option) the behaviour is HTTP compliant and aborted requests will be served. But when the option is specified, a session with an incoming channel closed will be aborted while it is still possible, either pending in the queue for a connection slot, or during the connection establishment if the server has not yet acknowledged the connection request. This considerably reduces the queue size and the load on saturated servers when users are tempted to click on STOP, which in turn reduces the response time for other users.

If this option has been enabled in a "defaults" section, it can be disabled in a specific instance by prepending the "no" keyword before it.

See also : "timeout queue" and server's "maxconn" and "maxqueue" parameters

option accept-invalid-http-request

no option accept-invalid-http-request

Enable or disable relaxing of HTTP request parsing

May be used in sections :	defaults		frontend		listen		backend
	yes		yes		yes		no

Arguments : none

By default, HAProxy complies with RFC2616 in terms of message parsing. This means that invalid characters in header names are not permitted and cause an error to be returned to the client. This is the desired behaviour as such forbidden characters are essentially used to build attacks exploiting server

weaknesses, and bypass security filtering. Sometimes, a buggy browser or server will emit invalid header names for whatever reason (configuration, implementation) and the issue will not be immediately fixed. In such a case, it is possible to relax HAProxy's header name parser to accept any character even if that does not make sense, by specifying this option.

This option should never be enabled by default as it hides application bugs and open security breaches. It should only be deployed after a problem has been confirmed.

When this option is enabled, erroneous header names will still be accepted in requests, but the complete request will be captured in order to permit later analysis using the "show errors" request on the UNIX stats socket. Doing this also helps confirming that the issue has been solved.

If this option has been enabled in a "defaults" section, it can be disabled in a specific instance by prepending the "no" keyword before it.

See also : "option accept-invalid-http-response" and "show errors" on the stats socket.

option accept-invalid-http-response

no option accept-invalid-http-response

Enable or disable relaxing of HTTP response parsing

May be used in sections :	defaults		frontend		listen		backend
	yes		no		yes		yes

Arguments : none

By default, HAProxy complies with RFC2616 in terms of message parsing. This means that invalid characters in header names are not permitted and cause an error to be returned to the client. This is the desired behaviour as such forbidden characters are essentially used to build attacks exploiting server weaknesses, and bypass security filtering. Sometimes, a buggy browser or server will emit invalid header names for whatever reason (configuration, implementation) and the issue will not be immediately fixed. In such a case, it is possible to relax HAProxy's header name parser to accept any character even if that does not make sense, by specifying this option.

This option should never be enabled by default as it hides application bugs and open security breaches. It should only be deployed after a problem has been confirmed.

When this option is enabled, erroneous header names will still be accepted in responses, but the complete response will be captured in order to permit later analysis using the "show errors" request on the UNIX stats socket.

Doing this also helps confirming that the issue has been solved.

If this option has been enabled in a "defaults" section, it can be disabled in a specific instance by prepending the "no" keyword before it.

See also : "option accept-invalid-http-request" and "show errors" on the stats socket.

option allbackups

no option allbackups

Use either all backup servers at a time or only the first one

May be used in sections :	defaults		frontend		listen		backend
	yes		no		yes		yes

Arguments : none

By default, the first operational backup server gets all traffic when normal servers are all down. Sometimes, it may be preferred to use multiple backups at once, because one will not be enough. When "option allbackups" is enabled, the load balancing will be performed among all backup servers when all normal ones are unavailable. The same load balancing algorithm will be used and the servers' weights will be respected. Thus, there will not be any priority order between the backup servers anymore.

This option is mostly used with static server farms dedicated to return a "sorry" page when an application is completely offline.

If this option has been enabled in a "defaults" section, it can be disabled in a specific instance by prepending the "no" keyword before it.

option checkcache

no option checkcache

Analyze all server responses and block requests with cacheable cookies

May be used in sections :	defaults		frontend		listen		backend
	yes		no		yes		yes

Arguments : none

Some high-level frameworks set application cookies everywhere and do not always let enough control to the developer to manage how the responses should be cached. When a session cookie is returned on a cacheable object, there is a high risk of session crossing or stealing between users traversing the same caches. In some situations, it is better to block the response than to let some sensitive session information go in the wild.

The option "checkcache" enables deep inspection of all server responses for

strict compliance with HTTP specification in terms of cacheability. It carefully checks "Cache-control", "Pragma" and "Set-cookie" headers in server response to check if there's a risk of caching a cookie on a client-side proxy. When this option is enabled, the only responses which can be delivered to the client are :

- all those without "Set-Cookie" header ;
- all those with a return code other than 200, 203, 206, 300, 301, 410, provided that the server has not set a "Cache-control: public" header ;
- all those that come from a POST request, provided that the server has not set a 'Cache-Control: public' header ;
- those with a 'Pragma: no-cache' header
- those with a 'Cache-control: private' header
- those with a 'Cache-control: no-store' header
- those with a 'Cache-control: max-age=0' header
- those with a 'Cache-control: s-maxage=0' header
- those with a 'Cache-control: no-cache' header
- those with a 'Cache-control: no-cache="set-cookie"' header
- those with a 'Cache-control: no-cache="set-cookie,' header (allowing other fields after set-cookie)

If a response doesn't respect these requirements, then it will be blocked just as if it was from an "rspdeny" filter, with an "HTTP 502 bad gateway". The session state shows "PH--" meaning that the proxy blocked the response during headers processing. Additionally, an alert will be sent in the logs so that admins are informed that there's something to be fixed.

Due to the high impact on the application, the application should be tested in depth with the option enabled before going to production. It is also a good practice to always activate it during tests, even if it is not used in production, as it will report potentially dangerous application behaviours.

If this option has been enabled in a "defaults" section, it can be disabled in a specific instance by prepending the "no" keyword before it.

option clitcpka

no option clitcpka

Enable or disable the sending of TCP keepalive packets on the client side

May be used in sections : defaults | frontend | listen | backend

yes | yes | yes | no

Arguments : none

When there is a firewall or any session-aware component between a client and a server, and when the protocol involves very long sessions with long idle periods (eg: remote desktops), there is a risk that one of the intermediate components decides to expire a session which has remained idle for too long.

Enabling socket-level TCP keep-alives makes the system regularly send packets to the other end of the connection, leaving it active. The delay between keep-alive probes is controlled by the system only and depends both on the operating system and its tuning parameters.

It is important to understand that keep-alive packets are neither emitted nor received at the application level. It is only the network stacks which sees them. For this reason, even if one side of the proxy already uses keep-alives to maintain its connection alive, those keep-alive packets will not be forwarded to the other side of the proxy.

Please note that this has nothing to do with HTTP keep-alive.

Using option "clitcpka" enables the emission of TCP keep-alive probes on the client side of a connection, which should help when session expirations are noticed between HAProxy and a client.

If this option has been enabled in a "defaults" section, it can be disabled in a specific instance by prepending the "no" keyword before it.

See also : "option srvtcpka", "option tcpka"

option contstats

Enable continuous traffic statistics updates

May be used in sections :

defaults	frontend	listen	backend
yes	yes	yes	no

Arguments : none

By default, counters used for statistics calculation are incremented only when a session finishes. It works quite well when serving small objects, but with big ones (for example large images or archives) or with A/V streaming, a graph generated from haproxy counters looks like a hedgehog. With this option enabled counters get incremented continuously, during a whole session. Recounting touches a hotpath directly so it is not enabled by default, as it has small performance impact (~0.5%).

option dontlog-normal

no option dontlog-normal

Enable or disable logging of normal, successful connections

May be used in sections :

defaults	frontend	listen	backend
yes	yes	yes	no

Arguments : none

There are large sites dealing with several thousand connections per second and for which logging is a major pain. Some of them are even forced to turn logs off and cannot debug production issues. Setting this option ensures that normal connections, those which experience no error, no timeout, no retry nor redispatch, will not be logged. This leaves disk space for anomalies. In HTTP mode, the response status code is checked and return codes 5xx will still be logged.

It is strongly discouraged to use this option as most of the time, the key to complex issues is in the normal logs which will not be logged here. If you need to separate logs, see the "log-separate-errors" option instead.

See also : "log", "dontlognull", "log-separate-errors" and section 8 about logging.

```
option dontlognull
no option dontlognull
  Enable or disable logging of null connections
  May be used in sections :      defaults | frontend | listen | backend
                                yes      |    yes   |    yes  |    no
  Arguments : none
```

In certain environments, there are components which will regularly connect to various systems to ensure that they are still alive. It can be the case from another load balancer as well as from monitoring systems. By default, even a simple port probe or scan will produce a log. If those connections pollute the logs too much, it is possible to enable option "dontlognull" to indicate that a connection on which no data has been transferred will not be logged, which typically corresponds to those probes.

It is generally recommended not to use this option in uncontrolled environments (eg: internet), otherwise scans and other malicious activities would not be logged.

If this option has been enabled in a "defaults" section, it can be disabled in a specific instance by prepending the "no" keyword before it.

See also : "log", "monitor-net", "monitor-uri" and section 8 about logging.

option forceclose				
no option forceclose				
Enable or disable active connection closing after response is transferred.				
May be used in sections :				
defaults	frontend	listen	backend	
yes	yes	yes	yes	

Arguments : none

Some HTTP servers do not necessarily close the connections when they receive the "Connection: close" set by "option httpclose", and if the client does not close either, then the connection remains open till the timeout expires. This causes high number of simultaneous connections on the servers and shows high global session times in the logs.

When this happens, it is possible to use "option forceclose". It will actively close the outgoing server channel as soon as the server has finished to respond. This option implicitly enables the "httpclose" option. Note that this option also enables the parsing of the full request and response, which means we can close the connection to the server very quickly, releasing some resources earlier than with httpclose.

This option may also be combined with "option http-pretend-keepalive", which will disable sending of the "Connection: close" header, but will still cause the connection to be closed once the whole response is received.

If this option has been enabled in a "defaults" section, it can be disabled in a specific instance by prepending the "no" keyword before it.

See also : "option httpclose" and "option http-pretend-keepalive"

```
option forwardfor [ except <network> ] [ header <name> ] [ if-none ]
Enable insertion of the X-Forwarded-For header to requests sent to servers
May be used in sections :   defaults | frontend | listen | backend
                           yes      |   yes    |   yes    |   yes
```

Arguments :

<network> is an optional argument used to disable this option for sources matching <network>
 <name> an optional argument to specify a different "X-Forwarded-For" header name.

Since HAProxy works in reverse-proxy mode, the servers see its IP address as their client address. This is sometimes annoying when the client's IP address is expected in server logs. To solve this problem, the well-known HTTP header "X-Forwarded-For" may be added by HAProxy to all requests sent to the server. This header contains a value representing the client's IP address. Since this header is always appended at the end of the existing header list, the server must be configured to always use the last occurrence of this header only. See the server's manual to find how to enable use of this standard header. Note that only the last occurrence of the header must be used, since it is really possible that the client has already brought one.

The keyword "header" may be used to supply a different header name to replace the default "X-Forwarded-For". This can be useful where you might already have a "X-Forwarded-For" header from a different application (eg: stunnel), and you need preserve it. Also if your backend server doesn't use the "X-Forwarded-For" header and requires different one (eg: Zeus Web Servers require "X-Cluster-Client-IP").

Sometimes, a same HAProxy instance may be shared between a direct client access and a reverse-proxy access (for instance when an SSL reverse-proxy is used to decrypt HTTPS traffic). It is possible to disable the addition of the header for a known source address or network by adding the "except" keyword followed by the network address. In this case, any source IP matching the network will not cause an addition of this header. Most common uses are with private networks or 127.0.0.1.

Alternatively, the keyword "if-none" states that the header will only be added if it is not present. This should only be used in perfectly trusted environment, as this might cause a security issue if headers reaching haproxy are under the control of the end-user.

This option may be specified either in the frontend or in the backend. If at least one of them uses it, the header will be added. Note that the backend's setting of the header subargument takes precedence over the frontend's if both are defined. In the case of the "if-none" argument, if at least one of the frontend or the backend does not specify it, it wants the addition to be mandatory, so it wins.

It is important to note that by default, HAProxy works in tunnel mode and only inspects the first request of a connection, meaning that only the first request will have the header appended, which is certainly not what you want. In order to fix this, ensure that any of the "httpclose", "forceclose" or "http-server-close" options is set when using this option.

Examples :

```
# Public HTTP address also used by stunnel on the same machine
frontend www
    mode http
    option forwardfor except 127.0.0.1 # stunnel already adds the header

# Those servers want the IP Address in X-Client
backend www
    mode http
    option forwardfor header X-Client
```

See also : "option httpclose", "option http-server-close",
"option forceclose"

```
option http-no-delay
no option http-no-delay
  Instruct the system to favor low interactive delays over performance in HTTP
  May be used in sections :   defaults | frontend | listen | backend
                             yes      |   yes    |   yes  |   yes

Arguments : none
```

In HTTP, each payload is unidirectional and has no notion of interactivity. Any agent is expected to queue data somewhat for a reasonably low delay. There are some very rare server-to-server applications that abuse the HTTP protocol and expect the payload phase to be highly interactive, with many interleaved data chunks in both directions within a single request. This is absolutely not supported by the HTTP specification and will not work across most proxies or servers. When such applications attempt to do this through haproxy, it works but they will experience high delays due to the network optimizations which favor performance by instructing the system to wait for enough data to be available in order to only send full packets. Typical delays are around 200 ms per round trip. Note that this only happens with abnormal uses. Normal uses such as CONNECT requests nor WebSockets are not affected.

When "option http-no-delay" is present in either the frontend or the backend used by a connection, all such optimizations will be disabled in order to make the exchanges as fast as possible. Of course this offers no guarantee on the functionality, as it may break at any other place. But if it works via HAProxy, it will work as fast as possible. This option should never be used by default, and should never be used at all unless such a buggy application is discovered. The impact of using this option is an increase of bandwidth usage and CPU usage, which may significantly lower performance in high latency environments.

```
option http-pretend-keepalive
no option http-pretend-keepalive
  Define whether haproxy will announce keepalive to the server or not
  May be used in sections :   defaults | frontend | listen | backend
                             yes      |   yes    |   yes  |   yes

Arguments : none
```

When running with "option http-server-close" or "option forceclose", haproxy adds a "Connection: close" header to the request forwarded to the server. Unfortunately, when some servers see this header, they automatically refrain from using the chunked encoding for responses of unknown length, while this is totally unrelated. The immediate effect is that this prevents haproxy from

maintaining the client connection alive. A second effect is that a client or a cache could receive an incomplete response without being aware of it, and consider the response complete.

By setting "option http-pretend-keepalive", haproxy will make the server believe it will keep the connection alive. The server will then not fall back to the abnormal undesired above. When haproxy gets the whole response, it will close the connection with the server just as it would do with the "forceclose" option. That way the client gets a normal response and the connection is correctly closed on the server side.

It is recommended not to enable this option by default, because most servers will more efficiently close the connection themselves after the last packet, and release its buffers slightly earlier. Also, the added packet on the network could slightly reduce the overall peak performance. However it is worth noting that when this option is enabled, haproxy will have slightly less work to do. So if haproxy is the bottleneck on the whole architecture, enabling this option might save a few CPU cycles.

This option may be set both in a frontend and in a backend. It is enabled if at least one of the frontend or backend holding a connection has it enabled. This option may be combined with "option httpclose", which will cause keepalive to be announced to the server and close to be announced to the client. This practice is discouraged though.

If this option has been enabled in a "defaults" section, it can be disabled in a specific instance by prepending the "no" keyword before it.

See also : "option forceclose" and "option http-server-close"

option http-server-close

no option http-server-close

Enable or disable HTTP connection closing on the server side

May be used in sections : defaults | frontend | listen | backend

yes		yes		yes		yes
-----	--	-----	--	-----	--	-----

Arguments : none

By default, when a client communicates with a server, HAProxy will only analyze, log, and process the first request of each connection. Setting "option http-server-close" enables HTTP connection-close mode on the server side while keeping the ability to support HTTP keep-alive and pipelining on the client side. This provides the lowest latency on the client side (slow network) and the fastest session reuse on the server side to save server resources, similarly to "option forceclose". It also permits non-keepalive capable servers to be served in keep-alive mode to the clients if they

conform to the requirements of RFC2616. Please note that some servers do not always conform to those requirements when they see "Connection: close" in the request. The effect will be that keep-alive will never be used. A workaround consists in enabling "option http-pretend-keepalive".

At the moment, logs will not indicate whether requests came from the same session or not. The accept date reported in the logs corresponds to the end of the previous request, and the request time corresponds to the time spent waiting for a new request. The keep-alive request time is still bound to the timeout defined by "timeout http-keep-alive" or "timeout http-request" if not set.

This option may be set both in a frontend and in a backend. It is enabled if at least one of the frontend or backend holding a connection has it enabled. It is worth noting that "option forceclose" has precedence over "option http-server-close" and that combining "http-server-close" with "httpclose" basically achieve the same result as "forceclose".

If this option has been enabled in a "defaults" section, it can be disabled in a specific instance by prepending the "no" keyword before it.

See also : "option forceclose", "option http-pretend-keepalive",
"option httpclose" and "1.1. The HTTP transaction model".

option http-use-proxy-header

no option http-use-proxy-header

Make use of non-standard Proxy-Connection header instead of Connection

May be used in sections :	defaults		frontend		listen		backend
	yes		yes		yes		no

Arguments : none

While RFC2616 explicitly states that HTTP/1.1 agents must use the Connection header to indicate their wish of persistent or non-persistent connections, both browsers and proxies ignore this header for proxied connections and make use of the undocumented, non-standard Proxy-Connection header instead. The issue begins when trying to put a load balancer between browsers and such proxies, because there will be a difference between what haproxy understands and what the client and the proxy agree on.

By setting this option in a frontend, haproxy can automatically switch to use that non-standard header if it sees proxied requests. A proxied request is defined here as one where the URI begins with neither a '/' nor a '*'. The choice of header only affects requests passing through proxies making use of one of the "httpclose", "forceclose" and "http-server-close" options. Note that this option can only be specified in a frontend and will affect the

request along its whole life.

Also, when this option is set, a request which requires authentication will automatically switch to use proxy authentication headers if it is itself a proxied request. That makes it possible to check or enforce authentication in front of an existing proxy.

This option should normally never be used, except in front of a proxy.

See also : "option httpclose", "option forceclose" and "option http-server-close".

option httpchk

option httpchk <uri>

option httpchk <method> <uri>

option httpchk <method> <uri> <version>

Enable HTTP protocol to check on the servers health

May be used in sections :	defaults		frontend		listen		backend
	yes		no		yes		yes

Arguments :

<method> is the optional HTTP method used with the requests. When not set, the "OPTIONS" method is used, as it generally requires low server processing and is easy to filter out from the logs. Any method may be used, though it is not recommended to invent non-standard ones.

<uri> is the URI referenced in the HTTP requests. It defaults to " / " which is accessible by default on almost any server, but may be changed to any other URI. Query strings are permitted.

<version> is the optional HTTP version string. It defaults to "HTTP/1.0" but some servers might behave incorrectly in HTTP 1.0, so turning it to HTTP/1.1 may sometimes help. Note that the Host field is mandatory in HTTP/1.1, and as a trick, it is possible to pass it after "\r\n" following the version string.

By default, server health checks only consist in trying to establish a TCP connection. When "option httpchk" is specified, a complete HTTP request is sent once the TCP connection is established, and responses 2xx and 3xx are considered valid, while all other ones indicate a server failure, including the lack of any response.

The port and interval are specified in the server configuration.

This option does not necessarily require an HTTP backend, it also works with

plain TCP backends. This is particularly useful to check simple scripts bound to some dedicated ports using the `inetd` daemon.

Examples :

```
# Relay HTTPS traffic to Apache instance and check service availability
# using HTTP request "OPTIONS * HTTP/1.1" on port 80.
backend https_relay
    mode tcp
    option httpchk OPTIONS * HTTP/1.1\r\nHost:\ www
    server apache1 192.168.1.1:443 check port 80
```

See also : "option ssl-hello-chk", "option smtpchk", "option mysql-check", "http-check" and the "check", "port" and "inter" server options.

`option httpclose`

`no option httpclose`

Enable or disable passive HTTP connection closing

May be used in sections :	defaults		frontend		listen		backend
	yes		yes		yes		yes

Arguments : none

By default, when a client communicates with a server, HAProxy will only analyze, log, and process the first request of each connection. If "option httpclose" is set, it will check if a "Connection: close" header is already set in each direction, and will add one if missing. Each end should react to this by actively closing the TCP connection after each transfer, thus resulting in a switch to the HTTP close mode. Any "Connection" header different from "close" will also be removed.

It seldom happens that some servers incorrectly ignore this header and do not close the connection eventhough they reply "Connection: close". For this reason, they are not compatible with older HTTP 1.0 browsers. If this happens it is possible to use the "option forceclose" which actively closes the request connection once the server responds. Option "forceclose" also releases the server connection earlier because it does not have to wait for the client to acknowledge it.

This option may be set both in a frontend and in a backend. It is enabled if at least one of the frontend or backend holding a connection has it enabled. If "option forceclose" is specified too, it has precedence over "httpclose". If "option http-server-close" is enabled at the same time as "httpclose", it basically achieves the same result as "option forceclose".

If this option has been enabled in a "defaults" section, it can be disabled in a specific instance by prepending the "no" keyword before it.

It sometimes happens that people need a pure HTTP proxy which understands basic proxy requests without caching nor any fancy feature. In this case, it may be worth setting up an HAProxy instance with the "option http_proxy" set. In this mode, no server is declared, and the connection is forwarded to the IP address and port found in the URL after the "http://" scheme.

No host address resolution is performed, so this only works when pure IP addresses are passed. Since this option's usage perimeter is rather limited, it will probably be used only by experts who know they need exactly it. Last, if the clients are susceptible of sending keep-alive requests, it will be needed to add "option httpclose" to ensure that all requests will correctly be analyzed.

If this option has been enabled in a "defaults" section, it can be disabled in a specific instance by prepending the "no" keyword before it.

Example :

```
# this backend understands HTTP proxy requests and forwards them directly.
backend direct_forward
    option httpclose
    option http_proxy
```

See also : "option httpclose"

option independant-streams

no option independant-streams

Enable or disable independant timeout processing for both directions

May be used in sections :

defaults		frontend		listen		backend
yes		yes		yes		yes

Arguments : none

By default, when data is sent over a socket, both the write timeout and the read timeout for that socket are refreshed, because we consider that there is activity on that socket, and we have no other means of guessing if we should receive data or not.

While this default behaviour is desirable for almost all applications, there exists a situation where it is desirable to disable it, and only refresh the read timeout if there are incoming data. This happens on sessions with large timeouts and low amounts of exchanged data such as telnet session. If the server suddenly disappears, the output data accumulates in the system's socket buffers, both timeouts are correctly refreshed, and there is no way to know the server does not receive them, so we don't timeout. However, when the underlying protocol always echoes sent data, it would be enough by itself to detect the issue using the read timeout. Note that this problem does not happen with more verbose protocols because data won't accumulate long in the socket buffers.

When this option is set on the frontend, it will disable read timeout updates on data sent to the client. There probably is little use of this case. When

the option is set on the backend, it will disable read timeout updates on data sent to the server. Doing so will typically break large HTTP posts from slow lines, so use it with caution.

See also : "timeout client" and "timeout server"

option ldap-check

Use LDAPv3 health checks for server testing

May be used in sections :

defaults	frontend	listen	backend
yes	no	yes	yes

Arguments : none

It is possible to test that the server correctly talks LDAPv3 instead of just testing that it accepts the TCP connection. When this option is set, an LDAPv3 anonymous simple bind message is sent to the server, and the response is analyzed to find an LDAPv3 bind response message.

The server is considered valid only when the LDAP response contains success resultCode (<http://tools.ietf.org/html/rfc4511#section-4.1.9>).

Logging of bind requests is server dependent see your documentation how to configure it.

Example :

```
option ldap-check
```

See also : "option httpchk"

option log-health-checks

no option log-health-checks

Enable or disable logging of health checks

May be used in sections :

defaults	frontend	listen	backend
yes	no	yes	yes

Arguments : none

Enable health checks logging so it possible to check for example what was happening before a server crash. Failed health check are logged if server is UP and succeeded health checks if server is DOWN, so the amount of additional information is limited.

If health check logging is enabled no health check status is printed when servers is set up UP/DOWN/ENABLED/DISABLED.

See also: "log" and section 8 about logging.

```
option log-separate-errors
no option log-separate-errors
  Change log level for non-completely successful connections
  May be used in sections :   defaults | frontend | listen | backend
                             yes      |   yes    |   yes  |   no
Arguments : none
```

Sometimes looking for errors in logs is not easy. This option makes haproxy raise the level of logs containing potentially interesting information such as errors, timeouts, retries, redispaches, or HTTP status codes 5xx. The level changes from "info" to "err". This makes it possible to log them separately to a different file with most syslog daemons. Be careful not to remove them from the original file, otherwise you would lose ordering which provides very important information.

Using this option, large sites dealing with several thousand connections per second may log normal traffic to a rotating buffer and only archive smaller error logs.

See also : "log", "dontlognull", "dontlog-normal" and section 8 about logging.

```
option logasap
no option logasap
  Enable or disable early logging of HTTP requests
  May be used in sections :   defaults | frontend | listen | backend
                             yes      |   yes    |   yes  |   no
Arguments : none
```

By default, HTTP requests are logged upon termination so that the total transfer time and the number of bytes appear in the logs. When large objects are being transferred, it may take a while before the request appears in the logs. Using "option logasap", the request gets logged as soon as the server sends the complete headers. The only missing information in the logs will be the total number of bytes which will indicate everything except the amount of data transferred, and the total time which will not take the transfer time into account. In such a situation, it's a good practice to capture the "Content-Length" response header so that the logs at least indicate how many bytes are expected to be transferred.

Examples :

```
listen http_proxy 0.0.0.0:80
mode http
```

```
option httplog
option logasap
log 192.168.2.200 local3
```

```
>>> Feb  6 12:14:14 localhost \
haproxy[14389]: 10.0.1.2:33317 [06/Feb/2009:12:14:14.655] http-in \
static/srv1 9/10/7/14/+30 200 +243 - - ---- 3/1/1/1/0 1/0 \
"GET /image.iso HTTP/1.0"
```

See also : "option httplog", "capture response header", and section 8 about logging.

```
option mysql-check [ user <username> ]
Use MySQL health checks for server testing
May be used in sections :   defaults | frontend | listen | backend
                             yes      |    no    |   yes  |   yes
```

Arguments :

```
user <username> This is the username which will be used when connecting
to MySQL server.
```

If you specify a username, the check consists of sending two MySQL packet, one Client Authentication packet, and one QUIT packet, to correctly close MySQL session. We then parse the MySQL Handshake Initialisation packet and/or Error packet. It is a basic but useful test which does not produce error nor aborted connect on the server. However, it requires adding an authorization in the MySQL table, like this :

```
USE mysql;
INSERT INTO user (Host,User) values ('<ip_of_haproxy>','<username>');
FLUSH PRIVILEGES;
```

If you don't specify a username (it is deprecated and not recommended), the check only consists in parsing the Mysql Handshake Initialisation packet or Error packet, we don't send anything in this mode. It was reported that it can generate lockout if check is too frequent and/or if there is not enough traffic. In fact, you need in this case to check MySQL "max_connect_errors" value as if a connection is established successfully within fewer than MySQL "max_connect_errors" attempts after a previous connection was interrupted, the error count for the host is cleared to zero. If HAProxy's server get blocked, the "FLUSH HOSTS" statement is the only way to unblock it.

Remember that this does not check database presence nor database consistency. To do this, you can use an external check with xinetd for example.

The check requires MySQL >=3.22, for older version, please use TCP check.

See also: "option httpchk"

If this option has been enabled in a "defaults" section, it can be disabled in a specific instance by prepending the "no" keyword before it.

```
option originalto [ except <network> ] [ header <name> ]
```

Enable insertion of the X-Original-To header to requests sent to servers

May be used in sections : defaults | frontend | listen | backend

yes | yes | yes | yes

Arguments :

<network> is an optional argument used to disable this option for sources matching <network>
 <name> an optional argument to specify a different "X-Original-To" header name.

Since HAProxy can work in transparent mode, every request from a client can be redirected to the proxy and HAProxy itself can proxy every request to a complex SQUID environment and the destination host from SO_ORIGINAL_DST will be lost. This is annoying when you want access rules based on destination ip addresses. To solve this problem, a new HTTP header "X-Original-To" may be added by HAProxy to all requests sent to the server. This header contains a value representing the original destination IP address. Since this must be configured to always use the last occurrence of this header only. Note that only the last occurrence of the header must be used, since it is really possible that the client has already brought one.

The keyword "header" may be used to supply a different header name to replace the default "X-Original-To". This can be useful where you might already have a "X-Original-To" header from a different application, and you need preserve it. Also if your backend server doesn't use the "X-Original-To" header and requires different one.

Sometimes, a same HAProxy instance may be shared between a direct client access and a reverse-proxy access (for instance when an SSL reverse-proxy is used to decrypt HTTPS traffic). It is possible to disable the addition of the header for a known source address or network by adding the "except" keyword followed by the network address. In this case, any source IP matching the network will not cause an addition of this header. Most common uses are with private networks or 127.0.0.1.

This option may be specified either in the frontend or in the backend. If at least one of them uses it, the header will be added. Note that the backend's setting of the header subargument takes precedence over the frontend's if both are defined.

It is important to note that by default, HAProxy works in tunnel mode and only inspects the first request of a connection, meaning that only the first request will have the header appended, which is certainly not what you want. In order to fix this, ensure that any of the "httpclose", "forceclose" or "http-server-close" options is set when using this option.

Examples :

```
# Original Destination address
frontend www
```

```

mode http
option originalto except 127.0.0.1

# Those servers want the IP Address in X-Client-Dst
backend www
mode http
option originalto header X-Client-Dst

```

See also : "option httpclose", "option http-server-close",
"option forceclose"

```

option persist
no option persist
Enable or disable forced persistence on down servers
May be used in sections:  defaults | frontend | listen | backend
                        yes      |    no    |   yes   |   yes
Arguments : none

```

When an HTTP request reaches a backend with a cookie which references a dead server, by default it is redispached to another server. It is possible to force the request to be sent to the dead server first using "option persist" if absolutely needed. A common use case is when servers are under extreme load and spend their time flapping. In this case, the users would still be directed to the server they opened the session on, in the hope they would be correctly served. It is recommended to use "option redispach" in conjunction with this option so that in the event it would not be possible to connect to the server at all (server definitely dead), the client would finally be redirected to another valid server.

If this option has been enabled in a "defaults" section, it can be disabled in a specific instance by prepending the "no" keyword before it.

See also : "option redispach", "retries", "force-persist"

```

option redispach
no option redispach
Enable or disable session redistribution in case of connection failure
May be used in sections:  defaults | frontend | listen | backend
                        yes      |    no    |   yes   |   yes
Arguments : none

```

In HTTP mode, if a server designated by a cookie is down, clients may definitely stick to it because they cannot flush the cookie, so they will not be able to access the service anymore.

Specifying "option redispatch" will allow the proxy to break their persistence and redistribute them to a working server.

It also allows to retry last connection to another server in case of multiple connection failures. Of course, it requires having "retries" set to a nonzero value.

This form is the preferred form, which replaces both the "redispatch" and "redis" keywords.

If this option has been enabled in a "defaults" section, it can be disabled in a specific instance by prepending the "no" keyword before it.

See also : "redispatch", "retries", "force-persist"

option smtpchk

option smtpchk <hello> <domain>

Use SMTP health checks for server testing

May be used in sections : defaults | frontend | listen | backend
 yes | no | yes | yes

Arguments :

<hello> is an optional argument. It is the "hello" command to use. It can be either "HELO" (for SMTP) or "EHLO" (for ESTMP). All other values will be turned into the default command ("HELO").

<domain> is the domain name to present to the server. It may only be specified (and is mandatory) if the hello command has been specified. By default, "localhost" is used.

When "option smtpchk" is set, the health checks will consist in TCP connections followed by an SMTP command. By default, this command is "HELO localhost". The server's return code is analyzed and only return codes starting with a "2" will be considered as valid. All other responses, including a lack of response will constitute an error and will indicate a dead server.

This test is meant to be used with SMTP servers or relays. Depending on the request, it is possible that some servers do not log each connection attempt, so you may want to experiment to improve the behaviour. Using telnet on port 25 is often easier than adjusting the configuration.

Most often, an incoming SMTP server needs to see the client's IP address for various purposes, including spam filtering, anti-spoofing and logging. When possible, it is often wise to masquerade the client's IP address when

connecting to the server using the "usesrc" argument of the "source" keyword, which requires the cttproxy feature to be compiled in.

Example :
 option smtpchk HELO mydomain.org

See also : "option httpchk", "source"

option socket-stats
 no option socket-stats

Enable or disable collecting & providing separate statistics for each socket.
 May be used in sections : defaults | frontend | listen | backend
 yes | yes | yes | no

Arguments : none

option splice-auto
 no option splice-auto

Enable or disable automatic kernel acceleration on sockets in both directions
 May be used in sections : defaults | frontend | listen | backend
 yes | yes | yes | yes

Arguments : none

When this option is enabled either on a frontend or on a backend, haproxy will automatically evaluate the opportunity to use kernel tcp splicing to forward data between the client and the server, in either direction. Haproxy uses heuristics to estimate if kernel splicing might improve performance or not. Both directions are handled independently. Note that the heuristics used are not much aggressive in order to limit excessive use of splicing. This option requires splicing to be enabled at compile time, and may be globally disabled with the global option "nossplice". Since splice uses pipes, using it requires that there are enough spare pipes.

Important note: kernel-based TCP splicing is a Linux-specific feature which first appeared in kernel 2.6.25. It offers kernel-based acceleration to transfer data between sockets without copying these data to user-space, thus providing noticeable performance gains and CPU cycles savings. Since many early implementations are buggy, corrupt data and/or are inefficient, this feature is not enabled by default, and it should be used with extreme care. While it is not possible to detect the correctness of an implementation, 2.6.29 is the first version offering a properly working implementation. In case of doubt, splicing may be globally disabled using the global "nossplice" keyword.

Example :

```
option splice-auto
```

If this option has been enabled in a "defaults" section, it can be disabled in a specific instance by prepending the "no" keyword before it.

See also : "option splice-request", "option splice-response", and global options "nosplice" and "maxpipes"

option splice-request

no option splice-request

Enable or disable automatic kernel acceleration on sockets for requests

May be used in sections : defaults | frontend | listen | backend

yes | yes | yes | yes

Arguments : none

When this option is enabled either on a frontend or on a backend, haproxy will user kernel tcp splicing whenever possible to forward data going from the client to the server. It might still use the recv/send scheme if there are no spare pipes left. This option requires splicing to be enabled at compile time, and may be globally disabled with the global option "nosplice". Since splice uses pipes, using it requires that there are enough spare pipes.

Important note: see "option splice-auto" for usage limitations.

Example :

```
option splice-request
```

If this option has been enabled in a "defaults" section, it can be disabled in a specific instance by prepending the "no" keyword before it.

See also : "option splice-auto", "option splice-response", and global options "nosplice" and "maxpipes"

option splice-response

no option splice-response

Enable or disable automatic kernel acceleration on sockets for responses

May be used in sections : defaults | frontend | listen | backend

yes | yes | yes | yes

Arguments : none

When this option is enabled either on a frontend or on a backend, haproxy will user kernel tcp splicing whenever possible to forward data going from

the server to the client. It might still use the recv/send scheme if there are no spare pipes left. This option requires splicing to be enabled at compile time, and may be globally disabled with the global option "nosplice". Since splice uses pipes, using it requires that there are enough spare pipes.

Important note: see "option splice-auto" for usage limitations.

Example :

```
option splice-response
```

If this option has been enabled in a "defaults" section, it can be disabled in a specific instance by prepending the "no" keyword before it.

See also : "option splice-auto", "option splice-request", and global options "nosplice" and "maxpipes"

option srvtcpka

no option srvtcpka

Enable or disable the sending of TCP keepalive packets on the server side

May be used in sections : defaults | frontend | listen | backend

yes		no		yes		yes
-----	--	----	--	-----	--	-----

Arguments : none

When there is a firewall or any session-aware component between a client and a server, and when the protocol involves very long sessions with long idle periods (eg: remote desktops), there is a risk that one of the intermediate components decides to expire a session which has remained idle for too long.

Enabling socket-level TCP keep-alives makes the system regularly send packets to the other end of the connection, leaving it active. The delay between keep-alive probes is controlled by the system only and depends both on the operating system and its tuning parameters.

It is important to understand that keep-alive packets are neither emitted nor received at the application level. It is only the network stacks which sees them. For this reason, even if one side of the proxy already uses keep-alives to maintain its connection alive, those keep-alive packets will not be forwarded to the other side of the proxy.

Please note that this has nothing to do with HTTP keep-alive.

Using option "srvtcpka" enables the emission of TCP keep-alive probes on the server side of a connection, which should help when session expirations are noticed between HAProxy and a server.

See also : "option clitcpka", "option tcpka"

Arguments : none

See also: "option httpchk"

Arguments : none

For this reason, in HTTP mode, HAProxy automatically asks the system to avoid sending this useless ACK on platforms which support it (currently at least Linux). It must not cause any problem, because the system will send it anyway after 40 ms if the response takes more time than expected to come.

See also : "option tcp-smart-connect"

See also : "option tcp-smart-accept"

option tcpka
 Enable or disable the sending of TCP keepalive packets on both sides
 May be used in sections : defaults | frontend | listen | backend

	yes		yes		yes		yes
--	-----	--	-----	--	-----	--	-----

Arguments : none

When there is a firewall or any session-aware component between a client and a server, and when the protocol involves very long sessions with long idle periods (eg: remote desktops), there is a risk that one of the intermediate components decides to expire a session which has remained idle for too long.

Enabling socket-level TCP keep-alives makes the system regularly send packets to the other end of the connection, leaving it active. The delay between keep-alive probes is controlled by the system only and depends both on the operating system and its tuning parameters.

It is important to understand that keep-alive packets are neither emitted nor received at the application level. It is only the network stacks which sees them. For this reason, even if one side of the proxy already uses keep-alives to maintain its connection alive, those keep-alive packets will not be forwarded to the other side of the proxy.

Please note that this has nothing to do with HTTP keep-alive.

Using option "tcpka" enables the emission of TCP keep-alive probes on both the client and server sides of a connection. Note that this is meaningful only in "defaults" or "listen" sections. If this option is used in a frontend, only the client side will get keep-alives, and if this option is used in a backend, only the server side will get keep-alives. For this reason, it is strongly recommended to explicitly use "option clitcpka" and "option srvtcpka" when the configuration is split between frontends and backends.

See also : "option clitcpka", "option srvtcpka"

option tcplog

Enable advanced logging of TCP connections with session state and timers

May be used in sections :	defaults		frontend		listen		backend
	yes		yes		yes		yes

Arguments : none

By default, the log output format is very poor, as it only contains the source and destination addresses, and the instance name. By specifying "option tcplog", each log line turns into a much richer format including, but not limited to, the connection timers, the session status, the connections numbers, the frontend, backend and server name, and of course the source address and ports. This option is useful for pure TCP proxies in order to find which of the client or server disconnects or times out. For normal HTTP

proxies, it's better to use "option httplog" which is even more complete.

This option may be set either in the frontend or the backend.

See also : "option httplog", and section 8 about logging.

option transparent

no option transparent

Enable client-side transparent proxying

May be used in sections :	defaults		frontend		listen		backend
	yes		no		yes		yes

Arguments : none

This option was introduced in order to provide layer 7 persistence to layer 3 load balancers. The idea is to use the OS's ability to redirect an incoming connection for a remote address to a local process (here HAProxy), and let this process know what address was initially requested. When this option is used, sessions without cookies will be forwarded to the original destination IP address of the incoming request (which should match that of another equipment), while requests with cookies will still be forwarded to the appropriate server.

Note that contrary to a common belief, this option does NOT make HAProxy present the client's IP to the server when establishing the connection.

See also: the "usesrc" argument of the "source" keyword, and the "transparent" option of the "bind" keyword.

persist rdp-cookie

persist rdp-cookie(name)

Enable RDP cookie-based persistence

May be used in sections :	defaults		frontend		listen		backend
	yes		no		yes		yes

Arguments :

<name> is the optional name of the RDP cookie to check. If omitted, the default cookie name "msts" will be used. There currently is no valid reason to change this name.

This statement enables persistence based on an RDP cookie. The RDP cookie contains all information required to find the server in the list of known servers. So when this option is set in the backend, the request is analysed and if an RDP cookie is found, it is decoded. If it matches a known server which is still UP (or if "option persist" is set), then the connection is forwarded to this server.

Note that this only makes sense in a TCP backend, but for this to work, the frontend must have waited long enough to ensure that an RDP cookie is present in the request buffer. This is the same requirement as with the "rdp-cookie" load-balancing method. Thus it is highly recommended to put all statements in a single "listen" section.

Also, it is important to understand that the terminal server will emit this RDP cookie only if it is configured for "token redirection mode", which means that the "IP address redirection" option is disabled.

Example :

```
listen tse-farm
    bind :3389
    # wait up to 5s for an RDP cookie in the request
    tcp-request inspect-delay 5s
    tcp-request content accept if RDP_COOKIE
    # apply RDP cookie persistence
    persist rdp-cookie
    # if server is unknown, let's balance on the same cookie.
# alternatively, "balance leastconn" may be useful too.
balance rdp-cookie
server srv1 1.1.1.1:3389
server srv2 1.1.1.2:3389
```

See also : "balance rdp-cookie", "tcp-request" and the "req_rdp_cookie" ACL.

rate-limit sessions <rate>

Set a limit on the number of new sessions accepted per second on a frontend

May be used in sections :	defaults		frontend		listen		backend
	yes		yes		yes		no

Arguments :

<rate> The <rate> parameter is an integer designating the maximum number of new sessions per second to accept on the frontend.

When the frontend reaches the specified number of new sessions per second, it stops accepting new connections until the rate drops below the limit again. During this time, the pending sessions will be kept in the socket's backlog (in system buffers) and haproxy will not even be aware that sessions are pending. When applying very low limit on a highly loaded service, it may make sense to increase the socket's backlog using the "backlog" keyword.

This feature is particularly efficient at blocking connection-based attacks or service abuse on fragile servers. Since the session rate is measured every millisecond, it is extremely accurate. Also, the limit applies immediately,

no delay is needed at all to detect the threshold.

Example : limit the connection rate on SMTP to 10 per second max

```
listen smtp
mode tcp
bind :25
rate-limit sessions 10
server 127.0.0.1:1025
```

Note : when the maximum rate is reached, the frontend's status appears as "FULL" in the statistics, exactly as when it is saturated.

See also : the "backlog" keyword and the "fe_sess_rate" ACL criterion.

```
redirect location <to> [code <code>] <option> [{if | unless} <condition>]
redirect prefix  <to> [code <code>] <option> [{if | unless} <condition>]
```

Return an HTTP redirection if/unless a condition is matched

May be used in sections :

defaults		frontend		listen		backend
no		yes		yes		yes

If/unless the condition is matched, the HTTP request will lead to a redirect response. If no condition is specified, the redirect applies unconditionally.

Arguments :

<to> With "redirect location", the exact value in <to> is placed into the HTTP "Location" header. In case of "redirect prefix", the "Location" header is built from the concatenation of <to> and the complete URI, including the query string, unless the "drop-query" option is specified (see below). As a special case, if <to> equals exactly "/" in prefix mode, then nothing is inserted before the original URI. It allows one to redirect to the same URL.

<code> The code is optional. It indicates which type of HTTP redirection is desired. Only codes 301, 302 and 303 are supported, and 302 is used if no code is specified. 301 means "Moved permanently", and a browser may cache the Location. 302 means "Moved permanently" and means that the browser should not cache the redirection. 303 is equivalent to 302 except that the browser will fetch the location with a GET method.

<option> There are several options which can be specified to adjust the expected behaviour of a redirection :

- "drop-query"

When this keyword is used in a prefix-based redirection, then the location will be set without any possible query-string, which is useful for directing users to a non-secure page for instance. It has no effect with a location-type redirect.

- "append-slash"

This keyword may be used in conjunction with "drop-query" to redirect users who use a URL not ending with a '/' to the same one with the '/'. It can be useful to ensure that search engines will only see one URL. For this, a return code 301 is preferred.

- "set-cookie NAME[=value]"

A "Set-Cookie" header will be added with NAME (and optionally "=value") to the response. This is sometimes used to indicate that a user has been seen, for instance to protect against some types of DoS. No other cookie option is added, so the cookie will be a session cookie. Note that for a browser, a sole cookie name without an equal sign is different from a cookie with an equal sign.

- "clear-cookie NAME[=]"

A "Set-Cookie" header will be added with NAME (and optionally "="), but with the "Max-Age" attribute set to zero. This will tell the browser to delete this cookie. It is useful for instance on logout pages. It is important to note that clearing the cookie "NAME" will not remove a cookie set with "NAME=value". You have to clear the cookie "NAME=" for that, because the browser makes the difference.

Example: move the login URL only to HTTPS.

```
acl clear      dst_port 80
acl secure     dst_port 8080
acl login_page url_beg /login
acl logout     url_beg /logout
acl uid_given  url_reg  /login?userid=[^&]+
acl cookie_set hdr_sub(cookie) SEEN=1
```

```
redirect prefix https://mysite.com set-cookie SEEN=1 if !cookie_set
redirect prefix https://mysite.com          if login_page !secure
redirect prefix http://mysite.com drop-query if login_page !uid_given
redirect location http://mysite.com/         if !login_page secure
redirect location / clear-cookie USERID=    if logout
```

Example: send redirects for request for articles without a '/'.

```
acl missing_slash path_reg ^/article/[~/]*$
redirect code 301 prefix / drop-query append-slash if missing_slash
```

See section 7 about ACL usage.

redispatch (deprecated)

redispatch (deprecated)

Enable or disable session redistribution in case of connection failure

May be used in sections:	defaults		frontend		listen		backend
	yes		no		yes		yes

Arguments : none

In HTTP mode, if a server designated by a cookie is down, clients may definitely stick to it because they cannot flush the cookie, so they will not be able to access the service anymore.

Specifying "redispatch" will allow the proxy to break their persistence and redistribute them to a working server.

It also allows to retry last connection to another server in case of multiple connection failures. Of course, it requires having "retries" set to a nonzero value.

This form is deprecated, do not use it in any new configuration, use the new "option redispatch" instead.

See also : "option redispatch"

reqadd <string> [{if | unless} <cond>]

Add a header at the end of the HTTP request

May be used in sections :	defaults		frontend		listen		backend
	no		yes		yes		yes

Arguments :

<string> is the complete line to be added. Any space or known delimiter must be escaped using a backslash ('\'). Please refer to section 6 about HTTP header manipulation for more information.

<cond> is an optional matching condition built from ACLs. It makes it possible to ignore this rule when other conditions are not met.

A new line consisting in <string> followed by a line feed will be added after the last header of an HTTP request.

Header transformations only apply to traffic which passes through HAProxy, and not to traffic generated by HAProxy, such as health-checks or error responses.

Example : add "X-Proto: SSL" to requests coming via port 81

```
acl is-ssl dst_port      81
reqadd     X-Proto:\ SSL if is-ssl
```

See also: "rspadd", section 6 about HTTP header manipulation, and section 7 about ACLs.

```
reqallow <search> [{if | unless} <cond>]
reqiallow <search> [{if | unless} <cond>] (ignore case)
```

Definitely allow an HTTP request if a line matches a regular expression

May be used in sections : defaults | frontend | listen | backend

	no		yes		yes		yes
--	----	--	-----	--	-----	--	-----

Arguments :

<search> is the regular expression applied to HTTP headers and to the request line. This is an extended regular expression. Parenthesis grouping is supported and no preliminary backslash is required. Any space or known delimiter must be escaped using a backslash ('\''). The pattern applies to a full line at a time. The "reqallow" keyword strictly matches case while "reqiallow" ignores case.

<cond> is an optional matching condition built from ACLs. It makes it possible to ignore this rule when other conditions are not met.

A request containing any line which matches extended regular expression <search> will mark the request as allowed, even if any later test would result in a deny. The test applies both to the request line and to request headers. Keep in mind that URLs in request line are case-sensitive while header names are not.

It is easier, faster and more powerful to use ACLs to write access policies. Reqdeny, reqallow and reqpass should be avoided in new designs.

Example :

```
# allow www.* but refuse *.local
reqiallow ^Host:\ www\.
reqideny  ^Host:\ .*\.local
```

See also: "reqdeny", "block", section 6 about HTTP header manipulation, and section 7 about ACLs.

```
reqdel <search> [{if | unless} <cond>]
reqidel <search> [{if | unless} <cond>] (ignore case)
```

Delete all headers matching a regular expression in an HTTP request

May be used in sections : defaults | frontend | listen | backend

no		yes		yes		yes
----	--	-----	--	-----	--	-----

Arguments :

<search> is the regular expression applied to HTTP headers and to the request line. This is an extended regular expression. Parenthesis grouping is supported and no preliminary backslash is required. Any space or known delimiter must be escaped using a backslash ('\\'). The pattern applies to a full line at a time. The "reqdel" keyword strictly matches case while "reqidel" ignores case.

<cond> is an optional matching condition built from ACLs. It makes it possible to ignore this rule when other conditions are not met.

Any header line matching extended regular expression **<search>** in the request will be completely deleted. Most common use of this is to remove unwanted and/or dangerous headers or cookies from a request before passing it to the next servers.

Header transformations only apply to traffic which passes through HAProxy, and not to traffic generated by HAProxy, such as health-checks or error responses. Keep in mind that header names are not case-sensitive.

Example :

```
# remove X-Forwarded-For header and SERVER cookie
reqidel ^X-Forwarded-For:.*
reqidel ^Cookie:.*SERVER=
```

See also: "reqadd", "reqrep", "rspdel", section 6 about HTTP header manipulation, and section 7 about ACLs.

```
reqdeny <search> [{if | unless} <cond>]
```

```
reqideny <search> [{if | unless} <cond>] (ignore case)
```

Deny an HTTP request if a line matches a regular expression

May be used in sections : defaults | frontend | listen | backend

no		yes		yes		yes
----	--	-----	--	-----	--	-----

Arguments :

<search> is the regular expression applied to HTTP headers and to the request line. This is an extended regular expression. Parenthesis grouping is supported and no preliminary backslash is required. Any space or known delimiter must be escaped using a backslash ('\\'). The pattern applies to a full line at a time. The "reqdeny" keyword strictly matches case while "reqideny" ignores case.

<cond> is an optional matching condition built from ACLs. It makes it possible to ignore this rule when other conditions are not met.

A request containing any line which matches extended regular expression `<search>` will mark the request as denied, even if any later test would result in an allow. The test applies both to the request line and to request headers. Keep in mind that URLs in request line are case-sensitive while header names are not.

A denied request will generate an "HTTP 403 forbidden" response once the complete request has been parsed. This is consistent with what is practiced using ACLs.

It is easier, faster and more powerful to use ACLs to write access policies. `Reqdeny`, `reqallow` and `reqpass` should be avoided in new designs.

Example :

```
# refuse *.local, then allow www.*
reqideny ^Host:\.*\.local
reqiallow ^Host:\ www\.
```

See also: "reqallow", "rspdeny", "block", section 6 about HTTP header manipulation, and section 7 about ACLs.

```
reqpass <search> [{if | unless} <cond>]
reqipass <search> [{if | unless} <cond>] (ignore case)
Ignore any HTTP request line matching a regular expression in next rules
May be used in sections : defaults | frontend | listen | backend
                        no      | yes    | yes    | yes
```

Arguments :

`<search>` is the regular expression applied to HTTP headers and to the request line. This is an extended regular expression. Parenthesis grouping is supported and no preliminary backslash is required. Any space or known delimiter must be escaped using a backslash (`'\'`). The pattern applies to a full line at a time. The "reqpass" keyword strictly matches case while "reqipass" ignores case.

`<cond>` is an optional matching condition built from ACLs. It makes it possible to ignore this rule when other conditions are not met.

A request containing any line which matches extended regular expression `<search>` will skip next rules, without assigning any deny or allow verdict. The test applies both to the request line and to request headers. Keep in mind that URLs in request line are case-sensitive while header names are not.

It is easier, faster and more powerful to use ACLs to write access policies.

Reqdeny, reqallow and reqpass should be avoided in new designs.

Example :

```
# refuse *.local, then allow www.*, but ignore "www.private.local"
reqipass ^Host:\ www.private\.local
reqideny ^Host:\ .*\.local
reqiallow ^Host:\ www\.
```

See also: "reqallow", "reqdeny", "block", section 6 about HTTP header manipulation, and section 7 about ACLs.

```
reqrep <search> <string> [{if | unless} <cond>]
requirep <search> <string> [{if | unless} <cond>] (ignore case)
Replace a regular expression with a string in an HTTP request line
May be used in sections : defaults | frontend | listen | backend
                        no      | yes   | yes   | yes
```

Arguments :

<search> is the regular expression applied to HTTP headers and to the request line. This is an extended regular expression. Parenthesis grouping is supported and no preliminary backslash is required. Any space or known delimiter must be escaped using a backslash ('\''). The pattern applies to a full line at a time. The "reqrep" keyword strictly matches case while "requirep" ignores case.

<string> is the complete line to be added. Any space or known delimiter must be escaped using a backslash ('\''). References to matched pattern groups are possible using the common \N form, with N being a single digit between 0 and 9. Please refer to section 6 about HTTP header manipulation for more information.

<cond> is an optional matching condition built from ACLs. It makes it possible to ignore this rule when other conditions are not met.

Any line matching extended regular expression **<search>** in the request (both the request line and header lines) will be completely replaced with **<string>**. Most common use of this is to rewrite URLs or domain names in "Host" headers.

Header transformations only apply to traffic which passes through HAProxy, and not to traffic generated by HAProxy, such as health-checks or error responses. Note that for increased readability, it is suggested to add enough spaces between the request and the response. Keep in mind that URLs in request line are case-sensitive while header names are not.

Example :

```
# replace "/static/" with "/" at the beginning of any request path.
```

```
reqrep ^([^\ ]*)\ /static/(.*)      \1\ /\2
# replace "www.mydomain.com" with "www" in the host name.
reqirep ^Host:\ www.mydomain.com    Host:\ www
```

See also: "reqadd", "reqdel", "rsprep", section 6 about HTTP header manipulation, and section 7 about ACLs.

```
reqtarpit <search> [{if | unless} <cond>]
reqitarpit <search> [{if | unless} <cond>] (ignore case)
Tarpit an HTTP request containing a line matching a regular expression
May be used in sections : defaults | frontend | listen | backend
                        no      | yes    | yes    | yes
Arguments :
  <search> is the regular expression applied to HTTP headers and to the
           request line. This is an extended regular expression. Parenthesis
           grouping is supported and no preliminary backslash is required.
           Any space or known delimiter must be escaped using a backslash
           ('\'). The pattern applies to a full line at a time. The
           "reqtarpit" keyword strictly matches case while "reqitarpit"
           ignores case.

  <cond>   is an optional matching condition built from ACLs. It makes it
           possible to ignore this rule when other conditions are not met.
```

A request containing any line which matches extended regular expression `<search>` will be tarpitted, which means that it will connect to nowhere, will be kept open for a pre-defined time, then will return an HTTP error 500 so that the attacker does not suspect it has been tarpitted. The status 500 will be reported in the logs, but the completion flags will indicate "PT". The delay is defined by "timeout tarpit", or "timeout connect" if the former is not set.

The goal of the tarpit is to slow down robots attacking servers with identifiable requests. Many robots limit their outgoing number of connections and stay connected waiting for a reply which can take several minutes to come. Depending on the environment and attack, it may be particularly efficient at reducing the load on the network and firewalls.

```
Examples :
# ignore user-agents reporting any flavour of "Mozilla" or "MSIE", but
# block all others.
reqipass  ^User-Agent:\.*(Mozilla|MSIE)
reqitarpit ^User-Agent:

# block bad guys
```

```
acl badguys src 10.1.0.3 172.16.13.20/28
reqitarpit . if badguys
```

See also: "reqallow", "reqdeny", "reqpass", section 6 about HTTP header manipulation, and section 7 about ACLs.

retries <value>

Set the number of retries to perform on a server after a connection failure

May be used in sections: defaults | frontend | listen | backend
yes | no | yes | yes

Arguments :

<value> is the number of times a connection attempt should be retried on a server when a connection either is refused or times out. The default value is 3.

It is important to understand that this value applies to the number of connection attempts, not full requests. When a connection has effectively been established to a server, there will be no more retry.

In order to avoid immediate reconnections to a server which is restarting, a turn-around timer of 1 second is applied before a retry occurs.

When "option redispatch" is set, the last retry may be performed on another server even if a cookie references a different server.

See also : "option redispatch"

rspadd <string> [{if | unless} <cond>]

Add a header at the end of the HTTP response

May be used in sections : defaults | frontend | listen | backend
no | yes | yes | yes

Arguments :

<string> is the complete line to be added. Any space or known delimiter must be escaped using a backslash ('\'). Please refer to section 6 about HTTP header manipulation for more information.

<cond> is an optional matching condition built from ACLs. It makes it possible to ignore this rule when other conditions are not met.

A new line consisting in <string> followed by a line feed will be added after the last header of an HTTP response.

Header transformations only apply to traffic which passes through HAProxy, and not to traffic generated by HAProxy, such as health-checks or error

responses.

See also: "reqadd", section 6 about HTTP header manipulation, and section 7 about ACLs.

```
rspdel <search> [{if | unless} <cond>]
rspidel <search> [{if | unless} <cond>] (ignore case)
Delete all headers matching a regular expression in an HTTP response
May be used in sections : defaults | frontend | listen | backend
                        no      | yes    | yes   | yes
Arguments :
  <search> is the regular expression applied to HTTP headers and to the
           response line. This is an extended regular expression, so
           parenthesis grouping is supported and no preliminary backslash
           is required. Any space or known delimiter must be escaped using
           a backslash ('\'). The pattern applies to a full line at a time.
           The "rspdel" keyword strictly matches case while "rspidel"
           ignores case.

  <cond>   is an optional matching condition built from ACLs. It makes it
           possible to ignore this rule when other conditions are not met.
```

Any header line matching extended regular expression <search> in the response will be completely deleted. Most common use of this is to remove unwanted and/or sensitive headers or cookies from a response before passing it to the client.

Header transformations only apply to traffic which passes through HAProxy, and not to traffic generated by HAProxy, such as health-checks or error responses. Keep in mind that header names are not case-sensitive.

Example :

```
# remove the Server header from responses
reqidel ^Server:.*
```

See also: "rspadd", "rsprep", "reqdel", section 6 about HTTP header manipulation, and section 7 about ACLs.

```
rspdeny <search> [{if | unless} <cond>]
rspideny <search> [{if | unless} <cond>] (ignore case)
Block an HTTP response if a line matches a regular expression
May be used in sections : defaults | frontend | listen | backend
                        no      | yes    | yes   | yes
Arguments :
```

`<search>` is the regular expression applied to HTTP headers and to the response line. This is an extended regular expression, so parenthesis grouping is supported and no preliminary backslash is required. Any space or known delimiter must be escaped using a backslash (`'\'`). The pattern applies to a full line at a time. The `"rspdeny"` keyword strictly matches case while `"rspideny"` ignores case.

`<cond>` is an optional matching condition built from ACLs. It makes it possible to ignore this rule when other conditions are not met.

A response containing any line which matches extended regular expression `<search>` will mark the request as denied. The test applies both to the response line and to response headers. Keep in mind that header names are not case-sensitive.

Main use of this keyword is to prevent sensitive information leak and to block the response before it reaches the client. If a response is denied, it will be replaced with an HTTP 502 error so that the client never retrieves any sensitive data.

It is easier, faster and more powerful to use ACLs to write access policies. `Rspdeny` should be avoided in new designs.

Example :

```
# Ensure that no content type matching ms-word will leak
rspideny ^Content-type:\.*/ms-word
```

See also: `"reqdeny"`, `"acl"`, `"block"`, section 6 about HTTP header manipulation and section 7 about ACLs.

```
rsprep <search> <string> [{if | unless} <cond>]
rspirep <search> <string> [{if | unless} <cond>] (ignore case)
Replace a regular expression with a string in an HTTP response line
May be used in sections : defaults | frontend | listen | backend
                        no      | yes    | yes    | yes
```

Arguments :

`<search>` is the regular expression applied to HTTP headers and to the response line. This is an extended regular expression, so parenthesis grouping is supported and no preliminary backslash is required. Any space or known delimiter must be escaped using a backslash (`'\'`). The pattern applies to a full line at a time. The `"rsprep"` keyword strictly matches case while `"rspirep"` ignores case.

`<string>` is the complete line to be added. Any space or known delimiter must be escaped using a backslash (`'\'`). References to matched pattern groups are possible using the common `\N` form, with `N` being a single digit between 0 and 9. Please refer to section 6 about HTTP header manipulation for more information.

`<cond>` is an optional matching condition built from ACLs. It makes it possible to ignore this rule when other conditions are not met.

Any line matching extended regular expression `<search>` in the response (both the response line and header lines) will be completely replaced with `<string>`. Most common use of this is to rewrite Location headers.

Header transformations only apply to traffic which passes through HAProxy, and not to traffic generated by HAProxy, such as health-checks or error responses. Note that for increased readability, it is suggested to add enough spaces between the request and the response. Keep in mind that header names are not case-sensitive.

Example :

```
# replace "Location: 127.0.0.1:8080" with "Location: www.mydomain.com"
rspirep ^Location:\ 127.0.0.1:8080    Location:\ www.mydomain.com
```

See also: "rspadd", "rspdel", "reqrep", section 6 about HTTP header manipulation, and section 7 about ACLs.

`server <name> <address>[:port] [param*]`

Declare a server in a backend

May be used in sections :	defaults	frontend	listen	backend
	no	no	yes	yes

Arguments :

`<name>` is the internal name assigned to this server. This name will appear in logs and alerts. If "http-send-server-name" is set, it will be added to the request header sent to the server.

`<address>` is the IPv4 address of the server. Alternatively, a resolvable hostname is supported, but this name will be resolved during start-up. If no address is specified in front of the port, or if address "0.0.0.0" is specified, then the address used will be the same as the one used by the incoming connection. This makes it possible to relay connections for many IPs on a different port or to perform transparent forwarding with connection limitation.

`<ports>` is an optional port specification. If set, all connections will be sent to this port. If unset, the same port the client

connected to will be used. The port may also be prefixed by a "+" or a "-". In this case, the server's port will be determined by adding this value to the client's port.

`<param*>` is a list of parameters for this server. The "server" keywords accepts an important number of options and has a complete section dedicated to it. Please refer to section 5 for more details.

Examples :

```
server first 10.1.1.1:1080 cookie first check inter 1000
server second 10.1.1.2:1080 cookie second check inter 1000
```

See also: "default-server", "http-send-name-header" and section 5 about server options

```
source <addr>[:<port>] [usesrc { <addr2>[:<port2>] | client | clientip } ]
source <addr>[:<port>] [usesrc { <addr2>[:<port2>] | hdr_ip(<hdr>[,<occ>]) } ]
source <addr>[:<port>] [interface <name>]
```

Set the source address for outgoing connections

May be used in sections :	defaults		frontend		listen		backend
	yes		no		yes		yes

Arguments :

- `<addr>` is the IPv4 address HAProxy will bind to before connecting to a server. This address is also used as a source for health checks. The default value of 0.0.0.0 means that the system will select the most appropriate address to reach its destination.
- `<port>` is an optional port. It is normally not needed but may be useful in some very specific contexts. The default value of zero means the system will select a free port. Note that port ranges are not supported in the backend. If you want to force port ranges, you have to specify them on each "server" line.
- `<addr2>` is the IP address to present to the server when connections are forwarded in full transparent proxy mode. This is currently only supported on some patched Linux kernels. When this address is specified, clients connecting to the server will be presented with this address, while health checks will still use the address `<addr>`.
- `<port2>` is the optional port to present to the server when connections are forwarded in full transparent proxy mode (see `<addr2>` above). The default value of zero means the system will select a free port.

- `<hdr>` is the name of a HTTP header in which to fetch the IP to bind to. This is the name of a comma-separated header list which can contain multiple IP addresses. By default, the last occurrence is used. This is designed to work with the X-Forwarded-For header and to automatically bind to the the client's IP address as seen by previous proxy, typically Stunnel. In order to use another occurrence from the last one, please see the `<occ>` parameter below. When the header (or occurrence) is not found, no binding is performed so that the proxy's default IP address is used. Also keep in mind that the header name is case insensitive, as for any HTTP header.
- `<occ>` is the occurrence number of a value to be used in a multi-value header. This is to be used in conjunction with "hdr_ip(`<hdr>`)", in order to specify which occurrence to use for the source IP address. Positive values indicate a position from the first occurrence, 1 being the first one. Negative values indicate positions relative to the last one, -1 being the last one. This is helpful for situations where an X-Forwarded-For header is set at the entry point of an infrastructure and must be used several proxy layers away. When this value is not specified, -1 is assumed. Passing a zero here disables the feature.
- `<name>` is an optional interface name to which to bind to for outgoing traffic. On systems supporting this features (currently, only Linux), this allows one to bind all traffic to the server to this interface even if it is not the one the system would select based on routing tables. This should be used with extreme care. Note that using this option requires root privileges.

The "source" keyword is useful in complex environments where a specific address only is allowed to connect to the servers. It may be needed when a private address must be used through a public gateway for instance, and it is known that the system cannot determine the adequate source address by itself.

An extension which is available on certain patched Linux kernels may be used through the "usesrc" optional keyword. It makes it possible to connect to the servers with an IP address which does not belong to the system itself. This is called "full transparent proxy mode". For this to work, the destination servers have to route their traffic back to this address through the machine running HAProxy, and IP forwarding must generally be enabled on this machine.

In this "full transparent proxy" mode, it is possible to force a specific IP address to be presented to the servers. This is not much used in fact. A more common use is to tell HAProxy to present the client's IP address. For this, there are two methods :

- present the client's IP and port addresses. This is the most transparent mode, but it can cause problems when IP connection tracking is enabled on the machine, because a same connection may be seen twice with different states. However, this solution presents the huge advantage of not limiting the system to the 64k outgoing address+port couples, because all of the client ranges may be used.
- present only the client's IP address and select a spare port. This solution is still quite elegant but slightly less transparent (downstream firewalls logs will not match upstream's). It also presents the downside of limiting the number of concurrent connections to the usual 64k ports. However, since the upstream and downstream ports are different, local IP connection tracking on the machine will not be upset by the reuse of the same session.

Note that depending on the transparent proxy technology used, it may be required to force the source address. In fact, cttproxy version 2 requires an IP address in <addr> above, and does not support setting of "0.0.0.0" as the IP address because it creates NAT entries which much match the exact outgoing address. Tproxy version 4 and some other kernel patches which work in pure forwarding mode generally will not have this limitation.

This option sets the default source for all servers in the backend. It may also be specified in a "defaults" section. Finer source address specification is possible at the server level using the "source" server option. Refer to section 5 for more information.

Examples :

```

backend private
    # Connect to the servers using our 192.168.1.200 source address
    source 192.168.1.200

backend transparent_ssl1
    # Connect to the SSL farm from the client's source address
    source 192.168.1.200 usesrc clientip

backend transparent_ssl2
    # Connect to the SSL farm from the client's source address and port
    # not recommended if IP conntrack is present on the local machine.
    source 192.168.1.200 usesrc client

backend transparent_ssl3
    # Connect to the SSL farm from the client's source address. It
    # is more conntrack-friendly.
    source 192.168.1.200 usesrc clientip

```

```

backend transparent_smtp
    # Connect to the SMTP farm from the client's source address/port
    # with Tproxy version 4.
    source 0.0.0.0 usesrc clientip

backend transparent_http
    # Connect to the servers using the client's IP as seen by previous
    # proxy.
    source 0.0.0.0 usesrc hdr_ip(x-forwarded-for,-1)

```

See also : the "source" server option in section 5, the Tproxy patches for the Linux kernel on www.balabit.com, the "bind" keyword.

`srvtimeout <timeout>` (deprecated)

Set the maximum inactivity time on the server side.

May be used in sections :

defaults	frontend	listen	backend
yes	no	yes	yes

Arguments :

`<timeout>` is the timeout value specified in milliseconds by default, but can be in any other unit if the number is suffixed by the unit, as explained at the top of this document.

The inactivity timeout applies when the server is expected to acknowledge or send data. In HTTP mode, this timeout is particularly important to consider during the first phase of the server's response, when it has to send the headers, as it directly represents the server's processing time for the request. To find out what value to put there, it's often good to start with what would be considered as unacceptable response times, then check the logs to observe the response time distribution, and adjust the value accordingly.

The value is specified in milliseconds by default, but can be in any other unit if the number is suffixed by the unit, as specified at the top of this document. In TCP mode (and to a lesser extent, in HTTP mode), it is highly recommended that the client timeout remains equal to the server timeout in order to avoid complex situations to debug. Whatever the expected server response times, it is a good practice to cover at least one or several TCP packet losses by specifying timeouts that are slightly above multiples of 3 seconds (eg: 4 or 5 seconds minimum).

This parameter is specific to backends, but can be specified once for all in "defaults" sections. This is in fact one of the easiest solutions not to forget about it. An unspecified timeout results in an infinite timeout, which is not recommended. Such a usage is accepted and works but reports a warning during startup because it may results in accumulation of expired sessions in

the system if the system's timeouts are not configured either.

This parameter is provided for compatibility but is currently deprecated. Please use "timeout server" instead.

See also : "timeout server", "timeout client" and "clitimeout".

```
stats admin { if | unless } <cond>
  Enable statistics admin level if/unless a condition is matched
  May be used in sections : defaults | frontend | listen | backend
                           no      |    no    |   yes  |   yes
```

This statement enables the statistics admin level if/unless a condition is matched.

The admin level allows to enable/disable servers from the web interface. By default, statistics page is read-only for security reasons.

Note : Consider not using this feature in multi-process mode (nbproc > 1) unless you know what you do : memory is not shared between the processes, which can result in random behaviours.

Currently, the POST request is limited to the buffer size minus the reserved buffer space, which means that if the list of servers is too long, the request won't be processed. It is recommended to alter few servers at a time.

Example :

```
# statistics admin level only for localhost
backend stats_localhost
  stats enable
  stats admin if LOCALHOST
```

Example :

```
# statistics admin level always enabled because of the authentication
backend stats_auth
  stats enable
  stats auth admin:AdMiN123
  stats admin if TRUE
```

Example :

```
# statistics admin level depends on the authenticated user
userlist stats-auth
  group admin    users admin
  user  admin    insecure-password AdMiN123
```



```

group readonly users haproxy
user haproxy insecure-password haproxy

backend stats_auth
stats enable
acl AUTH http_auth(stats-auth)
acl AUTH_ADMIN http_auth_group(stats-auth) admin
stats http-request auth unless AUTH
stats admin if AUTH_ADMIN

```

See also : "stats enable", "stats auth", "stats http-request", "nbproc", "bind-process", section 3.4 about userlists and section 7 about ACL usage.

```

stats auth <user>:<passwd>
Enable statistics with authentication and grant access to an account
May be used in sections : defaults | frontend | listen | backend
                        yes      |    no    |   yes   |   yes

```

Arguments :

<user> is a user name to grant access to

<passwd> is the cleartext password associated to this user

This statement enables statistics with default settings, and restricts access to declared users only. It may be repeated as many times as necessary to allow as many users as desired. When a user tries to access the statistics without a valid account, a "401 Forbidden" response will be returned so that the browser asks the user to provide a valid user and password. The realm which will be returned to the browser is configurable using "stats realm".

Since the authentication method is HTTP Basic Authentication, the passwords circulate in cleartext on the network. Thus, it was decided that the configuration file would also use cleartext passwords to remind the users that those ones should not be sensitive and not shared with any other account.

It is also possible to reduce the scope of the proxies which appear in the report using "stats scope".

Though this statement alone is enough to enable statistics reporting, it is recommended to set all other settings in order to avoid relying on default unobvious parameters.

Example :

```

# public access (limited to this backend only)
backend public_www

```

```

server srv1 192.168.0.1:80
stats enable
stats hide-version
stats scope .
stats uri /admin?stats
stats realm Haproxy\ Statistics
stats auth admin1:AdMiN123
stats auth admin2:AdMiN321

# internal monitoring access (unlimited)
backend private_monitoring
stats enable
stats uri /admin?stats
stats refresh 5s

```

See also : "stats enable", "stats realm", "stats scope", "stats uri"

stats enable

Enable statistics reporting with default settings

May be used in sections :

	defaults	frontend	listen	backend
	yes	no	yes	yes

Arguments : none

This statement enables statistics reporting with default settings defined at build time. Unless stated otherwise, these settings are used :

- stats uri : /haproxy?stats
- stats realm : "HAProxy Statistics"
- stats auth : no authentication
- stats scope : no restriction

Though this statement alone is enough to enable statistics reporting, it is recommended to set all other settings in order to avoid relying on default unobvious parameters.

Example :

```

# public access (limited to this backend only)
backend public_www
server srv1 192.168.0.1:80
stats enable
stats hide-version
stats scope .
stats uri /admin?stats
stats realm Haproxy\ Statistics
stats auth admin1:AdMiN123
stats auth admin2:AdMiN321

```

See also : "stats auth", "stats realm", "stats uri"

Arguments : none

Though this statement alone is enough to enable statistics reporting, it is recommended to set all other settings in order to avoid relying on default unobvious parameters.

```
# internal monitoring access (unlimited)
backend private_monitoring
    stats enable
    stats uri      /admin?stats
    stats refresh 5s
```

See also : "stats auth", "stats enable", "stats realm", "stats uri"

```
stats http-request { allow | deny | auth [realm <realm>] }
    [ { if | unless } <condition> ]
Access control for statistics
```

May be used in sections:

defaults		frontend		listen		backend
no		no		yes		yes

As "http-request", these set of options allow to fine control access to statistics. Each option may be followed by if/unless and acl. First option with matched condition (or option without condition) is final. For "deny" a 403 error will be returned, for "allow" normal processing is performed, for "auth" a 401/407 error code is returned so the client should be asked to enter a username and password.

There is no fixed limit to the number of http-request statements per instance.

See also : "http-request", section 3.4 about userlists and section 7 about ACL usage.

```
stats realm <realm>
```

Enable statistics and set authentication realm

May be used in sections :

defaults		frontend		listen		backend
yes		no		yes		yes

Arguments :

<realm> is the name of the HTTP Basic Authentication realm reported to the browser. The browser uses it to display it in the pop-up inviting the user to enter a valid username and password.

The realm is read as a single word, so any spaces in it should be escaped using a backslash ('\').

This statement is useful only in conjunction with "stats auth" since it is only related to authentication.

Though this statement alone is enough to enable statistics reporting, it is recommended to set all other settings in order to avoid relying on default unobvious parameters.

Example :

```
# public access (limited to this backend only)
backend public_www
    server srv1 192.168.0.1:80
```

```

stats enable
stats hide-version
stats scope .
stats uri /admin?stats
stats realm Haproxy\ Statistics
stats auth admin1:AdMiN123
stats auth admin2:AdMiN321

# internal monitoring access (unlimited)
backend private_monitoring
    stats enable
    stats uri /admin?stats
    stats refresh 5s

```

See also : "stats auth", "stats enable", "stats uri"

```
stats refresh <delay>
Enable statistics with automatic refresh
May be used in sections : defaults | frontend | listen | backend
                        yes   |   no   |   yes |   yes
Arguments :
    <delay> is the suggested refresh delay, specified in seconds, which will
            be returned to the browser consulting the report page. While the
            browser is free to apply any delay, it will generally respect it
            and refresh the page this every seconds. The refresh interval may
            be specified in any other non-default time unit, by suffixing the
            unit after the value, as explained at the top of this document.
```

This statement is useful on monitoring displays with a permanent page reporting the load balancer's activity. When set, the HTML report page will include a link "refresh"/"stop refresh" so that the user can select whether he wants automatic refresh of the page or not.

Though this statement alone is enough to enable statistics reporting, it is recommended to set all other settings in order to avoid relying on default unobvious parameters.

Example :

```

# public access (limited to this backend only)
backend public_www
    server srv1 192.168.0.1:80
    stats enable
    stats hide-version
    stats scope .
    stats uri /admin?stats

```

```

stats realm    Haproxy\ Statistics
stats auth     admin1:AdMiN123
stats auth     admin2:AdMiN321

# internal monitoring access (unlimited)
backend private_monitoring
    stats enable
    stats uri    /admin?stats
    stats refresh 5s

```

See also : "stats auth", "stats enable", "stats realm", "stats uri"

```

stats scope { <name> | "." }
Enable statistics and limit access scope
May be used in sections :  defaults | frontend | listen | backend
                           yes      |    no    |   yes  |   yes
Arguments :
    <name>    is the name of a listen, frontend or backend section to be
               reported. The special name "." (a single dot) designates the
               section in which the statement appears.

```

When this statement is specified, only the sections enumerated with this statement will appear in the report. All other ones will be hidden. This statement may appear as many times as needed if multiple sections need to be reported. Please note that the name checking is performed as simple string comparisons, and that it is never checked that a given section name really exists.

Though this statement alone is enough to enable statistics reporting, it is recommended to set all other settings in order to avoid relying on default unobvious parameters.

Example :

```

# public access (limited to this backend only)
backend public_www
    server srv1 192.168.0.1:80
    stats enable
    stats hide-version
    stats scope .
    stats uri    /admin?stats
    stats realm  Haproxy\ Statistics
    stats auth   admin1:AdMiN123
    stats auth   admin2:AdMiN321

# internal monitoring access (unlimited)

```

```

backend private_monitoring
    stats enable
    stats uri      /admin?stats
    stats refresh 5s

```

See also : "stats auth", "stats enable", "stats realm", "stats uri"

```

stats show-desc [ <description> ]
    Enable reporting of a description on the statistics page.
    May be used in sections :   defaults | frontend | listen | backend
                                yes      |    no    |   yes  |   yes

```

<name> is an optional description to be reported. If unspecified, the description from global section is automatically used instead.

This statement is useful for users that offer shared services to their customers, where node or description should be different for each customer.

Though this statement alone is enough to enable statistics reporting, it is recommended to set all other settings in order to avoid relying on default unobvious parameters.

Example :

```

# internal monitoring access (unlimited)
backend private_monitoring
    stats enable
    stats show-desc Master node for Europe, Asia, Africa
    stats uri      /admin?stats
    stats refresh  5s

```

See also: "show-node", "stats enable", "stats uri" and "description" in global section.

```

stats show-legends
    Enable reporting additional informations on the statistics page :
    - cap: capabilities (proxy)
    - mode: one of tcp, http or health (proxy)
    - id: SNMP ID (proxy, socket, server)
    - IP (socket, server)
    - cookie (backend, server)

```

Though this statement alone is enough to enable statistics reporting, it is recommended to set all other settings in order to avoid relying on default unobvious parameters.

See also: "stats enable", "stats uri".

`stats show-node [<name>]`

Enable reporting of a host name on the statistics page.

May be used in sections :

	defaults	frontend	listen	backend
	yes	no	yes	yes

Arguments:

`<name>` is an optional name to be reported. If unspecified, the node name from global section is automatically used instead.

This statement is useful for users that offer shared services to their customers, where node or description might be different on a stats page provided for each customer.

Though this statement alone is enough to enable statistics reporting, it is recommended to set all other settings in order to avoid relying on default unobvious parameters.

Example:

```
# internal monitoring access (unlimited)
backend private_monitoring
    stats enable
    stats show-node Europe-1
    stats uri      /admin?stats
    stats refresh  5s
```

See also: "show-desc", "stats enable", "stats uri", and "node" in global section.

`stats uri <prefix>`

Enable statistics and define the URI prefix to access them

May be used in sections :

	defaults	frontend	listen	backend
	yes	no	yes	yes

Arguments :

`<prefix>` is the prefix of any URI which will be redirected to stats. This prefix may contain a question mark ('?') to indicate part of a query string.

The statistics URI is intercepted on the relayed traffic, so it appears as a page within the normal application. It is strongly advised to ensure that the selected URI will never appear in the application, otherwise it will never be possible to reach it in the application.

The default URI compiled in haproxy is `/haproxy?stats`, but this may be changed at build time, so it's better to always explicitly specify it here. It is generally a good idea to include a question mark in the URI so that intermediate proxies refrain from caching the results. Also, since any string beginning with the prefix will be accepted as a stats request, the question mark helps ensuring that no valid URI will begin with the same words.

It is sometimes very convenient to use `/` as the URI prefix, and put that statement in a "listen" instance of its own. That makes it easy to dedicate an address or a port to statistics only.

Though this statement alone is enough to enable statistics reporting, it is recommended to set all other settings in order to avoid relying on default unobvious parameters.

Example :

```
# public access (limited to this backend only)
backend public_www
    server srv1 192.168.0.1:80
    stats enable
    stats hide-version
    stats scope .
    stats uri /admin?stats
    stats realm Haproxy\ Statistics
    stats auth admin1:AdMiN123
    stats auth admin2:AdMiN321

# internal monitoring access (unlimited)
backend private_monitoring
    stats enable
    stats uri /admin?stats
    stats refresh 5s
```

See also : "stats auth", "stats enable", "stats realm"

`stick match <pattern> [table <table>] [{if | unless} <cond>]`

Define a request pattern matching condition to stick a user to a server

May be used in sections :

defaults		frontend		listen		backend
no		no		yes		yes

Arguments :

`<pattern>` is a pattern extraction rule as described in section 7.8. It describes what elements of the incoming request or connection will be analysed in the hope to find a matching entry in a stickiness table. This rule is mandatory.

`<table>` is an optional stickiness table name. If unspecified, the same backend's table is used. A stickiness table is declared using the "stick-table" statement.

`<cond>` is an optional matching condition. It makes it possible to match on a certain criterion only when other conditions are met (or not met). For instance, it could be used to match on a source IP address except when a request passes through a known proxy, in which case we'd match on a header containing that IP address.

Some protocols or applications require complex stickiness rules and cannot always simply rely on cookies nor hashing. The "stick match" statement describes a rule to extract the stickiness criterion from an incoming request or connection. See section 7 for a complete list of possible patterns and transformation rules.

The table has to be declared using the "stick-table" statement. It must be of a type compatible with the pattern. By default it is the one which is present in the same backend. It is possible to share a table with other backends by referencing it using the "table" keyword. If another table is referenced, the server's ID inside the backends are used. By default, all server IDs start at 1 in each backend, so the server ordering is enough. But in case of doubt, it is highly recommended to force server IDs using their "id" setting.

It is possible to restrict the conditions where a "stick match" statement will apply, using "if" or "unless" followed by a condition. See section 7 for ACL based conditions.

There is no limit on the number of "stick match" statements. The first that applies and matches will cause the request to be directed to the same server as was used for the request which created the entry. That way, multiple matches can be used as fallbacks.

The stick rules are checked after the persistence cookies, so they will not affect stickiness if a cookie has already been used to select a server. That way, it becomes very easy to insert cookies and match on IP addresses in order to maintain stickiness between HTTP and HTTPS.

Note : Consider not using this feature in multi-process mode (`nbproc > 1`) unless you know what you do : memory is not shared between the processes, which can result in random behaviours.

Example :

```
# forward SMTP users to the same server they just used for POP in the
# last 30 minutes
```

```

backend pop
    mode tcp
    balance roundrobin
    stick store-request src
    stick-table type ip size 200k expire 30m
    server s1 192.168.1.1:110
    server s2 192.168.1.1:110

```

```

backend smtp
    mode tcp
    balance roundrobin
    stick match src table pop
    server s1 192.168.1.1:25
    server s2 192.168.1.1:25

```

See also : "stick-table", "stick on", "nbproc", "bind-process" and section 7 about ACLs and pattern extraction.

```

stick on <pattern> [table <table>] [{if | unless} <condition>]
Define a request pattern to associate a user to a server
May be used in sections : defaults | frontend | listen | backend
                        no      |    no    |   yes   |   yes

```

Note : This form is exactly equivalent to "stick match" followed by "stick store-request", all with the same arguments. Please refer to both keywords for details. It is only provided as a convenience for writing more maintainable configurations.

Note : Consider not using this feature in multi-process mode (nbproc > 1) unless you know what you do : memory is not shared between the processes, which can result in random behaviours.

Examples :

```

# The following form ...
stick on src table pop if !localhost

# ...is strictly equivalent to this one :
stick match src table pop if !localhost
stick store-request src table pop if !localhost

```

```

# Use cookie persistence for HTTP, and stick on source address for HTTPS as
# well as HTTP without cookie. Share the same table between both accesses.
backend http
    mode http

```

```

balance roundrobin
stick on src table https
cookie SRV insert indirect nocache
server s1 192.168.1.1:80 cookie s1
server s2 192.168.1.1:80 cookie s2

backend https
mode tcp
balance roundrobin
stick-table type ip size 200k expire 30m
stick on src
server s1 192.168.1.1:443
server s2 192.168.1.1:443

```

See also : "stick match", "stick store-request", "nbproc" and "bind-process".

```

stick store-request <pattern> [table <table>] [{if | unless} <condition>]
Define a request pattern used to create an entry in a stickiness table
May be used in sections :   defaults | frontend | listen | backend
                           no       |   no    |   yes  |   yes

```

Arguments :

<pattern> is a pattern extraction rule as described in section 7.8. It describes what elements of the incoming request or connection will be analysed, extracted and stored in the table once a server is selected.

<table> is an optional stickiness table name. If unspecified, the same backend's table is used. A stickiness table is declared using the "stick-table" statement.

<cond> is an optional storage condition. It makes it possible to store certain criteria only when some conditions are met (or not met). For instance, it could be used to store the source IP address except when the request passes through a known proxy, in which case we'd store a converted form of a header containing that IP address.

Some protocols or applications require complex stickiness rules and cannot always simply rely on cookies nor hashing. The "stick store-request" statement describes a rule to decide what to extract from the request and when to do it, in order to store it into a stickiness table for further requests to match it using the "stick match" statement. Obviously the extracted part must make sense and have a chance to be matched in a further request. Storing a client's IP address for instance often makes sense. Storing an ID found in a

URL parameter also makes sense. Storing a source port will almost never make any sense because it will be randomly matched. See section 7 for a complete list of possible patterns and transformation rules.

The table has to be declared using the "stick-table" statement. It must be of a type compatible with the pattern. By default it is the one which is present in the same backend. It is possible to share a table with other backends by referencing it using the "table" keyword. If another table is referenced, the server's ID inside the backends are used. By default, all server IDs start at 1 in each backend, so the server ordering is enough. But in case of doubt, it is highly recommended to force server IDs using their "id" setting.

It is possible to restrict the conditions where a "stick store-request" statement will apply, using "if" or "unless" followed by a condition. This condition will be evaluated while parsing the request, so any criteria can be used. See section 7 for ACL based conditions.

There is no limit on the number of "stick store-request" statements, but there is a limit of 8 simultaneous stores per request or response. This makes it possible to store up to 8 criteria, all extracted from either the request or the response, regardless of the number of rules. Only the 8 first ones which match will be kept. Using this, it is possible to feed multiple tables at once in the hope to increase the chance to recognize a user on another protocol or access method.

The "store-request" rules are evaluated once the server connection has been established, so that the table will contain the real server that processed the request.

Note : Consider not using this feature in multi-process mode (nbproc > 1) unless you know what you do : memory is not shared between the processes, which can result in random behaviours.

Example :

```
# forward SMTP users to the same server they just used for POP in the
# last 30 minutes
backend pop
    mode tcp
    balance roundrobin
    stick store-request src
    stick-table type ip size 200k expire 30m
    server s1 192.168.1.1:110
    server s2 192.168.1.1:110

backend smtp
    mode tcp
```

```

balance roundrobin
stick match src table pop
server s1 192.168.1.1:25
server s2 192.168.1.1:25

```

See also : "stick-table", "stick on", "nbproc", "bind-process" and section 7 about ACLs and pattern extraction.

```

stick-table type {ip | integer | string [len <length>] } size <size>
           [expire <expire>] [nopurge]

```

Configure the stickiness table for the current backend

```

May be used in sections :  defaults | frontend | listen | backend
                        no      |    no    |  yes  |  yes

```

Arguments :

- ip a table declared with "type ip" will only store IPv4 addresses. This form is very compact (about 50 bytes per entry) and allows very fast entry lookup and stores with almost no overhead. This is mainly used to store client source IP addresses.
- integer a table declared with "type integer" will store 32bit integers which can represent a client identifier found in a request for instance.
- string a table declared with "type string" will store substrings of up to <len> characters. If the string provided by the pattern extractor is larger than <len>, it will be truncated before being stored. During matching, at most <len> characters will be compared between the string in the table and the extracted pattern. When not specified, the string is automatically limited to 31 characters.
- <length> is the maximum number of characters that will be stored in a "string" type table. See type "string" above. Be careful when changing this parameter as memory usage will proportionally increase.
- <size> is the maximum number of entries that can fit in the table. This value directly impacts memory usage. Count approximately 50 bytes per entry, plus the size of a string if any. The size supports suffixes "k", "m", "g" for 2¹⁰, 2²⁰ and 2³⁰ factors.
- [nopurge] indicates that we refuse to purge older entries when the table is full. When not specified and the table is full when haproxy wants to store an entry in it, it will flush a few of the oldest

entries in order to release some space for the new ones. This is most often the desired behaviour. In some specific cases, it be desirable to refuse new entries instead of purging the older ones. That may be the case when the amount of data to store is far above the hardware limits and we prefer not to offer access to new clients than to reject the ones already connected. When using this parameter, be sure to properly set the "expire" parameter (see below).

`<expire>` defines the maximum duration of an entry in the table since it was last created, refreshed or matched. The expiration delay is defined using the standard time format, similarly as the various timeouts. The maximum duration is slightly above 24 days. See section 2.2 for more information. If this delay is not specified, the session won't automatically expire, but older entries will be removed once full. Be sure not to use the "nopurge" parameter if not expiration delay is specified.

There is only one stick-table per backend. At the moment of writing this doc, it does not seem useful to have multiple tables per backend. If this happens to be required, simply create a dummy backend with a stick-table in it and reference it.

It is important to understand that stickiness based on learning information has some limitations, including the fact that all learned associations are lost upon restart. In general it can be good as a complement but not always as an exclusive stickiness.

See also : "stick match", "stick on", "stick store-request", and section 2.2 about time format.

```
tcp-request content accept [{if | unless} <condition>]
Accept a connection if/unless a content inspection condition is matched
May be used in sections : defaults | frontend | listen | backend
                        no      | yes    | yes    | no
```

During TCP content inspection, the connection is immediately validated if the condition is true (when used with "if") or false (when used with "unless"). Most of the time during content inspection, a condition will be in an uncertain state which is neither true nor false. The evaluation immediately stops when such a condition is encountered. It is important to understand that "accept" and "reject" rules are evaluated in their exact declaration order, so that it is possible to build complex rules from them. There is no specific limit to the number of rules which may be inserted.

Note that the "if/unless" condition is optional. If no condition is set on the action, it is simply performed unconditionally.

If no "tcp-request content" rules are matched, the default action already is "accept". Thus, this statement alone does not bring anything without another "reject" statement.

See section 7 about ACL usage.

See also : "tcp-request content reject", "tcp-request inspect-delay"

```
tcp-request content reject [{if | unless} <condition>]
```

Reject a connection if/unless a content inspection condition is matched

May be used in sections : defaults | frontend | listen | backend
 no | yes | yes | no

During TCP content inspection, the connection is immediately rejected if the condition is true (when used with "if") or false (when used with "unless"). Most of the time during content inspection, a condition will be in an uncertain state which is neither true nor false. The evaluation immediately stops when such a condition is encountered. It is important to understand that "accept" and "reject" rules are evaluated in their exact declaration order, so that it is possible to build complex rules from them. There is no specific limit to the number of rules which may be inserted.

Note that the "if/unless" condition is optional. If no condition is set on the action, it is simply performed unconditionally.

If no "tcp-request content" rules are matched, the default action is set to "accept".

Example:

```
# reject SMTP connection if client speaks first
tcp-request inspect-delay 30s
acl content_present req_len gt 0
tcp-request reject if content_present

# Forward HTTPS connection only if client speaks
tcp-request inspect-delay 30s
acl content_present req_len gt 0
tcp-request accept if content_present
tcp-request reject
```

See section 7 about ACL usage.


```
tcp-request inspect-delay <timeout>
```

May be used in sections :	defaults	frontend	listen	backend
	no	yes	yes	no

`<timeout>` is the timeout value specified in milliseconds by default, but can be in any other unit if the number is suffixed by the unit, as explained at the top of this document.

Note that when performing content inspection, haproxy will evaluate the whole rules for every new chunk which gets in, taking into account the fact that those data are partial. If no rule matches before the aforementioned delay, a last check is performed upon expiration, this time considering that the contents are definitive. If no delay is set, haproxy will not wait at all and will immediately apply a verdict based on the available information. Obviously this is unlikely to be very useful and might even be racy, so such setups are not recommended.

For most protocols, it is enough to set it to a few seconds, as most clients send the full request immediately upon connection. Add 3 or more seconds to cover TCP retransmits but that's all. For some protocols, it may make sense to use large values, for instance to ensure that the client never talks before the server (eg: SMTP), or to wait for a client to talk before passing data to the server (eg: SSL). Note that the client timeout must cover at least the inspection delay, otherwise it will expire first. If the client closes the connection or if the buffer is full, the delay immediately expires since the contents will not be able to change anymore.

timeout check <timeout>

Set additional check timeout, but only after a connection has been already established.

May be used in sections: defaults | frontend | listen | backend
 yes | no | yes | yes

Arguments:

<timeout> is the timeout value specified in milliseconds by default, but can be in any other unit if the number is suffixed by the unit, as explained at the top of this document.

If set, haproxy uses min("timeout connect", "inter") as a connect timeout for check and "timeout check" as an additional read timeout. The "min" is used so that people running with *very* long "timeout connect" (eg. those who needed this due to the queue or tarpit) do not slow down their checks. (Please also note that there is no valid reason to have such long connect timeouts, because "timeout queue" and "timeout tarpit" can always be used to avoid that).

If "timeout check" is not set haproxy uses "inter" for complete check timeout (connect + read) exactly like all <1.3.15 version.

In most cases check request is much simpler and faster to handle than normal requests and people may want to kick out laggy servers so this timeout should be smaller than "timeout server".

This parameter is specific to backends, but can be specified once for all in "defaults" sections. This is in fact one of the easiest solutions not to forget about it.

See also: "timeout connect", "timeout queue", "timeout server",
 "timeout tarpit".

timeout client <timeout>

timeout clitimeout <timeout> (deprecated)

Set the maximum inactivity time on the client side.

May be used in sections : defaults | frontend | listen | backend
 yes | yes | yes | no

Arguments :

<timeout> is the timeout value specified in milliseconds by default, but can be in any other unit if the number is suffixed by the unit, as explained at the top of this document.

The inactivity timeout applies when the client is expected to acknowledge or send data. In HTTP mode, this timeout is particularly important to consider during the first phase, when the client sends the request, and during the

response while it is reading data sent by the server. The value is specified in milliseconds by default, but can be in any other unit if the number is suffixed by the unit, as specified at the top of this document. In TCP mode (and to a lesser extent, in HTTP mode), it is highly recommended that the client timeout remains equal to the server timeout in order to avoid complex situations to debug. It is a good practice to cover one or several TCP packet losses by specifying timeouts that are slightly above multiples of 3 seconds (eg: 4 or 5 seconds).

This parameter is specific to frontends, but can be specified once for all in "defaults" sections. This is in fact one of the easiest solutions not to forget about it. An unspecified timeout results in an infinite timeout, which is not recommended. Such a usage is accepted and works but reports a warning during startup because it may results in accumulation of expired sessions in the system if the system's timeouts are not configured either.

This parameter replaces the old, deprecated "clitimeout". It is recommended to use it to write new configurations. The form "timeout clitimeout" is provided only by backwards compatibility but its use is strongly discouraged.

See also : "clitimeout", "timeout server".

`timeout connect <timeout>`

`timeout contimeout <timeout>` (deprecated)

Set the maximum time to wait for a connection attempt to a server to succeed.

May be used in sections :	defaults		frontend		listen		backend
	yes		no		yes		yes

Arguments :

`<timeout>` is the timeout value specified in milliseconds by default, but can be in any other unit if the number is suffixed by the unit, as explained at the top of this document.

If the server is located on the same LAN as haproxy, the connection should be immediate (less than a few milliseconds). Anyway, it is a good practice to cover one or several TCP packet losses by specifying timeouts that are slightly above multiples of 3 seconds (eg: 4 or 5 seconds). By default, the connect timeout also presets both queue and tarpit timeouts to the same value if these have not been specified.

This parameter is specific to backends, but can be specified once for all in "defaults" sections. This is in fact one of the easiest solutions not to forget about it. An unspecified timeout results in an infinite timeout, which is not recommended. Such a usage is accepted and works but reports a warning during startup because it may results in accumulation of failed sessions in the system if the system's timeouts are not configured either.

See also: "timeout check", "timeout queue", "timeout server", "contimeout", "timeout tarpit".

If this parameter is not set, the "http-request" timeout applies, and if both are not set, "timeout client" still applies at the lower level. It should be set in the frontend to take effect, unless the frontend is in TCP mode, in which case the HTTP backend's timeout will be used.

```
timeout http-request <timeout>
```

May be used in sections : defaults | frontend | listen | backend

yes | yes | yes | yes

`<timeout>` is the timeout value specified in milliseconds by default, but can be in any other unit if the number is suffixed by the unit, as explained at the top of this document.

Note that this timeout only applies to the header part of the request, and not to any data. As soon as the empty line is received, this timeout is not used anymore. It is used again on keep-alive connections to wait for a second request if "timeout http-keep-alive" is not set.

If this parameter is not set, the client timeout still applies between each chunk of the incoming request. It should be set in the frontend to take effect, unless the frontend is in TCP mode, in which case the HTTP backend's timeout will be used.

timeout queue <timeout>

May be used in sections : defaults | frontend | listen | backend

yes	no	yes	yes
-----	----	-----	-----

Arguments :

`<timeout>` is the timeout value specified in milliseconds by default, but can be in any other unit if the number is suffixed by the unit, as explained at the top of this document.

When a server's `maxconn` is reached, connections are left pending in a queue which may be server-specific or global to the backend. In order not to wait indefinitely, a timeout is applied to requests pending in the queue. If the timeout is reached, it is considered that the request will almost never be served, so it is dropped and a 503 error is returned to the client.

The "timeout queue" statement allows to fix the maximum time for a request to be left pending in a queue. If unspecified, the same value as the backend's connection timeout ("timeout connect") is used, for backwards compatibility with older versions with no "timeout queue" parameter.

See also : "timeout connect", "contimeout".

`timeout server <timeout>`

`timeout srvtimeout <timeout>` (deprecated)

Set the maximum inactivity time on the server side.

May be used in sections :	defaults		frontend		listen		backend
	yes		no		yes		yes

Arguments :

`<timeout>` is the timeout value specified in milliseconds by default, but can be in any other unit if the number is suffixed by the unit, as explained at the top of this document.

The inactivity timeout applies when the server is expected to acknowledge or send data. In HTTP mode, this timeout is particularly important to consider during the first phase of the server's response, when it has to send the headers, as it directly represents the server's processing time for the request. To find out what value to put there, it's often good to start with what would be considered as unacceptable response times, then check the logs to observe the response time distribution, and adjust the value accordingly.

The value is specified in milliseconds by default, but can be in any other unit if the number is suffixed by the unit, as specified at the top of this document. In TCP mode (and to a lesser extent, in HTTP mode), it is highly recommended that the client timeout remains equal to the server timeout in order to avoid complex situations to debug. Whatever the expected server response times, it is a good practice to cover at least one or several TCP packet losses by specifying timeouts that are slightly above multiples of 3 seconds (eg: 4 or 5 seconds minimum).

This parameter is specific to backends, but can be specified once for all in

This parameter replaces the old, deprecated "srvtimeout". It is recommended to use it to write new configurations. The form "timeout srvtimeout" is provided only by backwards compatibility but its use is strongly discouraged.

timeout tarpit <timeout>

May be used in sections : defaults | frontend | listen | backend

Arguments :

When a connection is tarpped using "reqtarpit", it is maintained open with no activity for a certain amount of time, then closed. "timeout tarpit" defines how long it will be maintained open.

The value is specified in milliseconds by default, but can be in any other unit if the number is suffixed by the unit, as specified at the top of this document. If unspecified, the same value as the backend's connection timeout ("timeout connect") is used, for backwards compatibility with older versions with no "timeout tarpit" parameter.

See also : "timeout connect", "contimeout".

transparent (deprecated)

Enable client-side transparent proxying

May be used in sections : defaults | frontend | listen | backend

yes | no | yes | yes

Arguments : none

This keyword was introduced in order to provide layer 7 persistence to layer 3 load balancers. The idea is to use the OS's ability to redirect an incoming connection for a remote address to a local process (here HAProxy), and let this process know what address was initially requested. When this option is used, sessions without cookies will be forwarded to the original destination

IP address of the incoming request (which should match that of another equipment), while requests with cookies will still be forwarded to the appropriate server.

The "transparent" keyword is deprecated, use "option transparent" instead.

Note that contrary to a common belief, this option does NOT make HAProxy present the client's IP to the server when establishing the connection.

See also: "option transparent"

```
use_backend <backend> if <condition>
use_backend <backend> unless <condition>
```

Switch to a specific backend if/unless an ACL-based condition is matched.

May be used in sections :

	defaults	frontend	listen	backend
	no	yes	yes	no

Arguments :

<backend> is the name of a valid backend or "listen" section.

<condition> is a condition composed of ACLs, as described in section 7.

When doing content-switching, connections arrive on a frontend and are then dispatched to various backends depending on a number of conditions. The relation between the conditions and the backends is described with the "use_backend" keyword. While it is normally used with HTTP processing, it can also be used in pure TCP, either without content using stateless ACLs (eg: source address validation) or combined with a "tcp-request" rule to wait for some payload.

There may be as many "use_backend" rules as desired. All of these rules are evaluated in their declaration order, and the first one which matches will assign the backend.

In the first form, the backend will be used if the condition is met. In the second form, the backend will be used if the condition is not met. If no condition is valid, the backend defined with "default_backend" will be used. If no default backend is defined, either the servers in the same section are used (in case of a "listen" section) or, in case of a frontend, no server is used and a 503 service unavailable response is returned.

Note that it is possible to switch from a TCP frontend to an HTTP backend. In this case, either the frontend has already checked that the protocol is HTTP, and backend processing will immediately follow, or the backend will wait for a complete HTTP request to get in. This feature is useful when a frontend must decode several protocols on a unique port, one of them being HTTP.

See also: "default_backend", "tcp-request", and section 7 about ACLs.

Chapter 5

Server and default-server options

The "server" and "default-server" keywords support a certain number of settings which are all passed as arguments on the server line. The order in which those arguments appear does not count, and they are all optional. Some of those settings are single words (booleans) while others expect one or several values after them. In this case, the values must immediately follow the setting name. Except default-server, all those settings must be specified after the server's address if they are used:

```
server <name> <address>[:port] [settings ...]
default-server [settings ...]
```

The currently supported settings are the following ones.

addr <ipv4>

Using the "addr" parameter, it becomes possible to use a different IP address to send health-checks. On some servers, it may be desirable to dedicate an IP address to specific component able to perform complex tests which are more suitable to health-checks than the application. This parameter is ignored if the "check" parameter is not set. See also the "port" parameter.

Supported in default-server: No

backup

When "backup" is present on a server line, the server is only used in load balancing when all other non-backup servers are unavailable. Requests coming with a persistence cookie referencing the server will always be served though. By default, only the first operational backup server is used, unless

the "allbackups" option is set in the backend. See also the "allbackups" option.

Supported in default-server: No

check

This option enables health checks on the server. By default, a server is always considered available. If "check" is set, the server will receive periodic health checks to ensure that it is really able to serve requests. The default address and port to send the tests to are those of the server, and the default source is the same as the one defined in the backend. It is possible to change the address using the "addr" parameter, the port using the "port" parameter, the source address using the "source" address, and the interval and timers using the "inter", "rise" and "fall" parameters. The request method is defined in the backend using the "httpchk", "smtpchk", "mysql-check" and "ssl-hello-chk" options. Please refer to those options and parameters for more information.

Supported in default-server: No

cookie <value>

The "cookie" parameter sets the cookie value assigned to the server to <value>. This value will be checked in incoming requests, and the first operational server possessing the same value will be selected. In return, in cookie insertion or rewrite modes, this value will be assigned to the cookie sent to the client. There is nothing wrong in having several servers sharing the same cookie value, and it is in fact somewhat common between normal and backup servers. See also the "cookie" keyword in backend section.

Supported in default-server: No

disabled

The "disabled" keyword starts the server in the "disabled" state. That means that it is marked down in maintenance mode, and no connection other than the ones allowed by persist mode will reach it. It is very well suited to setup new servers, because normal traffic will never reach them, while it is still possible to test the service by making use of the force-persist mechanism.

Supported in default-server: No

error-limit <count>

If health observing is enabled, the "error-limit" parameter specifies the number of consecutive errors that triggers event selected by the "on-error" option. By default it is set to 10 consecutive errors.

Supported in default-server: Yes

See also the "check", "error-limit" and "on-error".

fall <count>

The "fall" parameter states that a server will be considered as dead after <count> consecutive unsuccessful health checks. This value defaults to 3 if unspecified. See also the "check", "inter" and "rise" parameters.

Supported in default-server: Yes

id <value>

Set a persistent ID for the server. This ID must be positive and unique for the proxy. An unused ID will automatically be assigned if unset. The first assigned value will be 1. This ID is currently only returned in statistics.

Supported in default-server: No

inter <delay>

fastinter <delay>

downinter <delay>

The "inter" parameter sets the interval between two consecutive health checks to <delay> milliseconds. If left unspecified, the delay defaults to 2000 ms. It is also possible to use "fastinter" and "downinter" to optimize delays between checks depending on the server state :

Server state	Interval used
UP 100% (non-transitional)	"inter"
Transitionally UP (going down), Transitionally DOWN (going up), or yet unchecked.	"fastinter" if set, "inter" otherwise.
DOWN 100% (non-transitional)	"downinter" if set, "inter" otherwise.

Just as with every other time-based parameter, they can be entered in any other explicit unit among { us, ms, s, m, h, d }. The "inter" parameter also serves as a timeout for health checks sent to servers if "timeout check" is not set. In order to reduce "resonance" effects when multiple servers are hosted on the same hardware, the health-checks of all servers are started with a small time offset between them. It is also possible to add some random noise in the health checks interval using the global "spread-checks" keyword. This makes sense for instance when a lot of backends use the same servers.

Supported in default-server: Yes

`maxconn <maxconn>`

The "maxconn" parameter specifies the maximal number of concurrent connections that will be sent to this server. If the number of incoming concurrent requests goes higher than this value, they will be queued, waiting for a connection to be released. This parameter is very important as it can save fragile servers from going down under extreme loads. If a "minconn" parameter is specified, the limit becomes dynamic. The default value is "0" which means unlimited. See also the "minconn" and "maxqueue" parameters, and the backend's "fullconn" keyword.

Supported in default-server: Yes

`maxqueue <maxqueue>`

The "maxqueue" parameter specifies the maximal number of connections which will wait in the queue for this server. If this limit is reached, next requests will be redispached to other servers instead of indefinitely waiting to be served. This will break persistence but may allow people to quickly re-log in when the server they try to connect to is dying. The default value is "0" which means the queue is unlimited. See also the "maxconn" and "minconn" parameters.

Supported in default-server: Yes

`minconn <minconn>`

When the "minconn" parameter is set, the maxconn limit becomes a dynamic limit following the backend's load. The server will always accept at least <minconn> connections, never more than <maxconn>, and the limit will be on the ramp between both values when the backend has less than <fullconn> concurrent connections. This makes it possible to limit the load on the server during normal loads, but push it further for important loads without overloading the server during exceptional loads. See also the "maxconn" and "maxqueue" parameters, as well as the "fullconn" backend keyword.

Supported in default-server: Yes

`observe <mode>`

This option enables health adjusting based on observing communication with the server. By default this functionality is disabled and enabling it also requires to enable health checks. There are two supported modes: "layer4" and "layer7". In layer4 mode, only successful/unsuccessful tcp connections are significant. In layer7, which is only allowed for http proxies, responses received from server are verified, like valid/wrong http code, unparsable headers, a timeout, etc.

Supported in default-server: No

See also the "check", "on-error" and "error-limit".

on-error <mode>

Select what should happen when enough consecutive errors are detected.

Currently, four modes are available:

- fastinter: force fastinter
- fail-check: simulate a failed check, also forces fastinter (default)
- sudden-death: simulate a pre-fatal failed health check, one more failed check will mark a server down, forces fastinter
- mark-down: mark the server immediately down and force fastinter

Supported in default-server: Yes

See also the "check", "observe" and "error-limit".

port <port>

Using the "port" parameter, it becomes possible to use a different port to send health-checks. On some servers, it may be desirable to dedicate a port to a specific component able to perform complex tests which are more suitable to health-checks than the application. It is common to run a simple script in inetd for instance. This parameter is ignored if the "check" parameter is not set. See also the "addr" parameter.

Supported in default-server: Yes

redir <prefix>

The "redir" parameter enables the redirection mode for all GET and HEAD requests addressing this server. This means that instead of having HAProxy forward the request to the server, it will send an "HTTP 302" response with the "Location" header composed of this prefix immediately followed by the requested URI beginning at the leading '/' of the path component. That means that no trailing slash should be used after <prefix>. All invalid requests will be rejected, and all non-GET or HEAD requests will be normally served by the server. Note that since the response is completely forged, no header mangling nor cookie insertion is possible in the response. However, cookies in requests are still analysed, making this solution completely usable to direct users to a remote location in case of local disaster. Main use consists in increasing bandwidth for static servers by having the clients directly connect to them. Note: never use a relative location here, it would cause a loop between the client and HAProxy!

Example : server srv1 192.168.1.1:80 redir http://image1.mydomain.com check

Supported in default-server: No

rise <count>

The "rise" parameter states that a server will be considered as operational after <count> consecutive successful health checks. This value defaults to 2 if unspecified. See also the "check", "inter" and "fall" parameters.

Supported in default-server: Yes

slowstart <start_time_in_ms>

The "slowstart" parameter for a server accepts a value in milliseconds which indicates after how long a server which has just come back up will run at full speed. Just as with every other time-based parameter, it can be entered in any other explicit unit among { us, ms, s, m, h, d }. The speed grows linearly from 0 to 100% during this time. The limitation applies to two parameters :

- maxconn: the number of connections accepted by the server will grow from 1 to 100% of the usual dynamic limit defined by (minconn,maxconn,fullconn).
- weight: when the backend uses a dynamic weighted algorithm, the weight grows linearly from 1 to 100%. In this case, the weight is updated at every health-check. For this reason, it is important that the "inter" parameter is smaller than the "slowstart", in order to maximize the number of steps.

The slowstart never applies when haproxy starts, otherwise it would cause trouble to running servers. It only applies when a server has been previously seen as failed.

Supported in default-server: Yes

```
source <addr>[:<pl>[-<ph>]] [usesrc { <addr2>[:<port2>] | client | clientip } ]
source <addr>[:<port>] [usesrc { <addr2>[:<port2>] | hdr_ip(<hdr>[,<occ>]) } ]
source <addr>[:<pl>[-<ph>]] [interface <name>] ...
```

The "source" parameter sets the source address which will be used when connecting to the server. It follows the exact same parameters and principle as the backend "source" keyword, except that it only applies to the server referencing it. Please consult the "source" keyword for details.

Additionally, the "source" statement on a server line allows one to specify a source port range by indicating the lower and higher bounds delimited by a dash ('-'). Some operating systems might require a valid IP address when a source port range is specified. It is permitted to have the same IP/range for several servers. Doing so makes it possible to bypass the maximum of 64k total concurrent connections. The limit will then reach 64k connections per server.

Supported in default-server: No

`track [<proxy>/]<server>`

This option enables ability to set the current state of the server by tracking another one. Only a server with checks enabled can be tracked so it is not possible for example to track a server that tracks another one. If `<proxy>` is omitted the current one is used. If `disable-on-404` is used, it has to be enabled on both proxies.

Supported in default-server: No

`weight <weight>`

The "weight" parameter is used to adjust the server's weight relative to other servers. All servers will receive a load proportional to their weight relative to the sum of all weights, so the higher the weight, the higher the load. The default weight is 1, and the maximal value is 256. A value of 0 means the server will not participate in load-balancing but will still accept persistent connections. If this parameter is used to distribute the load according to server's capacity, it is recommended to start with values which can both grow and shrink, for instance between 10 and 100 to leave enough room above and below for later adjustments.

Supported in default-server: Yes

Chapter 6

HTTP header manipulation

In HTTP mode, it is possible to rewrite, add or delete some of the request and response headers based on regular expressions. It is also possible to block a request or a response if a particular header matches a regular expression, which is enough to stop most elementary protocol attacks, and to protect against information leak from the internal network. But there is a limitation to this : since HAProxy's HTTP engine does not support keep-alive, only headers passed during the first request of a TCP session will be seen. All subsequent headers will be considered data only and not analyzed. Furthermore, HAProxy never touches data contents, it stops analysis at the end of headers.

There is an exception though. If HAProxy encounters an "Informational Response" (status code 1xx), it is able to process all `rsp*` rules which can allow, deny, rewrite or delete a header, but it will refuse to add a header to any such messages as this is not HTTP-compliant. The reason for still processing headers in such responses is to stop and/or fix any possible information leak which may happen, for instance because another downstream equipment would unconditionally add a header, or if a server name appears there. When such messages are seen, normal processing still occurs on the next non-informational messages.

This section covers common usage of the following keywords, described in detail in section 4.2 :

- `reqadd` <string>
- `reqallow` <search>
- `reqiallow` <search>
- `reqdel` <search>
- `reqidel` <search>
- `reqdeny` <search>
- `reqideny` <search>
- `reqpass` <search>

```

- reqipass    <search>
- reqrep      <search> <replace>
- requirep    <search> <replace>
- reqtarpit   <search>
- reqitarpit  <search>
- rspadd      <string>
- rspdel      <search>
- rspidel     <search>
- rspdeny     <search>
- rspideny    <search>
- rsprep      <search> <replace>
- rspirep     <search> <replace>

```

With all these keywords, the same conventions are used. The <search> parameter is a POSIX extended regular expression (regex) which supports grouping through parenthesis (without the backslash). Spaces and other delimiters must be prefixed with a backslash ('\') to avoid confusion with a field delimiter. Other characters may be prefixed with a backslash to change their meaning :

```

\t   for a tab
\r   for a carriage return (CR)
\n   for a new line (LF)
\    to mark a space and differentiate it from a delimiter
\#   to mark a sharp and differentiate it from a comment
\\   to use a backslash in a regex
\\\\  to use a backslash in the text (*2 for regex, *2 for haproxy)
\xXX to write the ASCII hex code XX as in the C language

```

The <replace> parameter contains the string to be used to replace the largest portion of text matching the regex. It can make use of the special characters above, and can reference a substring which is delimited by parenthesis in the regex, by writing a backslash ('\') immediately followed by one digit from 0 to 9 indicating the group position (0 designating the entire line). This practice is very common to users of the "sed" program.

The <string> parameter represents the string which will systematically be added after the last header line. It can also use special character sequences above.

Notes related to these keywords :

- ```

- these keywords are not always convenient to allow/deny based on header
 contents. It is strongly recommended to use ACLs with the "block" keyword
 instead, resulting in far more flexible and manageable rules.

- lines are always considered as a whole. It is not possible to reference
 a header name only or a value only. This is important because of the way

```

headers are written (notably the number of spaces after the colon).

- the first line is always considered as a header, which makes it possible to rewrite or filter HTTP requests URIs or response codes, but in turn makes it harder to distinguish between headers and request line. The regex prefix `^[^\ \t]*[^\ \t]` matches any HTTP method followed by a space, and the prefix `^[^\ \t:]*:` matches any header name followed by a colon.
- for performances reasons, the number of characters added to a request or to a response is limited at build time to values between 1 and 4 kB. This should normally be far more than enough for most usages. If it is too short on occasional usages, it is possible to gain some space by removing some useless headers before adding new ones.
- keywords beginning with "reqi" and "rspi" are the same as their counterpart without the 'i' letter except that they ignore case when matching patterns.
- when a request passes through a frontend then a backend, all req\* rules from the frontend will be evaluated, then all req\* rules from the backend will be evaluated. The reverse path is applied to responses.
- req\* statements are applied after "block" statements, so that "block" is always the first one, but before "use\_backend" in order to permit rewriting before switching.

## Chapter 7

# Using ACLs and pattern extraction

The use of Access Control Lists (ACL) provides a flexible solution to perform content switching and generally to take decisions based on content extracted from the request, the response or any environmental status. The principle is simple :

- define test criteria with sets of values
- perform actions only if a set of tests is valid

The actions generally consist in blocking the request, or selecting a backend.

In order to define a test, the "acl" keyword is used. The syntax is :

```
acl <aclname> <criterion> [flags] [operator] <value> ...
```

This creates a new ACL <aclname> or completes an existing one with new tests. Those tests apply to the portion of request/response specified in <criterion> and may be adjusted with optional flags [flags]. Some criteria also support an operator which may be specified before the set of values. The values are of the type supported by the criterion, and are separated by spaces.

ACL names must be formed from upper and lower case letters, digits, '-' (dash), '\_' (underscore) , '.' (dot) and ':' (colon). ACL names are case-sensitive, which means that "my\_acl" and "My\_Acl" are two different ACLs.

There is no enforced limit to the number of ACLs. The unused ones do not affect performance, they just consume a small amount of memory.

The following ACL flags are currently supported :

- i : ignore case during matching of all subsequent patterns.
- f : load patterns from a file.
- : force end of flags. Useful when a string looks like one of the flags.

The "-f" flag is special as it loads all of the lines it finds in the file specified in argument and loads all of them before continuing. It is even possible to pass multiple "-f" arguments if the patterns are to be loaded from multiple files. Empty lines as well as lines beginning with a sharp ('#') will be ignored. All leading spaces and tabs will be stripped. If it is absolutely needed to insert a valid pattern beginning with a sharp, just prefix it with a space so that it is not taken for a comment. Depending on the data type and match method, haproxy may load the lines into a binary tree, allowing very fast lookups. This is true for IPv4 and exact string matching. In this case, duplicates will automatically be removed. Also, note that the "-i" flag applies to subsequent entries and not to entries loaded from files preceding it. For instance :

```
acl valid-ua hdr(user-agent) -f exact-ua.lst -i -f generic-ua.lst test
```

In this example, each line of "exact-ua.lst" will be exactly matched against the "user-agent" header of the request. Then each line of "generic-ua" will be case-insensitively matched. Then the word "test" will be insensitively matched too.

Note that right now it is difficult for the ACL parsers to report errors, so if a file is unreadable or unparsable, the most you'll get is a parse error in the ACL. Thus, file-based ACLs should only be produced by reliable processes.

Supported types of values are :

- integers or integer ranges
- strings
- regular expressions
- IP addresses and networks

## 7.1 Matching integers

Matching integers is special in that ranges and operators are permitted. Note that integer matching only applies to positive values. A range is a value expressed with a lower and an upper bound separated with a colon, both of which

may be omitted.

For instance, "1024:65535" is a valid range to represent a range of unprivileged ports, and "1024:" would also work. "0:1023" is a valid representation of privileged ports, and ":1023" would also work.

As a special case, some ACL functions support decimal numbers which are in fact two integers separated by a dot. This is used with some version checks for instance. All integer properties apply to those decimal numbers, including ranges and operators.

For an easier usage, comparison operators are also supported. Note that using operators with ranges does not make much sense and is strongly discouraged. Similarly, it does not make much sense to perform order comparisons with a set of values.

Available operators for integer matching are :

```
eq : true if the tested value equals at least one value
ge : true if the tested value is greater than or equal to at least one value
gt : true if the tested value is greater than at least one value
le : true if the tested value is less than or equal to at least one value
lt : true if the tested value is less than at least one value
```

For instance, the following ACL matches any negative Content-Length header :

```
acl negative-length hdr_val(content-length) lt 0
```

This one matches SSL versions between 3.0 and 3.1 (inclusive) :

```
acl sslv3 req_ssl_ver 3:3.1
```

## 7.2 Matching strings

String matching applies to verbatim strings as they are passed, with the exception of the backslash ("\") which makes it possible to escape some characters such as the space. If the "-i" flag is passed before the first string, then the matching will be performed ignoring the case. In order to match the string "-i", either set it second, or pass the "--" flag before the first string. Same applies of course to match the string "--".

## 7.3 Matching regular expressions (regexes)

Just like with string matching, regex matching applies to verbatim strings as they are passed, with the exception of the backslash ("\") which makes it possible to escape some characters such as the space. If the "-i" flag is passed before the first regex, then the matching will be performed ignoring the case. In order to match the string "-i", either set it second, or pass the "--" flag before the first string. Same principle applies of course to match the string "--".

## 7.4 Matching IPv4 addresses

IPv4 addresses values can be specified either as plain addresses or with a netmask appended, in which case the IPv4 address matches whenever it is within the network. Plain addresses may also be replaced with a resolvable host name, but this practice is generally discouraged as it makes it more difficult to read and debug configurations. If hostnames are used, you should at least ensure that they are present in /etc/hosts so that the configuration does not depend on any random DNS match at the moment the configuration is parsed.

## 7.5 Available matching criteria

### 7.5.1 Matching at Layer 4 and below

A first set of criteria applies to information which does not require any analysis of the request or response contents. Those generally include TCP/IP addresses and ports, as well as internal values independant on the stream.

`always_false`

This one never matches. All values and flags are ignored. It may be used as a temporary replacement for another one when adjusting configurations.

`always_true`

This one always matches. All values and flags are ignored. It may be used as a temporary replacement for another one when adjusting configurations.

avg\_queue <integer>

avg\_queue(backend) <integer>

Returns the total number of queued connections of the designated backend divided by the number of active servers. This is very similar to "queue" except that the size of the farm is considered, in order to give a more accurate measurement of the time it may take for a new connection to be processed. The main usage is to return a sorry page to new users when it becomes certain they will get a degraded service. Note that in the event there would not be any active server anymore, we would consider twice the number of queued connections as the measured value. This is a fair estimate, as we expect one server to get back soon anyway, but we still prefer to send new traffic to another backend if in better shape. See also the "queue", "be\_conn", and "be\_sess\_rate" criteria.

be\_conn <integer>

be\_conn(backend) <integer>

Applies to the number of currently established connections on the backend, possibly including the connection being evaluated. If no backend name is specified, the current one is used. But it is also possible to check another backend. It can be used to use a specific farm when the nominal one is full. See also the "fe\_conn", "queue" and "be\_sess\_rate" criteria.

be\_id <integer>

Applies to the backend's id. Can be used in frontends to check from which backend it was called.

be\_sess\_rate <integer>

be\_sess\_rate(backend) <integer>

Returns true when the sessions creation rate on the backend matches the specified values or ranges, in number of new sessions per second. This is used to switch to an alternate backend when an expensive or fragile one reaches too high a session rate, or to limit abuse of service (eg. prevent sucking of an online dictionary).

Example :

```
Redirect to an error page if the dictionary is requested too often
backend dynamic
 mode http
 acl being_scanned be_sess_rate gt 100
 redirect location /denied.html if being_scanned
```

connslots <integer>

connslots(backend) <integer>

The basic idea here is to be able to measure the number of connection "slots" still available (connection + queue), so that anything beyond that (intended



usage; see "use\_backend" keyword) can be redirected to a different backend.

'connslots' = number of available server connection slots, + number of available server queue slots.

Note that while "fe\_conn" may be used, "connslots" comes in especially useful when you have a case of traffic going to one single ip, splitting into multiple backends (perhaps using acls to do name-based load balancing) and you want to be able to differentiate between different backends, and their available "connslots". Also, whereas "nbsrv" only measures servers that are actually \*down\*, this acl is more fine-grained and looks into the number of available connection slots as well. See also "queue" and "avg\_queue".

OTHER CAVEATS AND NOTES: at this point in time, the code does not take care of dynamic connections. Also, if any of the server maxconn, or maxqueue is 0, then this acl clearly does not make sense, in which case the value returned will be -1.

`dst <ip_address>`

Applies to the local IPv4 address the client connected to. It can be used to switch to a different backend for some alternative addresses.

`dst_conn <integer>`

Applies to the number of currently established connections on the same socket including the one being evaluated. It can be used to either return a sorry page before hard-blocking, or to use a specific backend to drain new requests when the socket is considered saturated. This offers the ability to assign different limits to different listening ports or addresses. See also the "fe\_conn" and "be\_conn" criteria.

`dst_port <integer>`

Applies to the local port the client connected to. It can be used to switch to a different backend for some alternative ports.

`fe_conn <integer>`

`fe_conn(frontend) <integer>`

Applies to the number of currently established connections on the frontend, possibly including the connection being evaluated. If no frontend name is specified, the current one is used. But it is also possible to check another frontend. It can be used to either return a sorry page before hard-blocking, or to use a specific backend to drain new requests when the farm is considered saturated. See also the "dst\_conn", "be\_conn" and "fe\_sess\_rate" criteria.

`fe_id <integer>`

Applies to the frontend's id. Can be used in backends to check from which

frontend it was called.

`fe_sess_rate <integer>`

`fe_sess_rate(frontend) <integer>`

Returns true when the session creation rate on the current or the named frontend matches the specified values or ranges, expressed in new sessions per second. This is used to limit the connection rate to acceptable ranges in order to prevent abuse of service at the earliest moment. This can be combined with layer 4 ACLs in order to force the clients to wait a bit for the rate to go down below the limit.

Example :

```
This frontend limits incoming mails to 10/s with a max of 100
concurrent connections. We accept any connection below 10/s, and
force excess clients to wait for 100 ms. Since clients are limited to
100 max, there cannot be more than 10 incoming mails per second.
frontend mail
 bind :25
 mode tcp
 maxconn 100
 acl too_fast fe_sess_rate ge 10
 tcp-request inspect-delay 100ms
 tcp-request content accept if ! too_fast
 tcp-request content accept if WAIT_END
```

`nbsrv <integer>`

`nbsrv(backend) <integer>`

Returns true when the number of usable servers of either the current backend or the named backend matches the values or ranges specified. This is used to switch to an alternate backend when the number of servers is too low to handle some load. It is useful to report a failure when combined with "monitor fail".

`queue <integer>`

`queue(backend) <integer>`

Returns the total number of queued connections of the designated backend, including all the connections in server queues. If no backend name is specified, the current one is used, but it is also possible to check another one. This can be used to take actions when queuing goes above a known level, generally indicating a surge of traffic or a massive slowdown on the servers. One possible action could be to reject new users but still accept old ones. See also the "avg\_queue", "be\_conn", and "be\_sess\_rate" criteria.

`so_id <integer>`

Applies to the socket's id. Useful in frontends with many bind keywords.

`src <ip_address>`

Applies to the client's IPv4 address. It is usually used to limit access to certain resources such as statistics. Note that it is the TCP-level source address which is used, and not the address of a client behind a proxy.

`src_port <integer>`

Applies to the client's TCP source port. This has a very limited usage.

`srv_id <integer>`

Applies to the server's id. Can be used in frontends or backends.

`srv_is_up(<server>)`

`srv_is_up(<backend>/<server>)`

Returns true when the designated server is UP, and false when it is either DOWN or in maintenance mode. If <backend> is omitted, then the server is looked up in the current backend. The function takes no arguments since it is used as a boolean. It is mainly used to take action based on an external status reported via a health check (eg: a geographical site's availability). Another possible use which is more of a hack consists in using dummy servers as boolean variables that can be enabled or disabled from the CLI, so that rules depending on those ACLs can be tweaked in realtime.

## 7.5.2 Matching contents at Layer 4

A second set of criteria depends on data found in buffers, but which can change during analysis. This requires that some data has been buffered, for instance through TCP request content inspection. Please see the "tcp-request" keyword for more detailed information on the subject.

`req_len <integer>`

Returns true when the length of the data in the request buffer matches the specified range. It is important to understand that this test does not return false as long as the buffer is changing. This means that a check with equality to zero will almost always immediately match at the beginning of the session, while a test for more data will wait for that data to come in and return false only when haproxy is certain that no more data will come in. This test was designed to be used with TCP request content inspection.

`req_proto_http`

Returns true when data in the request buffer look like HTTP and correctly parses as such. It is the same parser as the common HTTP request parser which is used so there should be no surprises. This test can be used for instance to direct HTTP traffic to a given port and HTTPS traffic to another one

using TCP request content inspection rules.

`req_rdp_cookie` <string>

`req_rdp_cookie(name)` <string>

Returns true when data in the request buffer look like the RDP protocol, and a cookie is present and equal to <string>. By default, any cookie name is checked, but a specific cookie name can be specified in parenthesis. The parser only checks for the first cookie, as illustrated in the RDP protocol specification. The cookie name is case insensitive. This ACL can be useful with the "MSTS" cookie, as it can contain the user name of the client connecting to the server if properly configured on the client. This can be used to restrict access to certain servers to certain users.

`req_rdp_cookie_cnt` <integer>

`req_rdp_cookie_cnt(name)` <integer>

Returns true when the data in the request buffer look like the RDP protocol and the number of RDP cookies matches the specified range (typically zero or one). Optionally a specific cookie name can be checked. This is a simple way of detecting the RDP protocol, as clients generally send the MSTS or MSTHASH cookies.

`req_ssl_ver` <decimal>

Returns true when data in the request buffer look like SSL, with a protocol version matching the specified range. Both SSLv2 hello messages and SSLv3 messages are supported. The test tries to be strict enough to avoid being easily fooled. In particular, it waits for as many bytes as announced in the message header if this header looks valid (bound to the buffer size). Note that TLSv1 is announced as SSL version 3.1. This test was designed to be used with TCP request content inspection.

`wait_end`

Waits for the end of the analysis period to return true. This may be used in conjunction with content analysis to avoid returning a wrong verdict early. It may also be used to delay some actions, such as a delayed reject for some special addresses. Since it either stops the rules evaluation or immediately returns true, it is recommended to use this acl as the last one in a rule. Please note that the default ACL "WAIT\_END" is always usable without prior declaration. This test was designed to be used with TCP request content inspection.

Examples :

```
delay every incoming request by 2 seconds
tcp-request inspect-delay 2s
tcp-request content accept if WAIT_END
```

```
don't immediately tell bad guys they are rejected
```

```

tcp-request inspect-delay 10s
acl goodguys src 10.0.0.0/24
acl badguys src 10.0.1.0/24
tcp-request content accept if goodguys
tcp-request content reject if badguys WAIT_END
tcp-request content reject

```

### 7.5.3 Matching at Layer 7

A third set of criteria applies to information which can be found at the application layer (layer 7). Those require that a full HTTP request has been read, and are only evaluated then. They may require slightly more CPU resources than the layer 4 ones, but not much since the request and response are indexed.

```

hdr <string>
hdr(header) <string>

```

Note: all the "hdr\*" matching criteria either apply to all headers, or to a particular header whose name is passed between parenthesis and without any space. The header name is not case-sensitive. The header matching complies with RFC2616, and treats as separate headers all values delimited by commas. Use the shdr() variant for response headers sent by the server.

The "hdr" criteria returns true if any of the headers matching the criteria match any of the strings. This can be used to check exact for values. For instance, checking that "connection: close" is set :

```

hdr(Connection) -i close

```

```

hdr_beg <string>
hdr_beg(header) <string>

```

Returns true when one of the headers begins with one of the strings. See "hdr" for more information on header matching. Use the shdr\_beg() variant for response headers sent by the server.

```

hdr_cnt <integer>
hdr_cnt(header) <integer>

```

Returns true when the number of occurrence of the specified header matches the values or ranges specified. It is important to remember that one header line may count as several headers if it has several values. This is used to detect presence, absence or abuse of a specific header, as well as to block request smuggling attacks by rejecting requests which contain more than one of certain headers. See "hdr" for more information on header matching. Use the shdr\_cnt() variant for response headers sent by the server.

hdr\_dir <string>

hdr\_dir(header) <string>

Returns true when one of the headers contains one of the strings either isolated or delimited by slashes. This is used to perform filename or directory name matching, and may be used with Referer. See "hdr" for more information on header matching. Use the shdr\_dir() variant for response headers sent by the server.

hdr\_dom <string>

hdr\_dom(header) <string>

Returns true when one of the headers contains one of the strings either isolated or delimited by dots. This is used to perform domain name matching, and may be used with the Host header. See "hdr" for more information on header matching. Use the shdr\_dom() variant for response headers sent by the server.

hdr\_end <string>

hdr\_end(header) <string>

Returns true when one of the headers ends with one of the strings. See "hdr" for more information on header matching. Use the shdr\_end() variant for response headers sent by the server.

hdr\_ip <ip\_address>

hdr\_ip(header) <ip\_address>

Returns true when one of the headers' values contains an IP address matching <ip\_address>. This is mainly used with headers such as X-Forwarded-For or X-Client-IP. See "hdr" for more information on header matching. Use the shdr\_ip() variant for response headers sent by the server.

hdr\_len <integer>

hdr\_len(<header>) <integer>

Returns true when at least one of the headers has a length which matches the values or ranges specified. This may be used to detect empty or too large headers. See "hdr" for more information on header matching. Use the shdr\_len() variant for response headers sent by the server.

hdr\_reg <regex>

hdr\_reg(header) <regex>

Returns true when one of the headers matches of the regular expressions. It can be used at any time, but it is important to remember that regex matching is slower than other methods. See also other "hdr\_" criteria, as well as "hdr" for more information on header matching. Use the shdr\_reg() variant for response headers sent by the server.

hdr\_sub <string>

`hdr_sub(header) <string>`

Returns true when one of the headers contains one of the strings. See "hdr" for more information on header matching. Use the `shdr_sub()` variant for response headers sent by the server.

`hdr_val <integer>`

`hdr_val(header) <integer>`

Returns true when one of the headers starts with a number which matches the values or ranges specified. This may be used to limit content-length to acceptable values for example. See "hdr" for more information on header matching. Use the `shdr_val()` variant for response headers sent by the server.

`http_auth(userlist)`

`http_auth_group(userlist) <group> [<group>]*`

Returns true when authentication data received from the client matches username & password stored on the userlist. It is also possible to use `http_auth_group` to check if the user is assigned to at least one of specified groups.

Currently only http basic auth is supported.

`http_first_req`

Returns true when the request being processed is the first one of the connection. This can be used to add or remove headers that may be missing from some requests when a request is not the first one, or even to perform some specific ACL checks only on the first request.

`method <string>`

Applies to the method in the HTTP request, eg: "GET". Some predefined ACL already check for most common methods.

`path <string>`

Returns true when the path part of the request, which starts at the first slash and ends before the question mark, equals one of the strings. It may be used to match known files, such as `/favicon.ico`.

`path_beg <string>`

Returns true when the path begins with one of the strings. This can be used to send certain directory names to alternative backends.

`path_dir <string>`

Returns true when one of the strings is found isolated or delimited with slashes in the path. This is used to perform filename or directory name matching without the risk of wrong match due to colliding prefixes. See also "url\_dir" and "path\_sub".

`path_dom <string>`

Returns true when one of the strings is found isolated or delimited with dots in the path. This may be used to perform domain name matching in proxy requests. See also "path\_sub" and "url\_dom".

`path_end <string>`

Returns true when the path ends with one of the strings. This may be used to control file name extension.

`path_len <integer>`

Returns true when the path length matches the values or ranges specified. This may be used to detect abusive requests for instance.

`path_reg <regex>`

Returns true when the path matches one of the regular expressions. It can be used any time, but it is important to remember that regex matching is slower than other methods. See also "url\_reg" and all "path\_" criteria.

`path_sub <string>`

Returns true when the path contains one of the strings. It can be used to detect particular patterns in paths, such as "../" for example. See also "path\_dir".

`req_ver <string>`

Applies to the version string in the HTTP request, eg: "1.0". Some predefined ACL already check for versions 1.0 and 1.1.

`status <integer>`

Applies to the HTTP status code in the HTTP response, eg: "302". It can be used to act on responses depending on status ranges, for instance, remove any Location header if the response is not a 3xx.

`url <string>`

Applies to the whole URL passed in the request. The only real use is to match "\*", for which there already is a predefined ACL.

`url_beg <string>`

Returns true when the URL begins with one of the strings. This can be used to check whether a URL begins with a slash or with a protocol scheme.

`url_dir <string>`

Returns true when one of the strings is found isolated or delimited with slashes in the URL. This is used to perform filename or directory name matching without the risk of wrong match due to colliding prefixes. See also "path\_dir" and "url\_sub".



`url_dom <string>`

Returns true when one of the strings is found isolated or delimited with dots in the URL. This is used to perform domain name matching without the risk of wrong match due to colliding prefixes. See also "url\_sub".

`url_end <string>`

Returns true when the URL ends with one of the strings. It has very limited use. "path\_end" should be used instead for filename matching.

`url_ip <ip_address>`

Applies to the IP address specified in the absolute URI in an HTTP request. It can be used to prevent access to certain resources such as local network. It is useful with option "http\_proxy".

`url_len <integer>`

Returns true when the url length matches the values or ranges specified. This may be used to detect abusive requests for instance.

`url_port <integer>`

Applies to the port specified in the absolute URI in an HTTP request. It can be used to prevent access to certain resources. It is useful with option "http\_proxy". Note that if the port is not specified in the request, port 80 is assumed.

`url_reg <regex>`

Returns true when the URL matches one of the regular expressions. It can be used any time, but it is important to remember that regex matching is slower than other methods. See also "path\_reg" and all "url\_" criteria.

`url_sub <string>`

Returns true when the URL contains one of the strings. It can be used to detect particular patterns in query strings for example. See also "path\_sub".

## 7.6 Pre-defined ACLs

Some predefined ACLs are hard-coded so that they do not have to be declared in every frontend which needs them. They all have their names in upper case in order to avoid confusion. Their equivalence is provided below.

| ACL name          | Equivalent to | Usage       |
|-------------------|---------------|-------------|
| -----+-----+----- |               |             |
| FALSE             | always_false  | never match |

|                |                              |                                  |
|----------------|------------------------------|----------------------------------|
| HTTP           | req_proto_http               | match if protocol is valid HTTP  |
| HTTP_1.0       | req_ver 1.0                  | match HTTP version 1.0           |
| HTTP_1.1       | req_ver 1.1                  | match HTTP version 1.1           |
| HTTP_CONTENT   | hdr_val(content-length) gt 0 | match an existing content-length |
| HTTP_URL_ABS   | url_reg ^[~/:]*://           | match absolute URL with scheme   |
| HTTP_URL_SLASH | url_beg /                    | match URL beginning with "/"     |
| HTTP_URL_STAR  | url *                        | match URL equal to "*"           |
| LOCALHOST      | src 127.0.0.1/8              | match connection from local host |
| METH_CONNECT   | method CONNECT               | match HTTP CONNECT method        |
| METH_GET       | method GET HEAD              | match HTTP GET or HEAD method    |
| METH_HEAD      | method HEAD                  | match HTTP HEAD method           |
| METH_OPTIONS   | method OPTIONS               | match HTTP OPTIONS method        |
| METH_POST      | method POST                  | match HTTP POST method           |
| METH_TRACE     | method TRACE                 | match HTTP TRACE method          |
| RDP_COOKIE     | req_rdp_cookie_cnt gt 0      | match presence of an RDP cookie  |
| REQ_CONTENT    | req_len gt 0                 | match data in the request buffer |
| TRUE           | always_true                  | always match                     |
| WAIT_END       | wait_end                     | wait for end of content analysis |

-----+-----+-----

## 7.7 Using ACLs to form conditions

Some actions are only performed upon a valid condition. A condition is a combination of ACLs with operators. 3 operators are supported :

- AND (implicit)
- OR (explicit with the "or" keyword or the "||" operator)
- Negation with the exclamation mark ("!")

A condition is formed as a disjunctive form:

```
[!]acl1 [!]acl2 ... [!]acln { or [!]acl1 [!]acl2 ... [!]acln } ...
```

Such conditions are generally used after an "if" or "unless" statement, indicating when the condition will trigger the action.

For instance, to block HTTP requests to the "\*" URL with methods other than "OPTIONS", as well as POST requests without content-length, and GET or HEAD requests with a content-length greater than 0, and finally every request which is not either GET/HEAD/POST/OPTIONS !

```
acl missing_cl hdr_cnt(Content-length) eq 0
```

```

block if HTTP_URL_STAR !METH_OPTIONS || METH_POST missing_cl
block if METH_GET HTTP_CONTENT
block unless METH_GET or METH_POST or METH_OPTIONS

```

To select a different backend for requests to static contents on the "www" site and to every request on the "img", "video", "download" and "ftp" hosts :

```

acl url_static path_beg /static /images /img /css
acl url_static path_end .gif .png .jpg .css .js
acl host_www hdr_beg(host) -i www
acl host_static hdr_beg(host) -i img. video. download. ftp.

now use backend "static" for all static-only hosts, and for static urls
of host "www". Use backend "www" for the rest.
use_backend static if host_static or host_www url_static
use_backend www if host_www

```

It is also possible to form rules using "anonymous ACLs". Those are unnamed ACL expressions that are built on the fly without needing to be declared. They must be enclosed between braces, with a space before and after each brace (because the braces must be seen as independant words). Example :

The following rule :

```

acl missing_cl hdr_cnt(Content-length) eq 0
block if METH_POST missing_cl

```

Can also be written that way :

```

block if METH_POST { hdr_cnt(Content-length) eq 0 }

```

It is generally not recommended to use this construct because it's a lot easier to leave errors in the configuration when written that way. However, for very simple rules matching only one source IP address for instance, it can make more sense to use them than to declare ACLs with random names. Another example of good use is the following :

With named ACLs :

```

acl site_dead nbsrv(dynamic) lt 2
acl site_dead nbsrv(static) lt 2
monitor fail if site_dead

```

With anonymous ACLs :

```

monitor fail if { nbsrv(dynamic) lt 2 } || { nbsrv(static) lt 2 }

```

See section 4.2 for detailed help on the "block" and "use\_backend" keywords.

## 7.8 Pattern extraction

The stickiness features relies on pattern extraction in the request and response. Sometimes the data needs to be converted first before being stored, for instance converted from ASCII to IP or upper case to lower case.

All these operations of data extraction and conversion are defined as "pattern extraction rules". A pattern rule always has the same format. It begins with a single pattern fetch word, potentially followed by a list of arguments within parenthesis then an optional list of transformations. As much as possible, the pattern fetch functions use the same name as their equivalent used in ACLs.

The list of currently supported pattern fetch functions is the following :

|           |                                                                                                                                                                                                                                                                                                            |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| src       | This is the source IPv4 address of the client of the session. It is of type IP and only works with such tables.                                                                                                                                                                                            |
| dst       | This is the destination IPv4 address of the session on the client side, which is the address the client connected to. It can be useful when running in transparent mode. It is of type IP and only works with such tables.                                                                                 |
| dst_port  | This is the destination TCP port of the session on the client side, which is the port the client connected to. This might be used when running in transparent mode or when assigning dynamic ports to some clients for a whole application session. It is of type integer and only works with such tables. |
| hdr(name) | This extracts the last occurrence of header <name> in an HTTP request and converts it to an IP address. This IP address is then used to match the table. A typical use is with the x-forwarded-for header.                                                                                                 |

The currently available list of transformations include :

|       |                                                                                                                             |
|-------|-----------------------------------------------------------------------------------------------------------------------------|
| lower | Convert a string pattern to lower case. This can only be placed after a string pattern fetch function or after a conversion |
|-------|-----------------------------------------------------------------------------------------------------------------------------|

- function returning a string type. The result is of type string.
- `upper` Convert a string pattern to upper case. This can only be placed after a string pattern fetch function or after a conversion function returning a string type. The result is of type string.
- `ipmask(mask)` Apply a mask to an IPv4 address, and use the result for lookups and storage. This can be used to make all hosts within a certain mask to share the same table entries and as such use the same server. The mask can be passed in dotted form (eg: 255.255.255.0) or in CIDR form (eg: 24).

## Chapter 8

# Logging

One of HAProxy's strong points certainly lies in its precise logs. It probably provides the finest level of information available for such a product, which is very important for troubleshooting complex environments. Standard information provided in logs include client ports, TCP/HTTP state timers, precise session state at termination and precise termination cause, information about decisions to direct traffic to a server, and of course the ability to capture arbitrary headers.

In order to improve administrators reactivity, it offers a great transparency about encountered problems, both internal and external, and it is possible to send logs to different sources at the same time with different level filters :

- global process-level logs (system errors, start/stop, etc..)
- per-instance system and internal errors (lack of resource, bugs, ...)
- per-instance external troubles (servers up/down, max connections)
- per-instance activity (client connections), either at the establishment or at the termination.

The ability to distribute different levels of logs to different log servers allow several production teams to interact and to fix their problems as soon as possible. For example, the system team might monitor system-wide errors, while the application team might be monitoring the up/down for their servers in real time, and the security team might analyze the activity logs with one hour delay.

## 8.1 Log levels

TCP and HTTP connections can be logged with information such as the date, time, source IP address, destination address, connection duration, response times, HTTP request, HTTP return code, number of bytes transmitted, conditions in which the session ended, and even exchanged cookies values. For example track a particular user's problems. All messages may be sent to up to two syslog servers. Check the "log" keyword in section 4.2 for more information about log facilities.

## 8.2 Log formats

HAProxy supports 4 log formats. Several fields are common between these formats and will be detailed in the following sections. A few of them may vary slightly with the configuration, due to indicators specific to certain options. The supported formats are as follows :

- the default format, which is very basic and very rarely used. It only provides very basic information about the incoming connection at the moment it is accepted : source IP:port, destination IP:port, and frontend-name. This mode will eventually disappear so it will not be described to great extents.
- the TCP format, which is more advanced. This format is enabled when "option tcplog" is set on the frontend. HAProxy will then usually wait for the connection to terminate before logging. This format provides much richer information, such as timers, connection counts, queue size, etc... This format is recommended for pure TCP proxies.
- the HTTP format, which is the most advanced for HTTP proxying. This format is enabled when "option httplog" is set on the frontend. It provides the same information as the TCP format with some HTTP-specific fields such as the request, the status code, and captures of headers and cookies. This format is recommended for HTTP proxies.
- the CLF HTTP format, which is equivalent to the HTTP format, but with the fields arranged in the same order as the CLF format. In this mode, all timers, captures, flags, etc... appear one per field after the end of the common fields, in the same order they appear in the standard HTTP format.

Next sections will go deeper into details for each of these formats. Format

specification will be performed on a "field" basis. Unless stated otherwise, a field is a portion of text delimited by any number of spaces. Since syslog servers are susceptible of inserting fields at the beginning of a line, it is always assumed that the first field is the one containing the process name and identifier.

Note : Since log lines may be quite long, the log examples in sections below might be broken into multiple lines. The example log lines will be prefixed with 3 closing angle brackets ('>>>') and each time a log is broken into multiple lines, each non-final line will end with a backslash ('\') and the next line will start indented by two characters.

### 8.2.1 Default log format

This format is used when no specific option is set. The log is emitted as soon as the connection is accepted. One should note that this currently is the only format which logs the request's destination IP and ports.

Example :

```
listen www
 mode http
 log global
 server srv1 127.0.0.1:8000
```

```
>>> Feb 6 12:12:09 localhost \
 haproxy[14385]: Connect from 10.0.1.2:33312 to 10.0.3.31:8012 \
 (www/HTTP)
```

| Field | Format                              | Extract from the example above |
|-------|-------------------------------------|--------------------------------|
| 1     | process_name '[' pid ']:'           | haproxy[14385]:                |
| 2     | 'Connect from'                      | Connect from                   |
| 3     | source_ip ':' source_port           | 10.0.1.2:33312                 |
| 4     | 'to'                                | to                             |
| 5     | destination_ip ':' destination_port | 10.0.3.31:8012                 |
| 6     | '(' frontend_name '/' mode ')'      | (www/HTTP)                     |

Detailed fields description :

- "source\_ip" is the IP address of the client which initiated the connection.
- "source\_port" is the TCP port of the client which initiated the connection.
- "destination\_ip" is the IP address the client connected to.
- "destination\_port" is the TCP port the client connected to.
- "frontend\_name" is the name of the frontend (or listener) which received and processed the connection.



- "mode is the mode the frontend is operating (TCP or HTTP).

It is advised not to use this deprecated format for newer installations as it will eventually disappear.

## 8.2.2 TCP log format

The TCP format is used when "option tcplog" is specified in the frontend, and is the recommended format for pure TCP proxies. It provides a lot of precious information for troubleshooting. Since this format includes timers and byte counts, the log is normally emitted at the end of the session. It can be emitted earlier if "option logasap" is specified, which makes sense in most environments with long sessions such as remote terminals. Sessions which match the "monitor" rules are never logged. It is also possible not to emit logs for sessions for which no data were exchanged between the client and the server, by specifying "option dontlognull" in the frontend. Successful connections will not be logged if "option dontlog-normal" is specified in the frontend. A few fields may slightly vary depending on some configuration options, those are marked with a star (\*) after the field name below.

Example :

```
frontend fnt
 mode tcp
 option tcplog
 log global
 default_backend bck

backend bck
 server srv1 127.0.0.1:8000
```

```
>>> Feb 6 12:12:56 localhost \
haproxy[14387]: 10.0.1.2:33313 [06/Feb/2009:12:12:51.443] fnt \
bck/srv1 0/0/5007 212 -- 0/0/0/0/3 0/0
```

| Field | Format                       | Extract from the example above |
|-------|------------------------------|--------------------------------|
| 1     | process_name '[' pid ']:'    | haproxy[14387]:                |
| 2     | client_ip ':' client_port    | 10.0.1.2:33313                 |
| 3     | '[' accept_date ']'          | [06/Feb/2009:12:12:51.443]     |
| 4     | frontend_name                | fnt                            |
| 5     | backend_name '/' server_name | bck/srv1                       |
| 6     | Tw '/' Tc '/' Tt*            | 0/0/5007                       |
| 7     | bytes_read*                  | 212                            |
| 8     | termination_state            | --                             |

```

9 actconn '/' feconn '/' beconn '/' srv_conn '/' retries* 0/0/0/0/3
10 srv_queue '/' backend_queue 0/0

```

Detailed fields description :

- "client\_ip" is the IP address of the client which initiated the TCP connection to haproxy.
- "client\_port" is the TCP port of the client which initiated the connection.
- "accept\_date" is the exact date when the connection was received by haproxy (which might be very slightly different from the date observed on the network if there was some queuing in the system's backlog). This is usually the same date which may appear in any upstream firewall's log.
- "frontend\_name" is the name of the frontend (or listener) which received and processed the connection.
- "backend\_name" is the name of the backend (or listener) which was selected to manage the connection to the server. This will be the same as the frontend if no switching rule has been applied, which is common for TCP applications.
- "server\_name" is the name of the last server to which the connection was sent, which might differ from the first one if there were connection errors and a redispatch occurred. Note that this server belongs to the backend which processed the request. If the connection was aborted before reaching a server, "<NOSRV>" is indicated instead of a server name.
- "Tw" is the total time in milliseconds spent waiting in the various queues. It can be "-1" if the connection was aborted before reaching the queue. See "Timers" below for more details.
- "Tc" is the total time in milliseconds spent waiting for the connection to establish to the final server, including retries. It can be "-1" if the connection was aborted before a connection could be established. See "Timers" below for more details.
- "Tt" is the total time in milliseconds elapsed between the accept and the last close. It covers all possible processings. There is one exception, if "option logasap" was specified, then the time counting stops at the moment the log is emitted. In this case, a '+' sign is prepended before the value, indicating that the final one will be larger. See "Timers" below for more details.
- "bytes\_read" is the total number of bytes transmitted from the server to the client when the log is emitted. If "option logasap" is specified, the

this value will be prefixed with a '+' sign indicating that the final one may be larger. Please note that this value is a 64-bit counter, so log analysis tools must be able to handle it without overflowing.

- "termination\_state" is the condition the session was in when the session ended. This indicates the session state, which side caused the end of session to happen, and for what reason (timeout, error, ...). The normal flags should be "--", indicating the session was closed by either end with no data remaining in buffers. See below "Session state at disconnection" for more details.
- "actconn" is the total number of concurrent connections on the process when the session was logged. It is useful to detect when some per-process system limits have been reached. For instance, if actconn is close to 512 when multiple connection errors occur, chances are high that the system limits the process to use a maximum of 1024 file descriptors and that all of them are used. See section 3 "Global parameters" to find how to tune the system.
- "feconn" is the total number of concurrent connections on the frontend when the session was logged. It is useful to estimate the amount of resource required to sustain high loads, and to detect when the frontend's "maxconn" has been reached. Most often when this value increases by huge jumps, it is because there is congestion on the backend servers, but sometimes it can be caused by a denial of service attack.
- "beconn" is the total number of concurrent connections handled by the backend when the session was logged. It includes the total number of concurrent connections active on servers as well as the number of connections pending in queues. It is useful to estimate the amount of additional servers needed to support high loads for a given application. Most often when this value increases by huge jumps, it is because there is congestion on the backend servers, but sometimes it can be caused by a denial of service attack.
- "srv\_conn" is the total number of concurrent connections still active on the server when the session was logged. It can never exceed the server's configured "maxconn" parameter. If this value is very often close or equal to the server's "maxconn", it means that traffic regulation is involved a lot, meaning that either the server's maxconn value is too low, or that there aren't enough servers to process the load with an optimal response time. When only one of the server's "srv\_conn" is high, it usually means that this server has some trouble causing the connections to take longer to be processed than on other servers.
- "retries" is the number of connection retries experienced by this session when trying to connect to the server. It must normally be zero, unless a

server is being stopped at the same moment the connection was attempted. Frequent retries generally indicate either a network problem between haproxy and the server, or a misconfigured system backlog on the server preventing new connections from being queued. This field may optionally be prefixed with a '+' sign, indicating that the session has experienced a redispatch after the maximal retry count has been reached on the initial server. In this case, the server name appearing in the log is the one the connection was redispatched to, and not the first one, though both may sometimes be the same in case of hashing for instance. So as a general rule of thumb, when a '+' is present in front of the retry count, this count should not be attributed to the logged server.

- "srv\_queue" is the total number of requests which were processed before this one in the server queue. It is zero when the request has not gone through the server queue. It makes it possible to estimate the approximate server's response time by dividing the time spent in queue by the number of requests in the queue. It is worth noting that if a session experiences a redispatch and passes through two server queues, their positions will be cumulated. A request should not pass through both the server queue and the backend queue unless a redispatch occurs.
- "backend\_queue" is the total number of requests which were processed before this one in the backend's global queue. It is zero when the request has not gone through the global queue. It makes it possible to estimate the average queue length, which easily translates into a number of missing servers when divided by a server's "maxconn" parameter. It is worth noting that if a session experiences a redispatch, it may pass twice in the backend's queue, and then both positions will be cumulated. A request should not pass through both the server queue and the backend queue unless a redispatch occurs.

### 8.2.3 HTTP log format

The HTTP format is the most complete and the best suited for HTTP proxies. It is enabled by when "option httplog" is specified in the frontend. It provides the same level of information as the TCP format with additional features which are specific to the HTTP protocol. Just like the TCP format, the log is usually emitted at the end of the session, unless "option logasap" is specified, which generally only makes sense for download sites. A session which matches the "monitor" rules will never be logged. It is also possible not to log sessions for which no data were sent by the client by specifying "option dontlognull" in the frontend. Successful connections will not be logged if "option dontlog-normal" is specified in the frontend.

Most fields are shared with the TCP log, some being different. A few fields may slightly vary depending on some configuration options. Those ones are marked with a star (\*) after the field name below.

Example :

```
frontend http-in
 mode http
 option httplog
 log global
 default_backend bck

backend static
 server srv1 127.0.0.1:8000
```

```
>>> Feb 6 12:14:14 localhost \
haproxy[14389]: 10.0.1.2:33317 [06/Feb/2009:12:14:14.655] http-in \
static/srv1 10/0/30/69/109 200 2750 - - ---- 1/1/1/1/0 0/0 {1wt.eu} \
{} "GET /index.html HTTP/1.1"
```

| Field | Format                                                  | Extract from the example above |
|-------|---------------------------------------------------------|--------------------------------|
| 1     | process_name '[' pid ']:'                               | haproxy[14389]:                |
| 2     | client_ip ':' client_port                               | 10.0.1.2:33317                 |
| 3     | '[' accept_date ']'                                     | [06/Feb/2009:12:14:14.655]     |
| 4     | frontend_name                                           | http-in                        |
| 5     | backend_name '/' server_name                            | static/srv1                    |
| 6     | Tq '/' Tw '/' Tc '/' Tr '/' Tt*                         | 10/0/30/69/109                 |
| 7     | status_code                                             | 200                            |
| 8     | bytes_read*                                             | 2750                           |
| 9     | captured_request_cookie                                 | -                              |
| 10    | captured_response_cookie                                | -                              |
| 11    | termination_state                                       | ----                           |
| 12    | actconn '/' feconn '/' beconn '/' srv_conn '/' retries* | 1/1/1/1/0                      |
| 13    | srv_queue '/' backend_queue                             | 0/0                            |
| 14    | '{' captured_request_headers* '}'                       | {haproxy.1wt.eu}               |
| 15    | '{' captured_response_headers* '}'                      | {}                             |
| 16    | ''' http_request '''                                    | "GET /index.html HTTP/1.1"     |

Detailed fields description :

- "client\_ip" is the IP address of the client which initiated the TCP connection to haproxy.
- "client\_port" is the TCP port of the client which initiated the connection.
- "accept\_date" is the exact date when the TCP connection was received by

haproxy (which might be very slightly different from the date observed on the network if there was some queuing in the system's backlog). This is usually the same date which may appear in any upstream firewall's log. This does not depend on the fact that the client has sent the request or not.

- "frontend\_name" is the name of the frontend (or listener) which received and processed the connection.
- "backend\_name" is the name of the backend (or listener) which was selected to manage the connection to the server. This will be the same as the frontend if no switching rule has been applied.
- "server\_name" is the name of the last server to which the connection was sent, which might differ from the first one if there were connection errors and a redispatch occurred. Note that this server belongs to the backend which processed the request. If the request was aborted before reaching a server, "<NOSRV>" is indicated instead of a server name. If the request was intercepted by the stats subsystem, "<STATS>" is indicated instead.
- "Tq" is the total time in milliseconds spent waiting for the client to send a full HTTP request, not counting data. It can be "-1" if the connection was aborted before a complete request could be received. It should always be very small because a request generally fits in one single packet. Large times here generally indicate network trouble between the client and haproxy. See "Timers" below for more details.
- "Tw" is the total time in milliseconds spent waiting in the various queues. It can be "-1" if the connection was aborted before reaching the queue. See "Timers" below for more details.
- "Tc" is the total time in milliseconds spent waiting for the connection to establish to the final server, including retries. It can be "-1" if the request was aborted before a connection could be established. See "Timers" below for more details.
- "Tr" is the total time in milliseconds spent waiting for the server to send a full HTTP response, not counting data. It can be "-1" if the request was aborted before a complete response could be received. It generally matches the server's processing time for the request, though it may be altered by the amount of data sent by the client to the server. Large times here on "GET" requests generally indicate an overloaded server. See "Timers" below for more details.
- "Tt" is the total time in milliseconds elapsed between the accept and the last close. It covers all possible processings. There is one exception, if "option logasap" was specified, then the time counting stops at the moment

the log is emitted. In this case, a '+' sign is prepended before the value, indicating that the final one will be larger. See "Timers" below for more details.

- "status\_code" is the HTTP status code returned to the client. This status is generally set by the server, but it might also be set by haproxy when the server cannot be reached or when its response is blocked by haproxy.
- "bytes\_read" is the total number of bytes transmitted to the client when the log is emitted. This does include HTTP headers. If "option logasap" is specified, the this value will be prefixed with a '+' sign indicating that the final one may be larger. Please note that this value is a 64-bit counter, so log analysis tools must be able to handle it without overflowing.
- "captured\_request\_cookie" is an optional "name=value" entry indicating that the client had this cookie in the request. The cookie name and its maximum length are defined by the "capture cookie" statement in the frontend configuration. The field is a single dash ('-') when the option is not set. Only one cookie may be captured, it is generally used to track session ID exchanges between a client and a server to detect session crossing between clients due to application bugs. For more details, please consult the section "Capturing HTTP headers and cookies" below.
- "captured\_response\_cookie" is an optional "name=value" entry indicating that the server has returned a cookie with its response. The cookie name and its maximum length are defined by the "capture cookie" statement in the frontend configuration. The field is a single dash ('-') when the option is not set. Only one cookie may be captured, it is generally used to track session ID exchanges between a client and a server to detect session crossing between clients due to application bugs. For more details, please consult the section "Capturing HTTP headers and cookies" below.
- "termination\_state" is the condition the session was in when the session ended. This indicates the session state, which side caused the end of session to happen, for what reason (timeout, error, ...), just like in TCP logs, and information about persistence operations on cookies in the last two characters. The normal flags should begin with "--", indicating the session was closed by either end with no data remaining in buffers. See below "Session state at disconnection" for more details.
- "actconn" is the total number of concurrent connections on the process when the session was logged. It is useful to detect when some per-process system limits have been reached. For instance, if actconn is close to 512 or 1024 when multiple connection errors occur, chances are high that the system limits the process to use a maximum of 1024 file descriptors and that all

of them are used. See section 3 "Global parameters" to find how to tune the system.

- "feconn" is the total number of concurrent connections on the frontend when the session was logged. It is useful to estimate the amount of resource required to sustain high loads, and to detect when the frontend's "maxconn" has been reached. Most often when this value increases by huge jumps, it is because there is congestion on the backend servers, but sometimes it can be caused by a denial of service attack.
- "beconn" is the total number of concurrent connections handled by the backend when the session was logged. It includes the total number of concurrent connections active on servers as well as the number of connections pending in queues. It is useful to estimate the amount of additional servers needed to support high loads for a given application. Most often when this value increases by huge jumps, it is because there is congestion on the backend servers, but sometimes it can be caused by a denial of service attack.
- "srv\_conn" is the total number of concurrent connections still active on the server when the session was logged. It can never exceed the server's configured "maxconn" parameter. If this value is very often close or equal to the server's "maxconn", it means that traffic regulation is involved a lot, meaning that either the server's maxconn value is too low, or that there aren't enough servers to process the load with an optimal response time. When only one of the server's "srv\_conn" is high, it usually means that this server has some trouble causing the requests to take longer to be processed than on other servers.
- "retries" is the number of connection retries experienced by this session when trying to connect to the server. It must normally be zero, unless a server is being stopped at the same moment the connection was attempted. Frequent retries generally indicate either a network problem between haproxy and the server, or a misconfigured system backlog on the server preventing new connections from being queued. This field may optionally be prefixed with a '+' sign, indicating that the session has experienced a redispatch after the maximal retry count has been reached on the initial server. In this case, the server name appearing in the log is the one the connection was redispatched to, and not the first one, though both may sometimes be the same in case of hashing for instance. So as a general rule of thumb, when a '+' is present in front of the retry count, this count should not be attributed to the logged server.
- "srv\_queue" is the total number of requests which were processed before this one in the server queue. It is zero when the request has not gone through the server queue. It makes it possible to estimate the approximate



server's response time by dividing the time spent in queue by the number of requests in the queue. It is worth noting that if a session experiences a redispatch and passes through two server queues, their positions will be cumulated. A request should not pass through both the server queue and the backend queue unless a redispatch occurs.

- "backend\_queue" is the total number of requests which were processed before this one in the backend's global queue. It is zero when the request has not gone through the global queue. It makes it possible to estimate the average queue length, which easily translates into a number of missing servers when divided by a server's "maxconn" parameter. It is worth noting that if a session experiences a redispatch, it may pass twice in the backend's queue, and then both positions will be cumulated. A request should not pass through both the server queue and the backend queue unless a redispatch occurs.
- "captured\_request\_headers" is a list of headers captured in the request due to the presence of the "capture request header" statement in the frontend. Multiple headers can be captured, they will be delimited by a vertical bar ('|'). When no capture is enabled, the braces do not appear, causing a shift of remaining fields. It is important to note that this field may contain spaces, and that using it requires a smarter log parser than when it's not used. Please consult the section "Capturing HTTP headers and cookies" below for more details.
- "captured\_response\_headers" is a list of headers captured in the response due to the presence of the "capture response header" statement in the frontend. Multiple headers can be captured, they will be delimited by a vertical bar ('|'). When no capture is enabled, the braces do not appear, causing a shift of remaining fields. It is important to note that this field may contain spaces, and that using it requires a smarter log parser than when it's not used. Please consult the section "Capturing HTTP headers and cookies" below for more details.
- "http\_request" is the complete HTTP request line, including the method, request and HTTP version string. Non-printable characters are encoded (see below the section "Non-printable characters"). This is always the last field, and it is always delimited by quotes and is the only one which can contain quotes. If new fields are added to the log format, they will be added before this field. This field might be truncated if the request is huge and does not fit in the standard syslog buffer (1024 characters). This is the reason why this field must always remain the last one.

## 8.3 Advanced logging options

Some advanced logging options are often looked for but are not easy to find out just by looking at the various options. Here is an entry point for the few options which can enable better logging. Please refer to the keywords reference for more information about their usage.

### 8.3.1 Disabling logging of external tests

It is quite common to have some monitoring tools perform health checks on haproxy. Sometimes it will be a layer 3 load-balancer such as LVS or any commercial load-balancer, and sometimes it will simply be a more complete monitoring system such as Nagios. When the tests are very frequent, users often ask how to disable logging for those checks. There are three possibilities :

- if connections come from everywhere and are just TCP probes, it is often desired to simply disable logging of connections without data exchange, by setting "option dontlognull" in the frontend. It also disables logging of port scans, which may or may not be desired.
- if the connection come from a known source network, use "monitor-net" to declare this network as monitoring only. Any host in this network will then only be able to perform health checks, and their requests will not be logged. This is generally appropriate to designate a list of equipments such as other load-balancers.
- if the tests are performed on a known URI, use "monitor-uri" to declare this URI as dedicated to monitoring. Any host sending this request will only get the result of a health-check, and the request will not be logged.

### 8.3.2 Logging before waiting for the session to terminate

The problem with logging at end of connection is that you have no clue about what is happening during very long sessions, such as remote terminal sessions or large file downloads. This problem can be worked around by specifying "option logasap" in the frontend. Haproxy will then log as soon as possible, just before data transfer begins. This means that in case of TCP, it will still log the connection status to the server, and in case of HTTP, it will log just after processing the server headers. In this case, the number of bytes reported

is the number of header bytes sent to the client. In order to avoid confusion with normal logs, the total time field and the number of bytes are prefixed with a '+' sign which means that real numbers are certainly larger.

### 8.3.3 Raising log level upon errors

Sometimes it is more convenient to separate normal traffic from errors logs, for instance in order to ease error monitoring from log files. When the option "log-separate-errors" is used, connections which experience errors, timeouts, retries, redispaches or HTTP status codes 5xx will see their syslog level raised from "info" to "err". This will help a syslog daemon store the log in a separate file. It is very important to keep the errors in the normal traffic file too, so that log ordering is not altered. You should also be careful if you already have configured your syslog daemon to store all logs higher than "notice" in an "admin" file, because the "err" level is higher than "notice".

### 8.3.4 Disabling logging of successful connections

Although this may sound strange at first, some large sites have to deal with multiple thousands of logs per second and are experiencing difficulties keeping them intact for a long time or detecting errors within them. If the option "dontlog-normal" is set on the frontend, all normal connections will not be logged. In this regard, a normal connection is defined as one without any error, timeout, retry nor redispach. In HTTP, the status code is checked too, and a response with a status 5xx is not considered normal and will be logged too. Of course, doing is is really discouraged as it will remove most of the useful information from the logs. Do this only if you have no other alternative.

## 8.4 Timing events

Timers provide a great help in troubleshooting network problems. All values are reported in milliseconds (ms). These timers should be used in conjunction with the session termination flags. In TCP mode with "option tcplog" set on the frontend, 3 control points are reported under the form "Tw/Tc/Tt", and in HTTP mode, 5 control points are reported under the form "Tq/Tw/Tc/Tr/Tt" :

- Tq: total time to get the client request (HTTP mode only). It's the time elapsed between the moment the client connection was accepted and the moment the proxy received the last HTTP header. The value "-1" indicates that the end of headers (empty line) has never been seen. This happens when the client closes prematurely or times out.
- Tw: total time spent in the queues waiting for a connection slot. It accounts for backend queue as well as the server queues, and depends on the queue size, and the time needed for the server to complete previous requests. The value "-1" means that the request was killed before reaching the queue, which is generally what happens with invalid or denied requests.
- Tc: total time to establish the TCP connection to the server. It's the time elapsed between the moment the proxy sent the connection request, and the moment it was acknowledged by the server, or between the TCP SYN packet and the matching SYN/ACK packet in return. The value "-1" means that the connection never established.
- Tr: server response time (HTTP mode only). It's the time elapsed between the moment the TCP connection was established to the server and the moment the server sent its complete response headers. It purely shows its request processing time, without the network overhead due to the data transmission. It is worth noting that when the client has data to send to the server, for instance during a POST request, the time already runs, and this can distort apparent response time. For this reason, it's generally wise not to trust too much this field for POST requests initiated from clients behind an untrusted network. A value of "-1" here means that the last the response header (empty line) was never seen, most likely because the server timeout stroke before the server managed to process the request.
- Tt: total session duration time, between the moment the proxy accepted it and the moment both ends were closed. The exception is when the "logasap" option is specified. In this case, it only equals (Tq+Tw+Tc+Tr), and is prefixed with a '+' sign. From this field, we can deduce "Td", the data transmission time, by subtracting other timers when valid :

$$Td = Tt - (Tq + Tw + Tc + Tr)$$

Timers with "-1" values have to be excluded from this equation. In TCP mode, "Tq" and "Tr" have to be excluded too. Note that "Tt" can never be negative.

These timers provide precious indications on trouble causes. Since the TCP protocol defines retransmit delays of 3, 6, 12... seconds, we know for sure that timers close to multiples of 3s are nearly always related to lost packets

due to network problems (wires, negotiation, congestion). Moreover, if "Tt" is close to a timeout value specified in the configuration, it often means that a session has been aborted on timeout.

Most common cases :

- If "Tq" is close to 3000, a packet has probably been lost between the client and the proxy. This is very rare on local networks but might happen when clients are on far remote networks and send large requests. It may happen that values larger than usual appear here without any network cause. Sometimes, during an attack or just after a resource starvation has ended, haproxy may accept thousands of connections in a few milliseconds. The time spent accepting these connections will inevitably slightly delay processing of other connections, and it can happen that request times in the order of a few tens of milliseconds are measured after a few thousands of new connections have been accepted at once. Setting "option http-server-close" may display larger request times since "Tq" also measures the time spent waiting for additional requests.
- If "Tc" is close to 3000, a packet has probably been lost between the server and the proxy during the server connection phase. This value should always be very low, such as 1 ms on local networks and less than a few tens of ms on remote networks.
- If "Tr" is nearly always lower than 3000 except some rare values which seem to be the average majored by 3000, there are probably some packets lost between the proxy and the server.
- If "Tt" is large even for small byte counts, it generally is because neither the client nor the server decides to close the connection, for instance because both have agreed on a keep-alive connection mode. In order to solve this issue, it will be needed to specify "option httpclose" on either the frontend or the backend. If the problem persists, it means that the server ignores the "close" connection mode and expects the client to close. Then it will be required to use "option forceclose". Having the smallest possible 'Tt' is important when connection regulation is used with the "maxconn" option on the servers, since no new connection will be sent to the server until another one is released.

Other noticeable HTTP log cases ('xx' means any value to be ignored) :

- Tq/Tw/Tc/Tr/+Tt    The "option logasap" is present on the frontend and the log was emitted before the data phase. All the timers are valid except "Tt" which is shorter than reality.
- 1/xx/xx/xx/Tt    The client was not able to send a complete request in time

or it aborted too early. Check the session termination flags then "timeout http-request" and "timeout client" settings.

- Tq/-1/xx/xx/Tt    It was not possible to process the request, maybe because servers were out of order, because the request was invalid or forbidden by ACL rules. Check the session termination flags.
- Tq/Tw/-1/xx/Tt    The connection could not establish on the server. Either it actively refused it or it timed out after Tt-(Tq+Tw) ms. Check the session termination flags, then check the "timeout connect" setting. Note that the tarpit action might return similar-looking patterns, with "Tw" equal to the time the client connection was maintained open.
- Tq/Tw/Tc/-1/Tt    The server has accepted the connection but did not return a complete response in time, or it closed its connexion unexpectedly after Tt-(Tq+Tw+Tc) ms. Check the session termination flags, then check the "timeout server" setting.

## 8.5 Session state at disconnection

TCP and HTTP logs provide a session termination indicator in the "termination\_state" field, just before the number of active connections. It is 2-characters long in TCP mode, and is extended to 4 characters in HTTP mode, each of which has a special meaning :

- On the first character, a code reporting the first event which caused the session to terminate :
  - C : the TCP session was unexpectedly aborted by the client.
  - S : the TCP session was unexpectedly aborted by the server, or the server explicitly refused it.
  - P : the session was prematurely aborted by the proxy, because of a connection limit enforcement, because a DENY filter was matched, because of a security check which detected and blocked a dangerous error in server response which might have caused information leak (eg: cacheable cookie), or because the response was processed by the proxy (redirect, stats, etc...).

- R : a resource on the proxy has been exhausted (memory, sockets, source ports, ...). Usually, this appears during the connection phase, and system logs should contain a copy of the precise error. If this happens, it must be considered as a very serious anomaly which should be fixed as soon as possible by any means.
  - I : an internal error was identified by the proxy during a self-check. This should NEVER happen, and you are encouraged to report any log containing this, because this would almost certainly be a bug. It would be wise to preventively restart the process after such an event too, in case it would be caused by memory corruption.
  - c : the client-side timeout expired while waiting for the client to send or receive data.
  - s : the server-side timeout expired while waiting for the server to send or receive data.
  - : normal session completion, both the client and the server closed with nothing left in the buffers.
- on the second character, the TCP or HTTP session state when it was closed :
- R : the proxy was waiting for a complete, valid REQUEST from the client (HTTP mode only). Nothing was sent to any server.
  - Q : the proxy was waiting in the QUEUE for a connection slot. This can only happen when servers have a 'maxconn' parameter set. It can also happen in the global queue after a redispatch consecutive to a failed attempt to connect to a dying server. If no redispatch is reported, then no connection attempt was made to any server.
  - C : the proxy was waiting for the CONNECTION to establish on the server. The server might at most have noticed a connection attempt.
  - H : the proxy was waiting for complete, valid response HEADERS from the server (HTTP only).
  - D : the session was in the DATA phase.
  - L : the proxy was still transmitting LAST data to the client while the server had already finished. This one is very rare as it can only happen when the client dies while receiving the last packets.
  - T : the request was tarpitted. It has been held open with the client during the whole "timeout tarpit" duration or until the client

closed, both of which will be reported in the "Tw" timer.

- : normal session completion after end of data transfer.
- the third character tells whether the persistence cookie was provided by the client (only in HTTP mode) :
  - N : the client provided NO cookie. This is usually the case for new visitors, so counting the number of occurrences of this flag in the logs generally indicate a valid trend for the site frequentation.
  - I : the client provided an INVALID cookie matching no known server. This might be caused by a recent configuration change, mixed cookies between HTTP/HTTPS sites, persistence conditionally ignored, or an attack.
  - D : the client provided a cookie designating a server which was DOWN, so either "option persist" was used and the client was sent to this server, or it was not set and the client was redispached to another server.
  - V : the client provided a VALID cookie, and was sent to the associated server.
  - E : the client provided a valid cookie, but with a last date which was older than what is allowed by the "maxidle" cookie parameter, so the cookie is consider EXPIRED and is ignored. The request will be redispached just as if there was no cookie.
  - O : the client provided a valid cookie, but with a first date which was older than what is allowed by the "maxlife" cookie parameter, so the cookie is consider too OLD and is ignored. The request will be redispached just as if there was no cookie.
- : does not apply (no cookie set in configuration).
- the last character reports what operations were performed on the persistence cookie returned by the server (only in HTTP mode) :
  - N : NO cookie was provided by the server, and none was inserted either.
  - I : no cookie was provided by the server, and the proxy INSERTED one. Note that in "cookie insert" mode, if the server provides a cookie, it will still be overwritten and reported as "I" here.
  - U : the proxy UPDATED the last date in the cookie that was presented by



the client. This can only happen in insert mode with "maxidle". It happens everytime there is activity at a different date than the date indicated in the cookie. If any other change happens, such as a redispach, then the cookie will be marked as inserted instead.

P : a cookie was PROVIDED by the server and transmitted as-is.

R : the cookie provided by the server was REWRITTEN by the proxy, which happens in "cookie rewrite" or "cookie prefix" modes.

D : the cookie provided by the server was DELETED by the proxy.

- : does not apply (no cookie set in configuration).

The combination of the two first flags gives a lot of information about what was happening when the session terminated, and why it did terminate. It can be helpful to detect server saturation, network troubles, local system resource starvation, attacks, etc...

The most common termination flags combinations are indicated below. They are alphabetically sorted, with the lowercase set just after the upper case for easier finding and understanding.

| Flags | Reason |
|-------|--------|
|-------|--------|

|    |                     |
|----|---------------------|
| -- | Normal termination. |
|----|---------------------|

|    |                                                                                                                                                                                                                                                                                   |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CC | The client aborted before the connection could be established to the server. This can happen when haproxy tries to connect to a recently dead (or unchecked) server, and the client aborts while haproxy is waiting for the server to respond or for "timeout connect" to expire. |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|    |                                                                                                                                                                                                                                                                                                                                                                 |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CD | The client unexpectedly aborted during data transfer. This can be caused by a browser crash, by an intermediate equipment between the client and haproxy which decided to actively break the connection, by network routing issues between the client and haproxy, or by a keep-alive session between the server and the client terminated first by the client. |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|    |                                                                                                                                                                                                          |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| cD | The client did not send nor acknowledge any data for as long as the "timeout client" delay. This is often caused by network failures on the client side, or the client simply leaving the net uncleanly. |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|    |                                                                                                                                                                           |
|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CH | The client aborted while waiting for the server to start responding. It might be the server taking too long to respond or the client clicking the 'Stop' button too fast. |
|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

- cH    The "timeout client" stroke while waiting for client data during a POST request. This is sometimes caused by too large TCP MSS values for PPPoE networks which cannot transport full-sized packets. It can also happen when client timeout is smaller than server timeout and the server takes too long to respond.
  
- CQ    The client aborted while its session was queued, waiting for a server with enough empty slots to accept it. It might be that either all the servers were saturated or that the assigned server was taking too long a time to respond.
  
- CR    The client aborted before sending a full HTTP request. Most likely the request was typed by hand using a telnet client, and aborted too early. The HTTP status code is likely a 400 here. Sometimes this might also be caused by an IDS killing the connection between haproxy and the client.
  
- cR    The "timeout http-request" stroke before the client sent a full HTTP request. This is sometimes caused by too large TCP MSS values on the client side for PPPoE networks which cannot transport full-sized packets, or by clients sending requests by hand and not typing fast enough, or forgetting to enter the empty line at the end of the request. The HTTP status code is likely a 408 here.
  
- CT    The client aborted while its session was tarpitted. It is important to check if this happens on valid requests, in order to be sure that no wrong tarpit rules have been written. If a lot of them happen, it might make sense to lower the "timeout tarpit" value to something closer to the average reported "Tw" timer, in order not to consume resources for just a few attackers.
  
- SC    The server or an equipment between it and haproxy explicitly refused the TCP connection (the proxy received a TCP RST or an ICMP message in return). Under some circumstances, it can also be the network stack telling the proxy that the server is unreachable (eg: no route, or no ARP response on local network). When this happens in HTTP mode, the status code is likely a 502 or 503 here.
  
- sC    The "timeout connect" stroke before a connection to the server could complete. When this happens in HTTP mode, the status code is likely a 503 or 504 here.
  
- SD    The connection to the server died with an error during the data transfer. This usually means that haproxy has received an RST from the server or an ICMP message from an intermediate equipment while

exchanging data with the server. This can be caused by a server crash or by a network issue on an intermediate equipment.

**sD** The server did not send nor acknowledge any data for as long as the "timeout server" setting during the data phase. This is often caused by too short timeouts on L4 equipments before the server (firewalls, load-balancers, ...), as well as keep-alive sessions maintained between the client and the server expiring first on haproxy.

**SH** The server aborted before sending its full HTTP response headers, or it crashed while processing the request. Since a server aborting at this moment is very rare, it would be wise to inspect its logs to control whether it crashed and why. The logged request may indicate a small set of faulty requests, demonstrating bugs in the application. Sometimes this might also be caused by an IDS killing the connection between haproxy and the server.

**sH** The "timeout server" stroke before the server could return its response headers. This is the most common anomaly, indicating too long transactions, probably caused by server or database saturation. The immediate workaround consists in increasing the "timeout server" setting, but it is important to keep in mind that the user experience will suffer from these long response times. The only long term solution is to fix the application.

**sQ** The session spent too much time in queue and has been expired. See the "timeout queue" and "timeout connect" settings to find out how to fix this if it happens too often. If it often happens massively in short periods, it may indicate general problems on the affected servers due to I/O or database congestion, or saturation caused by external attacks.

**PC** The proxy refused to establish a connection to the server because the process' socket limit has been reached while attempting to connect. The global "maxconn" parameter may be increased in the configuration so that it does not happen anymore. This status is very rare and might happen when the global "ulimit-n" parameter is forced by hand.

**PD** The proxy blocked an incorrectly formatted chunked encoded message in a request or a response, after the server has emitted its headers. In most cases, this will indicate an invalid message from the server to the client.

**PH** The proxy blocked the server's response, because it was invalid, incomplete, dangerous (cache control), or matched a security filter. In any case, an HTTP 502 error is sent to the client. One possible

cause for this error is an invalid syntax in an HTTP header name containing unauthorized characters. It is also possible but quite rare, that the proxy blocked a chunked-encoding request from the client due to an invalid syntax, before the server responded. In this case, an HTTP 400 error is sent to the client and reported in the logs.

- PR The proxy blocked the client's HTTP request, either because of an invalid HTTP syntax, in which case it returned an HTTP 400 error to the client, or because a deny filter matched, in which case it returned an HTTP 403 error.
- PT The proxy blocked the client's request and has tarpitted its connection before returning it a 500 server error. Nothing was sent to the server. The connection was maintained open for as long as reported by the "Tw" timer field.
- RC A local resource has been exhausted (memory, sockets, source ports) preventing the connection to the server from establishing. The error logs will tell precisely what was missing. This is very rare and can only be solved by proper system tuning.

The combination of the two last flags gives a lot of information about how persistence was handled by the client, the server and by haproxy. This is very important to troubleshoot disconnections, when users complain they have to re-authenticate. The commonly encountered flags are :

- Persistence cookie is not enabled.
- NN No cookie was provided by the client, none was inserted in the response. For instance, this can be in insert mode with "postonly" set on a GET request.
- II A cookie designating an invalid server was provided by the client, a valid one was inserted in the response. This typically happens when a "server" entry is removed from the configuraton, since its cookie value can be presented by a client when no other server knows it.
- NI No cookie was provided by the client, one was inserted in the response. This typically happens for first requests from every user in "insert" mode, which makes it an easy way to count real users.
- VN A cookie was provided by the client, none was inserted in the response. This happens for most responses for which the client has already got a cookie.

- VU A cookie was provided by the client, with a last visit date which is not completely up-to-date, so an updated cookie was provided in response. This can also happen if there was no date at all, or if there was a date but the "maxidle" parameter was not set, so that the cookie can be switched to unlimited time.
- EI A cookie was provided by the client, with a last visit date which is too old for the "maxidle" parameter, so the cookie was ignored and a new cookie was inserted in the response.
- OI A cookie was provided by the client, with a first visit date which is too old for the "maxlife" parameter, so the cookie was ignored and a new cookie was inserted in the response.
- DI The server designated by the cookie was down, a new server was selected and a new cookie was emitted in the response.
- VI The server designated by the cookie was not marked dead but could not be reached. A redispatch happened and selected another one, which was then advertised in the response.

## 8.6 Non-printable characters

In order not to cause trouble to log analysis tools or terminals during log consulting, non-printable characters are not sent as-is into log files, but are converted to the two-digits hexadecimal representation of their ASCII code, prefixed by the character '#'. The only characters that can be logged without being escaped are comprised between 32 and 126 (inclusive). Obviously, the escape character '#' itself is also encoded to avoid any ambiguity ("#23"). It is the same for the character '"' which becomes "#22", as well as '{', '|' and '}' when logging headers.

Note that the space character (' ') is not encoded in headers, which can cause issues for tools relying on space count to locate fields. A typical header containing spaces is "User-Agent".

Last, it has been observed that some syslog daemons such as syslog-ng escape the quote ('') with a backslash ('\'). The reverse operation can safely be performed since no quote may appear anywhere else in the logs.

## 8.7 Capturing HTTP cookies

Cookie capture simplifies the tracking a complete user session. This can be achieved using the "capture cookie" statement in the frontend. Please refer to section 4.2 for more details. Only one cookie can be captured, and the same cookie will simultaneously be checked in the request ("Cookie:" header) and in the response ("Set-Cookie:" header). The respective values will be reported in the HTTP logs at the "captured\_request\_cookie" and "captured\_response\_cookie" locations (see section 8.2.3 about HTTP log format). When either cookie is not seen, a dash ('-') replaces the value. This way, it's easy to detect when a user switches to a new session for example, because the server will reassign it a new cookie. It is also possible to detect if a server unexpectedly sets a wrong cookie to a client, leading to session crossing.

Examples :

```
capture the first cookie whose name starts with "ASPSESSION"
capture cookie ASPSESSION len 32

capture the first cookie whose name is exactly "vgnvisitor"
capture cookie vgnvisitor= len 32
```

## 8.8 Capturing HTTP headers

Header captures are useful to track unique request identifiers set by an upper proxy, virtual host names, user-agents, POST content-length, referrers, etc. In the response, one can search for information about the response length, how the server asked the cache to behave, or an object location during a redirection.

Header captures are performed using the "capture request header" and "capture response header" statements in the frontend. Please consult their definition in section 4.2 for more details.

It is possible to include both request headers and response headers at the same time. Non-existent headers are logged as empty strings, and if one header appears more than once, only its last occurrence will be logged. Request headers are grouped within braces '{' and '}' in the same order as they were declared, and delimited with a vertical bar '|' without any space. Response headers follow the same representation, but are displayed after a space following the request headers block. These blocks are displayed just before the HTTP request in the logs.

Example :

```
This instance chains to the outgoing proxy
listen proxy-out
 mode http
 option httplog
 option logasap
 log global
 server cache1 192.168.1.1:3128

log the name of the virtual server
capture request header Host len 20

log the amount of data uploaded during a POST
capture request header Content-Length len 10

log the beginning of the referrer
capture request header Referer len 20

server name (useful for outgoing proxies only)
capture response header Server len 20

logging the content-length is useful with "option logasap"
capture response header Content-Length len 10

log the expected cache behaviour on the response
capture response header Cache-Control len 8

the Via header will report the next proxy's name
capture response header Via len 20

log the URL location during a redirection
capture response header Location len 20
```

```
>>> Aug 9 20:26:09 localhost \
haproxy[2022]: 127.0.0.1:34014 [09/Aug/2004:20:26:09] proxy-out \
proxy-out/cache1 0/0/0/162/+162 200 +350 - - ---- 0/0/0/0/0 0/0 \
{fr.adserver.yahoo.co||http://fr.f416.mail.} {1864|private||} \
"GET http://fr.adserver.yahoo.com/"
```

```
>>> Aug 9 20:30:46 localhost \
haproxy[2022]: 127.0.0.1:34020 [09/Aug/2004:20:30:46] proxy-out \
proxy-out/cache1 0/0/0/182/+182 200 +279 - - ---- 0/0/0/0/0 0/0 \
{w.ods.org||} {Formilux/0.1.8|3495|||} \
"GET http://trafic.1wt.eu/ HTTP/1.1"
```

```
>>> Aug 9 20:30:46 localhost \
```

```
haproxy[2022]: 127.0.0.1:34028 [09/Aug/2004:20:30:46] proxy-out \
proxy-out/cache1 0/0/2/126/+128 301 +223 - - ---- 0/0/0/0/0 0/0 \
{www.sytadin.equipement.gouv.fr||http://trafic.1wt.eu/} \
{Apache|230|||http://www.sytadin.} \
"GET http://www.sytadin.equipement.gouv.fr/ HTTP/1.1"
```

## 8.9 Examples of logs

These are real-world examples of logs accompanied with an explanation. Some of them have been made up by hand. The syslog part has been removed for better reading. Their sole purpose is to explain how to decipher them.

```
>>> haproxy[674]: 127.0.0.1:33318 [15/Oct/2003:08:31:57.130] px-http \
px-http/srv1 6559/0/7/147/6723 200 243 - - ---- 5/3/3/1/0 0/0 \
"HEAD / HTTP/1.0"
```

=> long request (6.5s) entered by hand through 'telnet'. The server replied in 147 ms, and the session ended normally ('----')

```
>>> haproxy[674]: 127.0.0.1:33319 [15/Oct/2003:08:31:57.149] px-http \
px-http/srv1 6559/1230/7/147/6870 200 243 - - ---- 324/239/239/99/0 \
0/9 "HEAD / HTTP/1.0"
```

=> Idem, but the request was queued in the global queue behind 9 other requests, and waited there for 1230 ms.

```
>>> haproxy[674]: 127.0.0.1:33320 [15/Oct/2003:08:32:17.654] px-http \
px-http/srv1 9/0/7/14/+30 200 +243 - - ---- 3/3/3/1/0 0/0 \
"GET /image.iso HTTP/1.0"
```

=> request for a long data transfer. The "logasap" option was specified, so the log was produced just before transferring data. The server replied in 14 ms, 243 bytes of headers were sent to the client, and total time from accept to first data byte is 30 ms.

```
>>> haproxy[674]: 127.0.0.1:33320 [15/Oct/2003:08:32:17.925] px-http \
px-http/srv1 9/0/7/14/30 502 243 - - PH-- 3/2/2/0/0 0/0 \
"GET /cgi-bin/bug.cgi? HTTP/1.0"
```

=> the proxy blocked a server response either because of an "rspdeny" or "rspideny" filter, or because the response was improperly formatted and not HTTP-compliant, or because it blocked sensitive information which



risked being cached. In this case, the response is replaced with a "502 bad gateway". The flags ("PH--") tell us that it was haproxy who decided to return the 502 and not the server.

```
>>> haproxy[18113]: 127.0.0.1:34548 [15/Oct/2003:15:18:55.798] px-http \
 px-http/<NOSRV> -1/-1/-1/-1/8490 -1 0 - - CR-- 2/2/2/0/0 0/0 ""
```

=> the client never completed its request and aborted itself ("C---") after 8.5s, while the proxy was waiting for the request headers ("-R--"). Nothing was sent to any server.

```
>>> haproxy[18113]: 127.0.0.1:34549 [15/Oct/2003:15:19:06.103] px-http \
 px-http/<NOSRV> -1/-1/-1/-1/50001 408 0 - - cR-- 2/2/2/0/0 0/0 ""
```

=> The client never completed its request, which was aborted by the time-out ("c---") after 50s, while the proxy was waiting for the request headers ("-R--"). Nothing was sent to any server, but the proxy could send a 408 return code to the client.

```
>>> haproxy[18989]: 127.0.0.1:34550 [15/Oct/2003:15:24:28.312] px-tcp \
 px-tcp/srv1 0/0/5007 0 cD 0/0/0/0/0 0/0
```

=> This log was produced with "option tcplog". The client timed out after 5 seconds ("c----").

```
>>> haproxy[18989]: 10.0.0.1:34552 [15/Oct/2003:15:26:31.462] px-http \
 px-http/srv1 3183/-1/-1/-1/11215 503 0 - - SC-- 205/202/202/115/3 \
 0/0 "HEAD / HTTP/1.0"
```

=> The request took 3s to complete (probably a network problem), and the connection to the server failed ('SC--') after 4 attempts of 2 seconds (config says 'retries 3'), and no redispach (otherwise we would have seen "+/3"). Status code 503 was returned to the client. There were 115 connections on this server, 202 connections on this proxy, and 205 on the global process. It is possible that the server refused the connection because of too many already established.

## Chapter 9

# Statistics and monitoring

It is possible to query HAProxy about its status. The most commonly used mechanism is the HTTP statistics page. This page also exposes an alternative CSV output format for monitoring tools. The same format is provided on the Unix socket.

### 9.1 CSV format

The statistics may be consulted either from the unix socket or from the HTTP page. Both means provide a CSV format whose fields follow.

0. pxname: proxy name
1. svname: service name (FRONTEND for frontend, BACKEND for backend, any name for server)
2. qcur: current queued requests
3. qmax: max queued requests
4. scur: current sessions
5. smax: max sessions
6. slim: sessions limit
7. stot: total sessions
8. bin: bytes in
9. bout: bytes out
10. dreq: denied requests
11. dresp: denied responses
12. ereq: request errors
13. econ: connection errors
14. eresp: response errors (among which srv\_abrt)

15. wretr: retries (warning)
16. wredis: redispatches (warning)
17. status: status (UP/DOWN/NOLB/MAINT/MAINT(via)...)
  18. weight: server weight (server), total weight (backend)
  19. act: server is active (server), number of active servers (backend)
  20. bck: server is backup (server), number of backup servers (backend)
  21. chkfail: number of failed checks
  22. chkdown: number of UP->DOWN transitions
  23. lastchg: last status change (in seconds)
  24. downtime: total downtime (in seconds)
  25. qlimit: queue limit
  26. pid: process id (0 for first instance, 1 for second, ...)
  27. iid: unique proxy id
  28. sid: service id (unique inside a proxy)
  29. throttle: warm up status
  30. lbtot: total number of times a server was selected
  31. tracked: id of proxy/server if tracking is enabled
  32. type (0=frontend, 1=backend, 2=server, 3=socket)
  33. rate: number of sessions per second over last elapsed second
  34. rate\_lim: limit on new sessions per second
  35. rate\_max: max number of new sessions per second
  36. check\_status: status of last health check, one of:
    - UNK -> unknown
    - INI -> initializing
    - SOCKERR -> socket error
    - L4OK -> check passed on layer 4, no upper layers testing enabled
    - L4TMOUT -> layer 1-4 timeout
    - L4CON -> layer 1-4 connection problem, for example  
"Connection refused" (tcp rst) or "No route to host" (icmp)
    - L6OK -> check passed on layer 6
    - L6TMOUT -> layer 6 (SSL) timeout
    - L6RSP -> layer 6 invalid response - protocol error
    - L7OK -> check passed on layer 7
    - L7OKC -> check conditionally passed on layer 7, for example 404 with  
disable-on-404
    - L7TMOUT -> layer 7 (HTTP/SMTP) timeout
    - L7RSP -> layer 7 invalid response - protocol error
    - L7STS -> layer 7 response error, for example HTTP 5xx
  37. check\_code: layer5-7 code, if available
  38. check\_duration: time in ms took to finish last health check
  39. hrsp\_1xx: http responses with 1xx code
  40. hrsp\_2xx: http responses with 2xx code
  41. hrsp\_3xx: http responses with 3xx code
  42. hrsp\_4xx: http responses with 4xx code
  43. hrsp\_5xx: http responses with 5xx code
  44. hrsp\_other: http responses with other codes (protocol error)

- 45. hanafail: failed health checks details
- 46. req\_rate: HTTP requests per second over last elapsed second
- 47. req\_rate\_max: max number of HTTP requests per second observed
- 48. req\_tot: total number of HTTP requests received
- 49. cli\_abrt: number of data transfers aborted by the client
- 50. srv\_abrt: number of data transfers aborted by the server (inc. in eresp)

## 9.2 Unix Socket commands

The following commands are supported on the UNIX stats socket ; all of them must be terminated by a line feed. The socket supports pipelining, so that it is possible to chain multiple commands at once provided they are delimited by a semi-colon or a line feed, although the former is more reliable as it has no risk of being truncated over the network. The responses themselves will each be followed by an empty line, so it will be easy for an external script to match a given response with a given request. By default one command line is processed then the connection closes, but there is an interactive allowing multiple lines to be issued one at a time.

It is important to understand that when multiple haproxy processes are started on the same sockets, any process may pick up the request and will output its own stats.

### clear counters

Clear the max values of the statistics counters in each proxy (frontend & backend) and in each server. The cumulated counters are not affected. This can be used to get clean counters after an incident, without having to restart nor to clear traffic counters. This command is restricted and can only be issued on sockets configured for levels "operator" or "admin".

### clear counters all

Clear all statistics counters in each proxy (frontend & backend) and in each server. This has the same effect as restarting. This command is restricted and can only be issued on sockets configured for level "admin".

### disable server <backend>/<server>

Mark the server DOWN for maintenance. In this mode, no more checks will be performed on the server until it leaves maintenance.

If the server is tracked by other servers, those servers will be set to DOWN during the maintenance.

In the statistics page, a server DOWN for maintenance will appear with a

"MAINT" status, its tracking servers with the "MAINT(via)" one.

Both the backend and the server may be specified either by their name or by their numeric ID, prefixed with a sharp ('#').

This command is restricted and can only be issued on sockets configured for level "admin".

`enable server <backend>/<server>`

If the server was previously marked as DOWN for maintenance, this marks the server UP and checks are re-enabled.

Both the backend and the server may be specified either by their name or by their numeric ID, prefixed with a sharp ('#').

This command is restricted and can only be issued on sockets configured for level "admin".

`get weight <backend>/<server>`

Report the current weight and the initial weight of server <server> in backend <backend> or an error if either doesn't exist. The initial weight is the one that appears in the configuration file. Both are normally equal unless the current weight has been changed. Both the backend and the server may be specified either by their name or by their numeric ID, prefixed with a sharp ('#').

`help`

Print the list of known keywords and their basic usage. The same help screen is also displayed for unknown commands.

`prompt`

Toggle the prompt at the beginning of the line and enter or leave interactive mode. In interactive mode, the connection is not closed after a command completes. Instead, the prompt will appear again, indicating the user that the interpreter is waiting for a new command. The prompt consists in a right angle bracket followed by a space "> ". This mode is particularly convenient when one wants to periodically check information such as stats or errors. It is also a good idea to enter interactive mode before issuing a "help" command.

`quit`

Close the connection when in interactive mode.

`set timeout cli <delay>`

Change the CLI interface timeout for current connection. This can be useful during long debugging sessions where the user needs to constantly inspect

some indicators without being disconnected. The delay is passed in seconds.

`set weight <backend>/<server> <weight>[%]`

Change a server's weight to the value passed in argument. If the value ends with the '%' sign, then the new weight will be relative to the initially configured weight. Relative weights are only permitted between 0 and 100%, and absolute weights are permitted between 0 and 256. Servers which are part of a farm running a static load-balancing algorithm have stricter limitations because the weight cannot change once set. Thus for these servers, the only accepted values are 0 and 100% (or 0 and the initial weight). Changes take effect immediately, though certain LB algorithms require a certain amount of requests to consider changes. A typical usage of this command is to disable a server during an update by setting its weight to zero, then to enable it again after the update by setting it back to 100%. This command is restricted and can only be issued on sockets configured for level "admin". Both the backend and the server may be specified either by their name or by their numeric ID, prefixed with a sharp ('#').

`show errors [<iid>]`

Dump last known request and response errors collected by frontends and backends. If <iid> is specified, the limit the dump to errors concerning either frontend or backend whose ID is <iid>. This command is restricted and can only be issued on sockets configured for levels "operator" or "admin".

The errors which may be collected are the last request and response errors caused by protocol violations, often due to invalid characters in header names. The report precisely indicates what exact character violated the protocol. Other important information such as the exact date the error was detected, frontend and backend names, the server name (when known), the internal session ID and the source address which has initiated the session are reported too.

All characters are returned, and non-printable characters are encoded. The most common ones (\t = 9, \n = 10, \r = 13 and \e = 27) are encoded as one letter following a backslash. The backslash itself is encoded as '\\\' to avoid confusion. Other non-printable characters are encoded '\xNN' where NN is the two-digits hexadecimal representation of the character's ASCII code.

Lines are prefixed with the position of their first character, starting at 0 for the beginning of the buffer. At most one input line is printed per line, and large lines will be broken into multiple consecutive output lines so that the output never goes beyond 79 characters wide. It is easy to detect if a line was broken, because it will not end with '\n' and the next line's offset will be followed by a '+' sign, indicating it is a continuation of previous

line.

Example :

```
>>> $ echo "show errors" | socat stdio /tmp/sock1
[04/Mar/2009:15:46:56.081] backend http-in (#2) : invalid response
src 127.0.0.1, session #54, frontend fe-eth0 (#1), server s2 (#1)
response length 213 bytes, error at position 23:
```

```
00000 HTTP/1.0 200 OK\r\n
00017 header/bizarre:blah\r\n
00038 Location: blah\r\n
00054 Long-line: this is a very long line which should b
00104+ e broken into multiple lines on the output buffer,
00154+ otherwise it would be too large to print in a ter
00204+ minal\r\n
00211 \r\n
```

In the example above, we see that the backend "http-in" which has internal ID 2 has blocked an invalid response from its server s2 which has internal ID 1. The request was on session 54 initiated by source 127.0.0.1 and received by frontend fe-eth0 whose ID is 1. The total response length was 213 bytes when the error was detected, and the error was at byte 23. This is the slash ( '/') in header name "header/bizarre", which is not a valid HTTP character for a header name.

show info

Dump info about haproxy status on current process.

show sess

Dump all known sessions. Avoid doing this on slow connections as this can be huge. This command is restricted and can only be issued on sockets configured for levels "operator" or "admin".

show sess <id>

Display a lot of internal information about the specified session identifier. This identifier is the first field at the beginning of the lines in the dumps of "show sess" (it corresponds to the session pointer). Those information are useless to most users but may be used by haproxy developers to troubleshoot a complex bug. The output format is intentionally not documented so that it can freely evolve depending on demands.

show stat [<iid> <type> <sid>]

Dump statistics in the CSV format. By passing <id>, <type> and <sid>, it is possible to dump only selected items :

- <iid> is a proxy ID, -1 to dump everything
- <type> selects the type of dumpable objects : 1 for frontends, 2 for

backends, 4 for servers, -1 for everything. These values can be 0Red, for example:

1 + 2 = 3 -> frontend + backend.

1 + 2 + 4 = 7 -> frontend + backend + server.

- <sid> is a server ID, -1 to dump everything from the selected proxy.

Example :

```
>>> $ echo "show info;show stat" | socat stdio unix-connect:/tmp/sock1
Name: HAProxy
Version: 1.4-dev2-49
Release_date: 2009/09/23
Nbproc: 1
Process_num: 1
(...)

pxname,svname,qcur,qmax,scur,smax,slim,stot,bin,bout,dreq, (...)
stats,FRONTEND,,0,0,1000,0,0,0,0,0,,OPEN,,,,,,,,,1,1,0, (...)
stats,BACKEND,0,0,0,0,1000,0,0,0,0,0,,0,0,0,0,UP,0,0,0,,0,250, (...)
(...)
www1,BACKEND,0,0,0,0,1000,0,0,0,0,0,,0,0,0,0,UP,1,1,0,,0,250, (...)

$
```

Here, two commands have been issued at once. That way it's easy to find which process the stats apply to in multi-process mode. Notice the empty line after the information output which marks the end of the first block. A similar empty line appears at the end of the second block (stats) so that the reader knows the output has not been truncated.

```
/*
 * Local variables:
 * fill-column: 79
 * End:
 */
```