JOH User Manual

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Short Contents

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1 Introduction

Most site administrators use firewalls to protect their network from eventual abuse. Quite often such firewalls do not allow outbound connections to unknown and unused ports, including Jabber client connection port 5222/tcp, which makes it impossible to use Jabber services from inside such firewalls.

Several methods have been proposed so far to overcome this difficulty. The most reliable of them is *Jabber HTTP Polling*[1], which enables access to Jabber ports via HTTP requests.

Yet another method of accessing Jabber via HTTP is *HTTP Connect*. This method uses the HTTP '`CONNECT`' command to establish a permanent connection to the remote Jabber server.

JOH supports both methods. The name *JOH* stands for *Jabber Over HTTP*. The package provides an easy to use proxy server for Jabber connections. It is intended for use by system administrators who wish to provide access to their Jabber serves via HTTP for those users who happen to be behind strict firewalls.

[1] See `http://xmpp.org/extensions/xep-0025.html`.

2 Quick Start

There are two most common scenarios for configuring Jabber Over HTTP proxy.

In the first scenario, you have a dedicated Jabber server and the port 80 (HTTP) is not used on that server. In this case you will use *standalone mode*. In this mode `johd` is configured to listen on port 80 to proxy incoming requests to your Jabber server and vice-versa.

In the second scenario, the port 80 is already in use by an HTTP server running on the same box as your Jabber server. For such cases, JOH provides a *CGI mode*. In this mode, you start `johd` to listen on an auxiliary port, and configure your HTTP server to run a CGI program, `joh.cgi`, which is included in the package. The system then works as follows. HTTP polling requests are received by your HTTP server, which invokes `joh.cgi` to handle them, In its turn, `joh.cgi` extracts the necessary data from each request, reformats it and sends it over to the `johd` daemon over the auxiliary port. When a subsequent request arrives, `joh.cgi` receives the reply from `johd`, formats it as a HTTP response and sends it back to the HTTP server, which sends it to the requesting client.

The CGI mode works only with HTTP Polling.

Of course, there may be combined cases, e.g.:

- You run HTTP and Jabber servers on separate boxes, but wish your HTTP server to handle polling requests for your Jabber server. In such cases, you would also use the CGI mode. The `joh.cgi` would be installed on the HTTP server and `johd` on the Jabber server.
- You wish to use a standalone machine as Jabber proxy. In this case you would use `johd` in standalone mode on this machine and configure it to communicate with your main Jabber server.

2.1 Configure `johd` Sockets

`Johd` reads its configuration from the command line. Only the traditional short options are used. The order in which you place options is important: some of them affect others that appear further in the command line.

The '`-l`' option configures a socket to listen on (hence its mnemonics: *l*isten). Its argument is an *URL* or address specification for the socket. Normally, this specification is the desired IP address and port number, separated by a colon. For example, to have `johd` listen on IP address 127.0.0.1, port 1111, you would write:

```
johd -l 127.0.0.1:1111
```

If you wish it to listen on a given port on all configured network interfaces, just specify that port alone, without a specific IP address, as in:

```
johd -l 1111
```

In fact, `Johd` is able to work with three distinct socket families: UNIX sockets, IPv4 and IPv6 inet addresses. There are various ways to specify these. For a detailed discussion of them, see Section 3.1 [URLs], page 12.

Any number of '`-l`' options can be given: `johd` will open all required sockets and will listen for connections on any of them.

The important point is the *class* of the socket to open. As you already know, `johd` works with two distinct socket classes: HTTP sockets, which are supposed to receive data formatted in accordance with the HTTP protocol, and auxiliary CGI sockets, which are designed to communicate with `joh.cgi`. By default, the latter is assumed[1]. The class of the socket to open is changed by the '`-c`' command line option: '`-c HTTP`' tells `johd` to open all subsequent sockets for listening on HTTP requests, and '`-c CGI`' instructs it to open them for handling internal CGI protocol data. The '`-c`' option affects all '`-l`' options that appear to the right of it in the command line, until another '`-c`' option is encountered, which changes the default. To illustrate this, consider the following invocation:

```
johd -l 127.0.0.1:1111 \
     -c HTTP -l 10.10.0.1 -l 192.168.0.2 \
     -c CGI 10.10.0.1
```

It opens two sockets for auxiliary CGI: one at 127.0.0.1:1111 (it appeared before the first '`-c`' option and therefore belongs to the default class, which is '`CGI`') and the other at 10.10.0.1, which appears after an explicit '`-c CGI`'. Notice that this later has no port specification. If the port is missing. `johd` will select the default port for this class. The default port for '`CGI`' is 1100[2], and the default for '`HTTP`' is, of course, 80. Therefore, the command above will listen for HTTP requests on 10.10.0.1:80 and 192.168.0.2:80.

Each incoming connection is validated via *TCP wrappers*[3]. The default *daemon* (or *service*) name for validation coincides with the name `johd` was invoked with (i.e. is '`johd`', unless you renamed the program or started it via a symlink). However, the validation rules will most probably depend on the class of socket that received the connection: internal '`CGI`' sockets in most cases should not be visible outside your host, whereas '`HTTP`' ones should be accessible to everybody, Therefore, a special option is provided, which changes the TCP wrapper service name for subsequent sockets. This is the '`-S`' option (mnemonics: *S*ervice name). Similarly to '`-c`', the '`-S`'

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[1] The decision which class to take as the default is somehow arbitrary, we might as well have chosen HTTP, but historically it happened to be CGI.

[2] Again, the choice was somewhat arbitrary, but we know of no other service using this number.

[3] See Section "ACCESS CONTROL FILES" in *hosts_access(5) man page*, for detailed description of TCP wrapper access control files.

Note also, that this feature can be disabled at compile time, by the '`--without-tcp-wrappers`' option to `configure`, although this is highly unrecommended.

option affects all '-l' options to the right of it, until another '-S' option or end of the command line is encountered, whichever occurs first.

Now, let's illustrate this by an improved version the example above:

```
johd -l 127.0.0.1:1111 \
     -S johd-http -c HTTP -l 10.10.0.1 -l 192.168.0.2 \
     -s johd-cgi -c CGI 10.10.0.1
```

In this configuration, the 127.0.0.1:1111 socket will be protected by the TCP service name '`johd`', the two '`HTTP`' sockets — by service name '`johd-http`' and the '`CGI`' socket 10.10.0.1 — by service name '`johd-cgi`'.

Connections to remote Jabber servers are also validated using TCP wrappers. However, they use different service name. The service name for validating a requested jabber connection is created using the following pattern:

srvname`/jabber@`*ipaddr*

where *srvname* is the TCP service name, as described above, and *ipaddr* is the IP address of the server.

2.2 Using JOH in Standalone Mode

Configuring `johd` to work in standalone mode is pretty straightforward: all you have to do is give it an address (or addresses) to listen on and instruct it to open these addresses in '`HTTP`' class. In a simplest case, the following command will do:

```
johd -c HTTP
```

It will instruct `johd` to listen on port 80 on all configured network interfaces. To select a particular address or addresses to listen on, use the '`-l`' option, as described in the previous section.

It is important to configure your '`/etc/hosts.allow`' to control accesses to the incoming HTTP port and outgoing Jabber connections. For example, the two lines below allow access to HTTP from anywhere and grant anybody the right to request any Jabber servers:

```
johd: ALL
johd/jabber@ALL: ALL
```

As a more complex example, the entries below allow access to HTTP from anywhere and limit the use of Jabber servers to 208.68.163.220 and 192.168.10.1. The use of 208.68.163.220 is granted to anybody, and the use of 192.168.10.1 is allowed only for clients coming from IP addresses in the range 192.168.0.1 — 192.168.0.254.

```
johd: ALL
johd/jabber@208.68.163.220: ALL
johd/jabber@192.168.10.1: 192.168.10.0/24
```

2.3 Using JOH in CGI Mode

The '`CGI`' mode is a bit more complicated, because it involves configuring two components. However, the default settings are chosen so as to simplify the configuration. First, select the socket to use for interprocess communication between `johd` and `joh.cgi`. If both processes run on the same box, then '`localhost`' or some UNIX socket is a natural choice. Now, start the daemon:

```
johd -l 127.0.0.1
```

Make sure the socket 127.0.0.1:1100 is accessible from localhost. In particular, if your '`/etc/hosts.deny`' contains the line '`ALL: ALL`', place this in your '`/etc/hosts.allow`':

```
johd: 127.0.0.1
```

Similarly, make sure outgoing connections to selected Jabber servers are allowed for localhost:

```
johd/jabber@213.130.31.41: 127.0.0.1
```

Then copy `joh.cgi` to your '`cgi-bin`' directory and you're done. You might also wish to configure your HTTP server to use some good-looking alias for that. For example, in my Apache configuration I use:

```
Alias /http-poll  /var/www/cgi-bin/joh.cgi
```

If your HTTP server and `johd` are running on different machines, you will need to inform `joh.cgi` about the address `johd` is listening on. Suppose, for example, that `johd` is running on machine '`A`' and is listening on IP address 192.168.0.1, port 1100. The HTTP server is running on the machine '`B`', which has IP address 192.168.0.2. To tell `joh.cgi` it must connect to '`192.168.0.1:1100`', set the environment variable `JOH_SERVER_URL`. For example, if '`B`' is running Apache, then in your '`httpd.conf`' you would set:

```
SetEnv JOH_SERVER_URL 192.168.0.1:1100
```

Notice also, that you need to ensure that this socket on the box '`A`' is accessible only to 192.168.0.2. For example:

1. In '`/etc/hosts.deny`':

   ```
   johd: ALL
   ```

2. In '`/etc/hosts.allow`':

   ```
   johd: 192.168.0.2
   ```

2.4 Two Ways to Start `johd`

One of the basic assumptions made when designing `johd` was that it was to be run as a transport within Jabber configuration. Therefore, after startup, `johd` remains in the foreground and does not disconnect from the controlling terminal. It also normally sends all its diagnostic messages to the standard error output (but see Section 2.6 [logging], page 9, below.

To start `jabber2` components we recommend using GNU `Pies`, instead of the default simple program manager shipped with `Jabberd2`. `Pies` offers considerable flexibility in handling jabber components. For a detailed description of Pies, Section "Top" in *GNU Pies Manual*. For an example of `Jabberd2` configuration with Pies, refer to `http://www.gnu.org.ua/software/pies/example.php?what=jabberd2`.

To configure Pies to start `johd`, add the following `component` statement to your configuration file:

```
component johd {
  command "johd options";
  strderr syslog err;
};
```

Replace *johd* with the full pathname of the `johd` binary, and *options* with the desired command line options. For example:

```
component johd {
  command "/usr/sbin/johd -c HTTP";
  strderr syslog err;
};
```

Another way to start `johd` is independently of the Jabber server. To do so, give it the '`-D`' command line option. This option instructs `johd` to disconnect from the controlling terminal and run in the background as a daemon. Diagnostic messages are then sent to the syslog, using the '`daemon`' facility (this can be changed using the '`-F`' option; see Section 2.6 [logging], page 9).

Normally, `johd` continues its operation with the privileges of the user who started it. If this user is root, you may wish `johd` to run as some other user. To do so, use the '`-u`' option, e.g.:

```
johd -cHTTP -D -u nobody
```

The daemon switches to new user after completing operations that require root privileges, such as, e.g. creating sockets that listen on ports below 1024, etc.

When starting `johd` in daemon mode, it is also common to give it the '`-p`' option. This option takes a file name as argument and causes the program to write its PID to that file after switching to the background. If this file already exists, `johd` will read the PID from it and will check if a process with that PID is actually running. If so, `johd` refuses to startup and outputs an appropriate diagnostics. Otherwise, it will overwrite the file with the new PID value.

If both '`-u`' and '`-p`' are used, the pidfile is opened after switching to the user provileges. In this case, you should make sure the directory component of the pidfile is writable for the user supplied with the '`-u`' option.

Following is an example startup command:

```
johd -D -p /var/run/johd.pid
```

To automate startup and shutdown of `johd` in daemon mode, use the following shell script:

```
#! /bin/sh
PIDFILE=/var/run/johd.pid

case $1 in
start) /usr/bin/johd -D -p $PIDFILE;;
stop)  test -f $PIDFILE && kill -TERM `cat $PIDFILE`;;
restart)
       $0 stop
       $0 start;;
*)     echo >&2 "usage: $0 {start|stop|restart}"
esac
```

2.5 HTTP GET Requests

Proxying of Jabber connections is requested by HTTP requests with either 'POST' or 'CONNECT' methods. Any other requests received by johd are normally dropped. However, 'GET' requests are handled separately. Normally, an incoming 'GET' request means that someone has pointed his web browser to the URL served by johd. When such a request arrives, johd replies with a 404 response code. A compiled-in error page is sent back in the response. This behavior can be customized in two ways.

First, you can supply a custom error page using the '-E' command line option. The argument to this option must specify an absolute pathname to a valid HTML file. The contents of this file will be sent back in 404 responses.

Similarly to '-c' and '-S' options, the '-E' option applies to all HTTP sockets created by subsequent '-l' options which appear to the right of it, until another '-E' or '-R' option (see below) is encountered.

An example usage follows:

```
johd -c HTTP -E /etc/joh/404.html -l 10.10.10.1
```

Another way to handle 'GET' requests is to return a 303 response, redirecting the requester to another HTTP resource. This is achieved via the '-R' option. Its argument is a valid URL, beginning with a 'http://'. For example:

```
johd -c HTTP -R http://www.example.net/jabber
```

Notice, that '-E' and '-R' options are mutually exclusive. For example, the following invocation will reply to 'GET' requests arriving to '10.10.10.1' with the error page read from '/etc/joh/404.html', and will redirect any 'GET' request arriving to '10.10.10.2' to http://www.example.net/jabber:

```
johd -c HTTP -E /etc/joh/404.html -l 10.10.10.1 \
     -R http://www.example.net/jabber -l 10.10.10.2
```

The 'joh.cgi' utility provides similar features, except that it cannot send back a '404' response.

If any request other than 'POST' arrives, 'joh.cgi' replies with the compiled-in error page, just as johd does. If the JOH_ERROR_PAGE environment variable is set, and its value points to a readable file, this file's contents is sent back instead.

If JOH_ERROR_REDIRECT variable is set and its value is a URL which begins with 'http://', joh.cgi responds with a redirection to that URL.

2.6 Logging and Debugging

Normally, johd prints any errors, warnings and other diagnostic messages on standard error. You can, however, change this default and direct all diagnostic messages to syslog. To do so, specify the desired syslog facility with the '-F' command line option. For example:

```
johd -F daemon
```

Allowed facility names for use with this option are: 'user', 'daemon', 'auth', 'authpriv', 'mail', 'cron', 'local0' through 'local7'. All names are case-insensitive.

Notice, that when given the '-D' option (see [daemon], page 7), johd automatically assumes '-F daemon', so you need not use the '-F' option, unless, of course, you want to change the default facility.

Messages sent to syslog are prefixed by the program name. To change this prefix use the '-L' option. Its argument will be used as a log tag to prefix each message with.

Each diagnostic message has a *severity level* associated with it. Severity levels are (in order of increasing severity): 'debug', 'warning', 'info', 'error', and 'crit'. The latter is assigned to conditions which cause immediate termination of the program.

Normally, severity levels are not printed. To instruct johd to precede each message with its severity level, use the '-P' option.

Debugging diagnostics is useful when you trace some difficult configuration problem or investigate a bug in johd itself. This diagnostics is printed only when the '-d' option is given. The argument to the '-d' option is the *debugging level*, an integer number ranging from 0 to 100. Level 0 effectively disables all debugging and is equivalent to not specifying '-d' option at all. Subsequent levels produce increasing amount of debugging information. Finally, the level 100 prints dumps of network packets received and sent by johd.

Notice, that the use of the '-d' option with levels greater than 10 requires a good knowledge about johd internals and slows down its operation, so use it sparingly, if at all.

When debugging johd it may be helpful to know where precisely in the source code each debugging message was generated. This information can be obtained using the '-i' (source-*i*nfo) option. When it is given, each debug message is additionally prefixed with the name of the source file and line number in it.

3 Johd – Jabber Over HTTP Daemon

The following table summarizes the available command line options in alphabetic order. For each option, it provides a reference to the place in the tutorial where the option is discussed.

'-c *class*'
: Sets socket class. Allowed values for *class* are '`CGI`' and '`HTTP`'. This option affects all subsequent '`-l`' options appearing to the right of it, until another '`-c`' option or end of command line is encountered, whichever occurs first.

  See [socket class], page 4.

'-D'
: After startup, switch to the background and run as daemon. See [daemon], page 7.

'-d *number*'
: Sets debugging level. See Section 2.6 [logging], page 9.

'-E *file*'
: Read the 404 error page from *file*. This error page is returned as a response to HTTP GET requests. The *file* must contain a valid HTML document *without external references* in the '`head`' section. See Section 2.5 [get], page 8.

  This option affects all HTTP sockets created by subsequent '`-l`' options which appear to the right of it, until another '`-E`' option or end of command line is encountered, whichever occurs first.

'-F *facility*'
: Sets syslog facility. Allowed values for *facility* are: '`user`', '`daemon`', '`auth`', '`authpriv`', '`mail`', '`cron`', '`local0`' through '`local7`'. All names are case-insensitive.

  See Section 2.6 [logging], page 9.

'-h'
: Shows a terse help summary.

'-i'
: Show source line information with debug messages. See Section 2.6 [logging], page 9.

'-L *string*'
: Sets log tag. See Section 2.6 [logging], page 9.

'-l *url*'
: Listen on the given *url*. Several '`-l`' options can appear in the command line.

  See [listen option], page 3.

'-P'
: Prefix diagnostic messages with their severity level. See Section 2.6 [logging], page 9.

'-p *file*'
: Write PID to *file*. See [daemon], page 7.

‘-R *url*’ Redirect HTTP GET requests to *url*. The argument must begin with ‘http://’. See Section 2.5 [get], page 8.

This option affects all HTTP sockets created by subsequent ‘-l’ options which appear to the right of it, until another ‘-R’ option or end of command line is encountered, whichever occurs first.

‘-S *name*’ Sets service name for TCP wrappers. This option affects all subsequent ‘-l’ options appearing to the right of it, until another ‘-S’ option or end of command line is encountered, whichever occurs first.

See [TCP wrappers], page 4.

‘-s *url*’ Sets URL of the default jabber server. It is used if the request does not specify the server explicitly.

‘-t *type*:*timeout*’

Sets session idle timeout. *Type* is the type of the socket: ‘C’ for client sockets (either ‘CGI’ or ‘HTTP’) and ‘J’ for Jabber socket. *Timeout* is the timeout value, either in seconds or in ‘*X*h*Y*m*Z*s’ form.

Defaults are: ‘-t C:5m -t J:1m’.

‘-u *user*’ Run as *user*, after completing privileged operations, such as creating sockets that listen on ports below 1024. See [daemon], page 7.

‘-V’ Prints the program version.

3.1 URLs

JOH components are able to handle three socket families: UNIX sockets, IPv4 and IPv6. *URLs* provide a uniform way of specifying socket addresses in any of these families.

A URL consists of the following parts:

scheme://*adress*:*port*

Up to two parts can be omitted, if that does not create ambiguity.

Valid URL schemes are:

unix Specifies a UNIX socket. The *address* part is the socket pathname, and the ‘:*port*’ part is not used. The pathname must be absolute, e.g. ‘unix:///var/run/joh.socket’.

To facilitate typing, the two slashes after the colon can be omitted, as in:

```
unix:/var/run/joh.socket
```

inet Specifies an IPv4 socket. The *address* part must be an IPv4 address in dotted quad form, or a host name. If the latter resolves to multiple addresses, those belonging to the IPv4 family are selected. The *port* part is either the network port number in decimal, or a corresponding service name from '/etc/services'. For example:

```
inet://127.0.0.1:1100
```

inet6 Specifies an IPv6 socket. The *address* part must be either an IPv6 address in numeric notation enclosed in square brackets or a host name. If the latter resolves to multiple addresses, those belonging to the IPv6 family are selected. The *port* part is either the network port number in decimal, or a corresponding service name from '/etc/services'. E.g.:

```
inet6://[::1]:1100
```

For URLs given as argument to the '-l' option, either *address* or *port* can be omitted. If *address* is omitted, the program will listen on all available network interfaces with addresses from the specified family, e.g.:

```
inet6://:1100
```

instructs johd to listen on port 1100 on all IPv6 interfaces.

If *port* is omitted, the default is selected depending upon the class of the socket: 1100 is used for 'CGI' sockets, and 80 is used for 'HTTP' sockets.

The *port* component can also be omitted in URLs which are arguments to the '-s' option (see [default jabber server], page 12). In this case, port defaults to 5222, e.g.:

```
inet6://[::1]
inet://127.0.0.1
```

For compatibility with earlier versions, johd accepts IPv6 addresses without square brackets, although such use is not recommended, e.g.:

```
inet6://::1:1100
```

If the *scheme* part is omitted, johd tries to do its best to guess what address family is assumed. Thus:

'/var/run/socket' is treated as 'unix:///var/run/socket';

'127.0.0.1' is treated as 'inet://127.0.0.1';

'[::1]:3398' is treated as 'inet6://[::1]:3398';

'::1:3398' is treated as 'inet6://[::1]:3398';

The URL '3456' causes johd to listen on port 3456 on all available network interfaces, no matter what their address family is.

3.2 Exit Codes

Depending on the reason for termination, johd exits with the following codes:

0 Normal termination. This includes, e.g., termination on 'SIGTERM' signal.

64 Usage error, e.g. unknown option or erroneous argument was given in the command line.

69 A service is unavailable. This happens, for instance, if the program could not fork or disconnect from the controlling terminal.

70 An internal software error has been detected. If it ever happens, please report this as bug. See Chapter 5 [Reporting Bugs], page 17.

75 Temporary error condition. Currently this happens if the '`-p file`' option is specified, *file* exists, but cannot be accessed.

78 A configuration error occurred. This is different from usage error (64) in that the data supplied to the program where syntactically correct, but cannot be used. For example, a host name supplied with '`-l`' cannot be resolved.

3.3 Signals

The following signals cause immediate program termination with exit code 0: '`SIGPIPE`', '`SIGINT`', '`SIGQUIT`', '`SIGTERM`', '`SIGHUP`'.

4 Joh.cgi – Auxiliary CGI Utility

If you need to run `johd` on a box which already runs an HTTP server, it is impossible to have `johd` handle HTTP connections directly, because port 80 is already in use. The solution then is to use `joh.cgi` within your HTTP server and to start `johd` in CGI mode. This approach is discussed in detail in Section 2.3 [cgi], page 6.

The usual way to run `joh.cgi` is to copy it to your '`cgi-bin`' directory and to provide an alias for it. For example, in Apache '`httpd.conf`':

```
Alias /http-poll  /var/www/cgi-bin/joh.cgi
```

The built-in default configuration is sufficient for most cases. If, however, you need to configure `joh.cgi`, you can do so via the following environment variables:

`JOH_SERVER_URL`
: Sets the URL of the `johd` server. Default is '`127.0.0.1:1100`'.

`JOH_JABBER_SERVER_URL`
: Sets the URL of the default Jabber server. This value is used when the incoming HTTP request does not specify server and port explicitly.

  The default value is '`inet://gnu.org.ua`'.

`JOH_JABBER_SERVER`
: Specifies the IP address of the default Jabber server.

`JOH_JABBER_PORT`
: Sets the port name of the default Jabber server.

`JOH_ERROR_PAGE`
: If any request other than '`POST`' arrives, return the contents of the file specified in the value of this variable. See [joh.cgi bad request handling], page 8.

`JOH_ERROR_REDIRECT`
: If any request other than '`POST`' arrives, redirect it to the URL supplied in this variable. See [joh.cgi bad request handling], page 8.

5 How to Report a Bug

Please, report bugs and suggestions to `gray+joh@gnu.org.ua`.

You hit a bug if at least one of the conditions below is met:

- `johd` of `joh.cgi` terminate on signal 11 (SIGSEGV) or 6 (SIGABRT).
- `johd` terminates with exit code 70 (internal software error)
- Either of the components fails to do its job as described in this manual.

If you think you've found a bug, please be sure to include maximum information available to reliably reproduce it, or at least to analyze it. The information needed is:

- Version of the package you are using.
- Compilation options used when configuring the package.
- Command line options used.
- Conditions under which the bug appears.

Any errors, typos or omissions found in this manual also qualify as bugs. Please report them, if you happen to find any.

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0. PREAMBLE

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