HotSpot Gateway

Document revision 4.3 (January 14, 2008, 8:59 GMT)
This document applies to V3.0

Table of Contents

General Information

Summary

The MikroTik HotSpot Gateway enables providing of public network access for clients using wireless or wired network connections.

HotSpot Gateway features:

- authentication of clients using local client database, or RADIUS server
- accounting using local database, or RADIUS server
- Walled-garden system (accessing some web pages without authorization)

Quick Setup Guide

Given a router with two interfaces: Local (where HotSpot clients are connected to) and Public, which is connected to the Internet. To set up HotSpot on the Local interface:

1. first, a valid IP configuration is required on both interfaces. This can be done with **/setup** command or by setting up the router manually. In this example we will assume the configuration with DHCP server already enabled on the Local interface
2. valid DNS configuration must be set up in the **/ip dns** submenu
3. To put HotSpot on the Local interface, using the same IP address pool as DHCP server uses for that interface: `/ip hotspot add interface=local address-pool=dhcp-pool-1`

4. and finally, add at least one HotSpot user: `/ip hotspot user add name=admin`

These simple steps should be sufficient to enable HotSpot system

Please find HotSpot How-to's, which will answer most of your questions about configuring a HotSpot gateway, at the end of this manual. It is still recommended that you read and understand all the **Description** section below before deploying a HotSpot system.

If this does not work:

- check that **/ip dns** contains valid DNS servers, try to **/ping www.example.com** to see, that DNS resolving works
- make sure that connection tracking is enabled: `/ip firewall connection tracking set enabled=yes`

Specifications

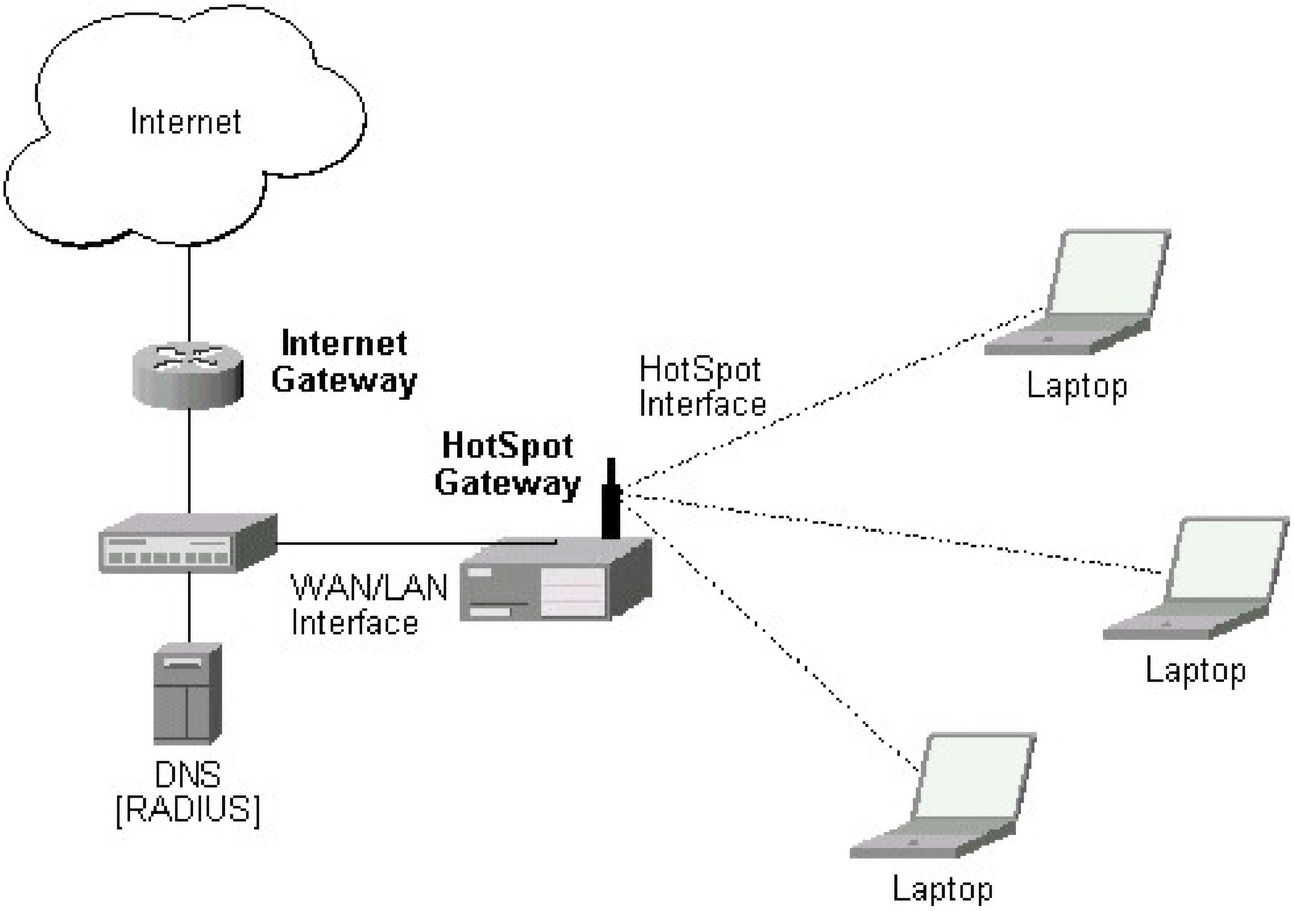
Packages required: ***hotspot, dhcp (optional)***
License required: ***level1 (Limited to 1 active user), level3 (Limited to 1 active user), level4 (Limited to 200 active users), level5 (Limited to 500 active users), level6***
Home menu level: ***/ip hotspot***
Standards and Technologies: ***ICMP***, ***DHCP***
Hardware usage: ***Not significant***

Description

MikroTik HotSpot Gateway should have at least two network interfaces:

1. HotSpot interface, which is used to connect HotSpot clients
2. LAN/WAN interface, which is used to access network resources. For example, DNS and RADIUS server(s) should be accessible

The diagram below shows a sample HotSpot setup.



The HotSpot interface should have an IP address assigned to it. Physical network connection has to be established between the HotSpot user's computer and the gateway. It can be wireless (the wireless card should be registered to AP), or wired (the NIC card should be connected to a hub or a switch).

Introduction to HotSpot

HotSpot is a way to authorize users to access some network resources. It does not provide traffic encryption. To log in, users may use almost any web browser (either HTTP or HTTPS protocol), so they are not required to install additional software. The gateway is accounting the uptime and amount of traffic each of its clients have used, and also can send this information to a RADIUS server. The HotSpot system may limit each particular user's bitrate, total amount of traffic, uptime and some other parameters to be mentioned further in this document.

The HotSpot system is targeted to provide authentication within a local network (for the local network users to access the Internet), but may as well be used to authorize access from outer networks to access local resources (like an authentication gateway for the outside world to access your network). Configuring Walled Garden feature, it is possible to allow users to access some web pages without the need of prior authentication.

Getting Address

First of all, a client must get an IP address. It may be set on the client statically, or leased from a DHCP server. The DHCP server may provide ways of binding lent IP addresses to clients MAC addresses, if required. The HotSpot system does not care how did a client get an address before he/she gets to the HotSpot login page.

Moreover, HotSpot server may automatically and transparently change any IP address (yes, meaning really **any** IP address) of a client to a valid unused address from the selected IP pool. If a user is able to get his/her Internet connection working at their place, he/she will be able to get his/her connection working in the HotSpot network. This feature gives a possibility to provide a network access (for example, Internet access) to mobile clients that are not willing (or are disallowed, not qualified enough or otherwise unable) to change their networking settings. The users will not notice the translation (i.e., there will not be any changes in the users' config), but the router itself will see completely different (from what is actually set on each client) source IP addresses on packets sent from the clients (even the firewall mangle table will 'see' the translated addresses). This technique is called one-to-one NAT, but is also known as "Universal Client" as that is how it was called in the RouterOS version 2.8.

One-to-one NAT accepts any incoming address from a connected network interface and performs a network address translation so that data may be routed through standard IP networks. Clients may use any preconfigured addresses. If the one-to-one NAT feature is set to translate a client's address to a public IP address, then the client may even run a server or any other service that requires a public IP address. This NAT is changing source address of each packet just after it is received by the router (it is like source NAT that is performed early in the packet path, so that even firewall mangle table, which normally 'sees' received packets unaltered, can only 'see' the translated address).

Note also that **arp** mode must be **enabled** on the interface you use one-to-one NAT on.

Before the authentication

When enabling HotSpot on an interface, the system automatically sets up everything needed to show login page for all clients that are not logged in. This is done by adding dynamic destination NAT rules, which you can observe on a working HotSpot system. These rules are needed to redirect all HTTP and HTTPS requests from unauthorized users to the HotSpot authentication proxy. Other rules that are also inserted, will be described later in a special section of this manual.

In most common setup, opening any HTTP page will bring up the HotSpot servlet login page (which can be customized extensively, as described later on). As normal user behavior is to open web pages by their DNS names, a valid DNS configuration should be set up on the HotSpot gateway itself (it is possible to reconfigure the gateway so that it will not require local DNS configuration, but such a configuration is impractical and thus not recommended).

Walled Garden

You may wish not to require authorization for some services (for example to let clients access the web server of your company without registration), or even to require authorization only to a number of services (for example, for users to be allowed to access an internal file server or another restricted area). This can be done by setting up Walled Garden system.

When a not logged-in user requests a service allowed in the Walled Garden configuration, the HotSpot gateway does not intercept it, or in case of HTTP, simply redirects the request to the original destination. Other requests are redirected to the HotSpot servlet (login page infrastructure). When a user is logged in, there is no effect of this table on him/her.

Walled Garden for HTTP requests is using the embedded proxy server (**/ip proxy**). This means that all the configured parameters of that proy server will also be effective for the WalledGarden clients (as well as for all clients that have transparent proxy enabled)

Authentication

- **HTTP PAP** - simplest method, which shows the HotSpot login page and expect to get the authentication info (i.e. username and password) in plain text. Note that passwords are not being encrypted when transferred over the network. Another use of this method is the possibility of hard-coded authentication information in the servlet's login page simply creating the appropriate link.
- **HTTP CHAP** - standard method, which includes CHAP challenge in the login page. The CHAP MD5 hash challenge is to be used together with the user's password for computing the string which will be sent to the HotSpot gateway. The hash result (as a password) together with username is sent over network to HotSpot service (so, password is never sent in plain text over IP network). On the client side, MD5 algorithm is implemented in JavaScript applet, so if a browser does not support JavaScript (like, for example, Internet Explorer 2.0 or some PDA browsers) or it has JavaScipt disabled, it will not be able to authenticate users. It is possible to allow unencrypted passwords to be accepted by turning on HTTP PAP authentication method, but it is not recommended (due to security considerations) to use that feature.
- **HTTPS** - the same as HTTP PAP, but using SSL protocol for encrypting transmissions. HotSpot user just send his/her password without additional hashing (note that there is no need to worry about plain-text password exposure over the network, as the transmission itself is encrypted). In either case, HTTP POST method (if not possible, then - HTTP GET method) is used to send data to the HotSpot gateway.
- **HTTP cookie** - after each successful login, a cookie is sent to the web browser and the same cookie is added to active HTTP cookie list. Next time the same user will try to log in, web browser will send the saved HTTP cookie. This cookie will be compared with the one stored on the HotSpot gateway and only if source MAC address and randomly generated ID match the ones stored on the gateway, user will be automatically logged in using the login information (username and password pair) was used when the cookie was first generated. Otherwise, the user will be prompted to log in, and in the case authentication is successful, old cookie will be removed from the local HotSpot active cookie list and the new one with different random ID and expiration time will be added to the list and sent to the web browser. It is also possible to erase cookie on user manual logoff (not in the default server pages, but you can modify them to perform this). This method may only be used together with HTTP PAP, HTTP CHAP or HTTPS methods as there would be nothing to generate cookies in the first place otherwise.
- **MAC address** - try to authenticate clients as soon as they appear in the hosts list (i.e., as soon as they have sent any packet to the HotSpot server), using client's MAC address as username.
- **Trial** - users may be allowed to use the service free of charge for some period of time for evaluation, and be required to authenticate only after this period is over. HotSpot can be configured to allow some amount of time per MAC address to be freely used with some limitations imposed by the provided user profile. In case the MAC address still has some trial time unused, the login page will contain the link for trial login. The time is automatically reset after the configured amount of time (so that, for example, any MAC address may use 30 minutes a day without ever registering). The username of such a user (as seen in the active user table and in the login link) is "T-XX:XX:XX:XX:XX:XX" (where XX:XX:XX:XX:XX:XX is his/her MAC address). The authentication procedure will not ask RADIUS server permission to

authorise such a user.

There are currently 6 different authentication methods. You can use one or more of them simultaneously:

HotSpot can authenticate users consulting the local user database or a RADIUS server (local database is consulted first, then - a RADIUS server). In case of HTTP cookie authentication via RADIUS server, the router will send the same information to the server as was used when the cookie was first generated. If authentication is done locally, profile corresponding to that user is used, otherwise (in case RADIUS reply did not contain the group for that user) the default profile is used to set default values for parameters, which are not set in RADIUS access-accept message. For more information on how the interaction with a RADIUS server works, see the respective manual section.

The HTTP PAP method also makes it possible to authenticate by requesting the page `/login?username=username&password=password` . In case you want to log in using telnet connection, the exact HTTP request would look like that: **GET /login?username=username&password=password HTTP/1.0** (note that the request is case-sensitive)

Authorization

After authentication, user gets access to the Internet, and receives some limitations (which are user profile specific). HotSpot may also perform a one-to-one NAT for the client, so that a particular user would always receive the same IP address regardless of what PC is he/she working at.

The system will automatically detect and redirect requests to a proxy server a client is using (if any; it may be set in his/her settings to use an unknown to us proxy server) to the proxy server embedded in the router.

Authorization may be delegated to a RADIUS server, which delivers similar configuration options as the local database. For any user requiring authorization, a RADIUS server gets queried first, and if no reply received, the local database is examined. RADIUS server may send a Change of Authorization request according to standards to alter the previously accepted parameters.

Advertisement

The same proxy used for unauthorized clients to provide Walled-Garden facility, may also be used for authorized users to show them advertisement popups. Transparent proxy for authorized users allows to monitor http requests of the clients and to take some action if required. It enables the possibility to open status page even if client is logged in by mac address, as well as to show advertisements time after time

When the time has come to show an advertisement, the server redirects client's web browser to the status page. Only requests, which provide html content, are redirected (images and other content will not be affected). The status page displays the advertisement and next advertise-interval is used to schedule next advertisement. If status page is unable to display an advertisement for configured timeout starting from moment, when it is scheduled to be shown, client access is blocked within walled-garden (just as unauthorized clients are). Client is unblocked when the scheduled page is finally shown. Note that if popup windows are blocked in the browser, the link on the status page may be used to open the advertisement manually.

While client is blocked, FTP and other services will not be allowed. Thus requiring client to open an advertisement for any Internet activity not especially allowed by the Walled-Garden.

Accounting

The HotSpot system implement accounting internally, you are not required to do anything special for it to work. The accounting information for each user may be sent to a RADIUS server.

Configuration menus

- **/ip hotspot** - HotSpot servers on particular interfaces (one server per interface). HotSpot server must be added in this menu in order for HotSpot system to work on an interface
- **/ip hotspot profile** - HotSpot server profiles. Settings, which affect login procedure for HotSpot clients are configured here. More than one HotSpot servers may use the same profile
- **/ip hotspot host** - dynamic list of active network hosts on all HotSpot interfaces. Here you can also find IP address bindings of the one-to-one NAT
- **/ip hotspot ip-binding** - rules for binding IP addresses to hosts on hotspot interfaces
- **/ip hotspot service-port** - address translation helpers for the one-to-one NAT
- **/ip hotspot walled-garden** - Walled Garden rules at HTTP level (DNS names, HTTP request substrings)
- **/ip hotspot walled-garden ip** - Walled Garden rules at IP level (IP addresses, IP protocols)
- **/ip hotspot user** - local HotSpot system users
- **/ip hotspot user profile** - local HotSpot system users profiles (user groups)
- **/ip hotspot active** - dynamic list of all authenticated HotSpot users
- **/ip hotspot cookie** - dynamic list of all valid HTTP cookies

Question&Answer-Based Setup

Command name: ***/ip hotspot setup***

Questions

address pool of network (*name*) - IP address pool for the HotSpot network

dns name (*text*) - DNS domain name of the HotSpot gateway (will be statically configured on the local DNS proxy

dns servers (*IP addressIP address*) - DNS servers for HotSpot clients

hotspot interface (*name*) - interface to run HotSpot on

ip address of smtp server (*IP address*; default: **0.0.0.0**) - IP address of the SMTP server to redirect SMTP requests (TCP port 25) to

- **0.0.0.0** - no redirect

local address of network (*IP address*; default: **10.5.50.1/24**) - HotSpot gateway address for the interface

masquerade network (yes | no; default: **yes**) - whether to masquerade the HotSpot network

name of local hotspot user (*text*; default: **admin**) - username of one automatically created user

passphrase (*text*) - the passphrase of the certificate you are importing

password for the user (*text*) - password for the automatically created user

select certificate (*namenone* | *import-other-certificate*) - choose SSL certificate from the list of the imported certificates

- **none** - do not use SSL
- **import-other-certificate** - setup the certificates not imported yet, and ask this question again

Notes

Depending on current settings and answers to the previous questions, default values of following questions may be different. Some questions may disappear if they become redundant

Example

To configure HotSpot on ether1 interface (which is already configured with address of 192.0.2.1/25), and adding user admin with password rubbish:

```
[admin@MikroTik] > ip hotspot setup
hotspot interface: ether1
local address of network: 192.0.2.1/24
masquerade network: yes
address pool of network: 192.0.2.2-192.0.2.126
select certificate: none
ip address of smtp server: 0.0.0.0
dns servers: 192.0.2.254
dns name: hs.example.net
name of local hotspot user: admin
password for the user: rubbish
[admin@MikroTik] >
```

HotSpot Interface Setup

Home menu level: ***/ip hotspot***

Description

HotSpot system is put on individual interfaces. You can run completely different HotSpot configurations on different interfaces

Property Description

HTTPS (*read-only: flag*) - whether the HTTPS service is actually running on the interface (i.e., it is set up in the server profile, and a valid certificate is imported in the router)

address-pool (*namenone*; default: **none**) - IP address pool name for performing one-to-one NAT. You can choose not to use the one-to-one NAT

- **none** - do not perform one-to-one NAT for the clients of this HotSpot interface

addresses-per-mac (*integerunlimited*; default: **2**) - number of IP addresses allowed to be bind with any particular MAC address (it is a small chance to reduce denial of service attack based on taking over all free IP addresses in the address pool). Not available if address-pool is set to none

- **unlimited** - number of IP addresses per one MAC address is not limited

idle-timeout (*timenone*; default: **00:05:00**) - idle timeout (maximal period of inactivity) for unauthorized clients. It is used to detect, that client is not using outer networks (e.g. Internet), i.e., there is NO TRAFFIC coming from that client and going through the router. Reaching the timeout, user will be dropped of the host list, and the address used buy the user will be freed

- **none** - do not timeout idle users

interface (*name*) - interface to run HotSpot on

ip-of-dns-name (*read-only: IP address*) - IP address of the HotSpot gateway's DNS name set in the HotSpot interface profile

keepalive-timeout (*timenone*; default: **none**) - keepalive timeout for unauthorized clients. Used to detect, that the computer of the client is alive and reachable. If check will fail during this period, user will be dropped of the host list, and the address used buy the user will be freed

- **none** - do not timeout unreachable users

profile (*name*; default: **default**) - default HotSpot profile for the interface

Command Description

reset-html (*name*) - overwrite the existing HotSpot servlet with the original HTML files. It is used if you have changed the servlet and it is not working after that

Notes

addresses-per-mac property works only if address pool is defined. Also note that in case you are authenticating users connected through a router, than all the IP addresses will seem to have come from one MAC address.

Example

To add HotSpot system to the **local** interface, allowing the system to do one-to-one NAT for each client (addresses from the **HS-real** address pool will be used for the NAT):

```
[admin@MikroTik] ip hotspot> add interface=local address-pool=HS-real
[admin@MikroTik] ip hotspot> print
Flags: X - disabled, I - invalid, S - HTTPS
 #   NAME                        INTERFACE    ADDRESS-POOL PROFILE IDLE-TIMEOUT
 0   hs-local                    local        HS-real      default 00:05:00
[admin@MikroTik] ip hotspot>
```

HotSpot Server Profiles

Home menu level: ***/ip hotspot profile***

Description

There may be various different HotSpot systems, defined as HotSpot Server Profiles, on the same gateway machine. One or more interfaces can be grouped into one server profile. There are very few settings for the servers on particular interfaces - most of the configuration is set in the server profiles. For example, it is possible to make completely different set of servlet pages for each server profile, and define different RADIUS servers for authentication.

Property Description

dns-name (*text*) - DNS name of the HotSpot server. This is the DNS name used as the name of the HotSpot server (i.e., it appears as the location of the login page). This name will automatically be added as a static DNS entry in the DNS cache

hotspot-address (*IP address*; default: **0.0.0.0**) - IP address for HotSpot service

html-directory (*text*; default: **hotspot**) - name of the directory (accessible with FTP), which stores the HTML servlet pages (when changed, the default pages are automatically copied into specified directory if it does not exist already)

http-cookie-lifetime (*time*; default: **3d**) - validity time of HTTP cookies

http-proxy (*IP address*; default: **0.0.0.0**) - address of the proxy server the HotSpot service will use as a [parent] proxy server for all those requests intercepted by Universal Proxy system and not defined in the /ip proxy direct list. If not specified, the address defined in parent-proxy parameter of /ip proxy. If that is absent as well, the request will be resolved by the local proxy

login-by (*multiple choice: cookie | http-chap | http-pap | https | mac | trial*; default: **cookie,http-chap**) - which authentication methods to use

- **cookie** - use HTTP cookies to authenticate, without asking user credentials. Other method will be used in case the client does not have cookie, or the stored username and password pair are not valid anymore since the last authentication. May only be used together with other HTTP authentication methods (HTTP-PAP, HTTP-CHAP or HTTPS), as in the other case there would be no way for the cookies to be generated in the first place
- **http-chap** - use CHAP challenge-response method with MD5 hashing algorithm for hashing passwords. This way it is possible to avoid sending clear-text passwords over an insecure network. This is the default authentication method
- **http-pap** - use plain-text authentication over the network. Please note that in case this method will be used, your user passwords will be exposed on the local networks, so it will be possible to intercept them
- **https** - use encrypted SSL tunnel to transfer user communications with the HotSpot server. Note that in order this to work, a valid certificate must be imported into the router (see a separate manual on certificate management)
- **mac** - try to use client's MAC address first as its username. If the matching MAC address exists in the local user database or on the RADIUS server, the client will be authenticated without asking to fill the login form
- **trial** - does not require authentication for a certain amount of time

mac-auth-password (*text*) - if MAC authentication is used, this field can be used to specify password for the users to be authenticated by their MAC addresses

nas-port-type (*text*; default: **wireless-802.11**) - NAS-Port-Type attribute value to be sent to the RADIUS server

radius-accounting (yes | no; default: **yes**) - whether to send RADIUS server accounting information on each user once in a while (the "while" is defined in the radius-interim-update property)

radius-default-domain (*text*; default: **""**) - default domain to use for RADIUS requests. It allows to select different RADIUS servers depending on HotSpot server profile, but may be handful for single RADIUS server as well.

radius-interim-update (*timereceived*; default: **received**) - how often to sent cumulative accounting reports.

- **0s** - same as received
- **received** - use whatever value received from the RADIUS server

radius-location-id (*text*) - Raduis-Location-Id attribute value to be sent to the RADIUS server

radius-location-name (*text*) - Raduis-Location-Name attribute value to be sent to the RADIUS server

rate-limit (*text*; default: **""**) - Rate limitation in form of rx-rate[/tx-rate] [rx-burst-rate[/tx-burst-rate] [rx-burst-threshold[/tx-burst-threshold] [rx-burst-time[/tx-burst-time]]]] [priority] [rx-rate-min[/tx-rate-min]] from the point of view of the router (so "rx" is client upload, and "tx" is client download). All rates should be numbers with optional 'k' (1,000s) or 'M' (1,000,000s). If tx-rate is not specified, rx-rate is as tx-rate too. Same goes for tx-burst-rate and tx-burst-threshold and tx-burst-time. If both rx-burst-threshold and tx-burst-threshold are not specified (but burst-rate is specified), rx-rate and tx-rate is used as burst thresholds. If both rx-burst-time and tx-burst-time are not specified, 1s is used as default. rx-rate-min and tx-rate min are the values of limit-at properties

smtp-server (*IP address*; default: **0.0.0.0**) - default SMTP server to be used to redirect unconditionally all user SMTP requests to

split-user-domain (yes | no; default: **no**) - whether to split username from domain name when the username is given in "user@domain" or in "domain\user" format

ssl-certificate (*namenone*; default: **none**) - name of the SSL certificate to use for HTTPS authentication. Not used for other authentication methods

trial-uptime (*timetime*; default: **30m/1d**) - is used only when authentication method is trial. Specifies the amount of time the user identified by MAC address can use HotSpot services without authentication and the time, that has to pass that the user is allowed to use HotSpot services again

trial-user-profile (*name*; default: **default**) - is used only only when authentication method is trial. Specifies user profile, that trial users will use

use-radius (yes | no; default: **no**) - whether to use RADIUS to authenticate HotSpot users

Notes

If **dns-name** property is not specified, **hotspot-address** is used instead. If **hotspot-address** is also absent, then both are to be detected automatically.

In order to use RADIUS authentication, the **/radius** menu must be set up properly.

Trial authentication method should always be used together with one of the other authentication methods.

Example

HotSpot User Profiles

Home menu level: ***/ip hotspot user profile***

Description

Article moved to: HotSpot AAA section

HotSpot Users

Home menu level: ***/ip hotspot user***

Description

Article moved to: HotSpot AAA section

HotSpot Active Users

Home menu level: ***/ip hotspot active***

Description

Article moved to: HotSpot AAA section

HotSpot Cookies

Home menu level: ***/ip hotspot cookie***

Description

Cookies can be used for authentication in the Hotspot service

Property Description

domain (*read-only: text*) - domain name (if split from username)
expires-in (*read-only: time*) - how long is the cookie valid
mac-address (*read-only: MAC address*) - user's MAC address
user (*read-only: name*) - username

Notes

There can be multiple cookies with the same MAC address. For example, there will be a separate cookie for each web browser on the same computer.

Cookies can expire - that's the way how it is supposed to be. Default validity time for cookies is **3** days (72 hours), but it can be changed for each individual HotSpot server profile, for example :

```
/ip hotspot profile set default http-cookie-lifetime=1d
```

Example

To get the list of valid cookies:

```
[admin@MikroTik] ip hotspot cookie> print
```

```
  # USER                 DOMAIN            MAC-ADDRESS       EXPIRES-IN
  0 ex                                     01:23:45:67:89:AB 23h54m16s
[admin@MikroTik] ip hotspot cookie>
```

HTTP-level Walled Garden

Home menu level: ***/ip hotspot walled-garden***

Description

Walled garden is a system which allows unauthorized use of some resources, but requires authorization to access other resources. This is useful, for example, to give access to some general information about HotSpot service provider or billing options.

This menu only manages Walled Garden for HTTP and HTTPS protocols. Other protocols can also be included in Walled Garden, but that is configured elsewhere (in **/ip hotspot walled-garden ip**; see the next section of this manual for details)

Property Description

action (*allow* | *deny*; default: **allow**) - action to undertake if a request matches the rule:

- **allow** - allow the access to the page without prior authorization
- **deny** - authorization is required to access this page

dst-address (*read-only: IP address*) - IP address of the destination web server (installed by IP-level walled garden)

dst-host (*wildcard*; default: "") - domain name of the destination web server

dst-port (*integer*; default: "") - the TCP port a client has send the request to

hits (*read-only: integer*) - how many times has this rule been used

method (*text*) - HTTP method of the request

path (*wildcard*; default: "") - the path of the request

server (*name*) - name of the HotSpot server this rule applies to

src-address (*IP address*) - IP address of the user sending the request

Notes

Wildcard properties (**dst-host** and **dst-path**) match a complete string (i.e., they will not match "example.com" if they are set to "example"). Available wildcards are '*' (match any number of any characters) and '?' (match any one character). Regular expressions are also accepted here, but for property to be treated as a regular expression, it should start with a colon (':').

Small hits in using regular expressions:

- **** symbol sequence is used to enter **** character in console
- **\.** pattern means **.** only (in regular expressions single dot in pattern means any symbol)
- to show that no symbols are allowed before the given pattern, we use **^** symbol at the beginning of the pattern

- to specify that no symbols are allowed after the given pattern, we use **$** symbol at the end of the pattern

You can not use **path** property for HTTPS requests as router can not (and should not - that is what the HTTPS protocol was made for!) decrypt the request.

IP-level walled garden, described in the following section, makes dynamic entries here. In this case, the **dst-address** property is filled (it is empty otherwise).

Example

To allow unauthorized requests to the **www.example.com** domain's **/paynow.html** page:

```
[admin@MikroTik] ip hotspot walled-garden> add path="/paynow.html" \
\... dst-host="www.example.com"
[admin@MikroTik] ip hotspot walled-garden> print detail
Flags: X - disabled, D - dynamic
 0   dst-host="www.example.com" path="/paynow.html" action=allow
[admin@MikroTik] ip hotspot walled-garden>
```

IP-level Walled Garden

Home menu level: ***/ip hotspot walled-garden ip***

Description

This menu is manages Walled Garden for generic IP requests. See the previous section for managing HTTP and HTTPS protocol specific properties (like the actual DNS name, HTTP method and path used in requests).

Property Description

action (*accept* | *drop* | *reject*; default: **accept**) - action to undertake if a packet matches the rule:

- **accept** - allow the access to the page without prior authorization
- **drop** - the authorization is required to access this page
- **reject** - the authorization is required to access this page, in case the page will be accsessed withot authorization ICMP reject message host-unreachable will be generated

dst-address (*IP address*) - IP address of the destination web server

dst-host (*text*; default: **""**) - domain name of the destination web server (this is not a regular expression or a wildcard of any kind). The DNS name specified is resolved to a list of IP addresses when the rule is added, and all those IP addresses are used

dst-port (*integer*; default: **""**) - the TCP or UDP port (protocol MUST be specified explicitly in the protocol property) a client has send the request to

protocol (*integerddp* | *egp* | *encap* | *ggp* | *gre* | *hmp* | *icmp* | *idpr-cmtp* | *igmp* | *ipencap* | *ipip* | *ipsec-ah* | *ipsec-esp* | *iso-tp4* | *ospf* | *pup* | *rdp* | *rspf* | *st* | *tcp* | *udp* | *vmtp* | *xns-idp* | *xtp*) - IP protocol name

server (*name*) - name of the HotSpot server this rule applied to

src-address (*IP address*) - IP address of the user sending the request

Example

One-to-one NAT static address bindings

Home menu level: ***/ip hotspot ip-binding***

Description

You can setup NAT translations statically based on either the original IP address (or IP network), or the original MAC address. You can also allow some addresses to bypass HotSpot authentication (i.e., they will be able work without having to log in to the network first) and completely block some addresses.

Property Description

address (*IP addressnetmask*; default: "") - the original IP address or network of the client

mac-address (*MAC address*; default: "") - the source MAC address of the client

server (*nameall*; default: **all**) - the name of the server the client is connecting to

to-address (*IP address*; default: "") - IP address to translate the original client address to. If address property is given as network, this is the starting address for the translation (i.e., the first address is translated to to-address, address + 1 to to-address + 1, and so on)

type (*regular* | *bypassed* | *blocked*) - type of the static binding entry

- **regular** - perform a one-to-one NAT translation according to the values set in this entry
- **bypassed** - perform the translation, but exclude the client from having to log in to the HotSpot system
- **blocked** - the translation will not be preformed, and all packets from the host will be dropped

Notes

This is an ordered list, so you can put more specific entries on the top of the list for them to override more common rules that appear lower. You can even put an entry with **0.0.0.0/0** address at the end of the list to make the desired action default for those addresses that will not match any other entry.

Active Host List

Home menu level: ***/ip hotspot host***

Description

This menu shows all active network hosts that are connected to the HotSpot gateway. This list includes all one-to-one NAT translations

Property Description

address (*read-only: IP address*) - the original IP address of the client

authorized (*read-only: flag*) - whether the client is successfully authenticated by the HotSpot system

bridge-port (*read-only: name*) - the actual physical interface, which the host is connected to. This is used when HotSpot service is put on a bridge interface to determine the host's actual port within the bridge.

bypassed (*read-only: flag*) - whether the client does not need to be authorized by the HotSpot system

bytes-in (*read-only: integer*) - how many bytes did the router receive from the client

bytes-out (*read-only: integer*) - how many bytes did the router send to the client

found-by (*read-only: text*) - how was this host discovered (first packet type, sender, recipient)

host-dead-time (*read-only: time*) - how long has the router not received any packets (including ARP replies, keepalive replies and user traffic) from this host

idle-time (*read-only: time*) - the amount of time has the user been idle

idle-timeout (*read-only: time*) - the exact value of idle-timeout that applies to this user. This property shows how long should the user stay idle for it to be logged off automatically

keepalive-timeout (*read-only: time*) - the exact value of keepalive-timeout that applies to this user. This property shows how long should the user's computer stay out of reach for it to be logged off automatically

mac-address (*read-only: MAC address*) - the actual MAC address of the user

packets-in (*read-only: integer*) - how many packets did the router receive from the client

packets-out (*read-only: integer*) - how many packets did the router send to the client

server (*read-only: name*) - name of the server, which the host is connected to

static (*read-only: flag*) - whether this translation has been taken from the static IP binding list

to-address (*read-only: IP address*) - what address is the original IP address of the host translated to

uptime (*read-only: time*) - current session time of the user (i.e., how long has the user been in the active host list)

Command Description

make-binding - copy a dynamic entry from this list to the static IP bindings list (*name*) - item number (*text*) - custom comment to the static entry to be created (*regular* | *bypassed* | *blocked*) - the type of the static entry

Service Port

Home menu level: ***/ip hotspot service-port***

Description

Just like for classic NAT, the HotSpot embedded one-to-one NAT 'breaks' some protocols that are incompatible with address translation. To leave these protocols consistent, helper modules must be used. For the one-to-one NAT the only such a module is for FTP protocol.

Property Description

name (*read-only: name*) - protocol name

ports (*read-only: integer*) - list of the ports on which the protocol is working

Example

To set the FTP protocol uses both 20 and 21 TCP port:

```
[admin@MikroTik] ip hotspot service-port> print
Flags: X - disabled
  #   NAME                                                                PORTS
  0   ftp                                                                 21
[admin@MikroTik] ip hotspot service-port> set ftp ports=20,21
[admin@MikroTik] ip hotspot service-port> print
Flags: X - disabled
  #   NAME                                                                PORTS
  0   ftp                                                                 20
                                                                          21

[admin@MikroTik] ip hotspot service-port>
```

Customizing HotSpot: Firewall Section

Description

Apart from the obvious dynamic entries in the **/ip hotspot** submenu itself (like hosts and active users), some additional rules are added in the firewall tables when activating a HotSpot service. Unlike RouterOS version 2.8, there are relatively few firewall rules added in the firewall as the main job is made by the one-to-one NAT algorithm.

NAT rules

From **/ip firewall nat print dynamic** command, you can get something like this (comments follow after each of the rules):

```
 0 D chain=dstnat action=jump jump-target=hotspot hotspot=from-client
```

Putting all HotSpot-related tasks for packets from all HotSpot clients into a separate chain.

```
 1 I chain=hotspot action=jump jump-target=pre-hotspot
```

Any actions that should be done before HotSpot rules apply, should be put in the **pre-hotspot** chain. This chain is under full administrator control and does not contain any rules set by the system, hence the invalid jump rule (as the chain does not have any rules by default).

```
 2 D chain=hotspot action=redirect to-ports=64872 dst-port=53 protocol=udp
 3 D chain=hotspot action=redirect to-ports=64872 dst-port=53 protocol=tcp
```

Redirect all DNS requests to the HotSpot service. The 64872 port provides DNS service for all HotSpot users. If you want HotSpot server to listen also to another port, add rules here the same way, changing **dst-port** property.

```
 4 D chain=hotspot action=redirect to-ports=64873 hotspot=local-dst dst-port=80
     protocol=tcp
```

Redirect all HTTP login requests to the HTTP login servlet. The 64873 is HotSpot HTTP servlet port.

```
 5 D chain=hotspot action=redirect to-ports=64875 hotspot=local-dst dst-port=443
     protocol=tcp
```

Redirect all HTTPS login requests to the HTTPS login servlet. The 64875 is HotSpot HTTPS servlet port.

```
 6 D chain=hotspot action=jump jump-target=hs-unauth hotspot=!auth protocol=tcp
```

All other packets except DNS and login requests from unauthorized clients should pass through the **hs-unauth** chain.

```
 7 D chain=hotspot action=jump jump-target=hs-auth hotspot=auth protocol=tcp
```

And packets from the authorized clients - through the **hs-auth** chain.

```
 8 D ;;; www.mikrotik.com
     chain=hs-unauth action=return dst-address=66.228.113.26 dst-port=80 protocol=tcp
```

First in the **hs-unauth** chain is put everything that affects TCP protocol in the **/ip hotspot walled-garden ip** submenu (i.e., everything where either protocol is not set, or set to TCP). Here we are excluding www.mikrotik.com from being redirected to the login page.

```
 9 D chain=hs-unauth action=redirect to-ports=64874 dst-port=80 protocol=tcp
```

All other HTTP requests are redirected to the Walled Garden proxy server which listens the 64874 port. If there is an **allow** entry in the **/ip hotspot walled-garden** menu for an HTTP request, it is being forwarded to the destination. Otherwise, the request will be automatically redirected to the HotSpot login servlet (port 64873).

```
10 D chain=hs-unauth action=redirect to-ports=64874 dst-port=3128 protocol=tcp
11 D chain=hs-unauth action=redirect to-ports=64874 dst-port=8080 protocol=tcp
```

HotSpot by default assumes that only these ports may be used for HTTP proxy requests. These two entries are used to "catch" client requests to unknown proxies (you can add more rules here for other ports). I.e., to make it possible for the clients with unknown proxy settings to work with the HotSpot system. This feature is called "Universal Proxy". If it is detected that a client is using some proxy server, the system will automatically mark that packets with the **http** hotspot mark to work around the unknown proxy problem, as we will see later on. Note that the port used (64874) is the same as for HTTP requests in the rule #9 (so both HTTP and HTTP proxy requests are processed by the same code).

```
12 D chain=hs-unauth action=redirect to-ports=64875 dst-port=443 protocol=tcp
```

HTTPS proxy is listening on the 64875 port.

```
13 I chain=hs-unauth action=jump jump-target=hs-smtp dst-port=25 protocol=tcp
```

Redirect for SMTP protocol may also be defined in the HotSpot configuration. In case it is, a redirect rule will be put in the **hs-smtp** chain. This is done so that users with unknown SMTP configuration would be able to send their mail through the service provider's (your) SMTP server instead of going to the [possibly unavailable outside their network of origin] SMTP server users have configured on their computers. The chain is empty by default, hence the invalid jump rule.

```
14 D chain=hs-auth action=redirect to-ports=64874 hotspot=http protocol=tcp
```

Providing HTTP proxy service for authorized users. Authenticated user requests may need to be subject to transparent proxying (the "Universal Proxy" technique and advertisement feature). This **http** mark is put automatically on the HTTP proxy requests to the servers detected by the HotSpot HTTP proxy (the one that is listening on the 64874 port) as HTTP proxy requests for unknown proxy servers. This is done so that users that have some proxy settings would use the HotSpot gateway instead of the [possibly unavailable outside their network of origin] proxy server users have configured in their computers. This mark is also applied when advertisement is due to be shown to the user, as well as on any HTTP requests done form the users whose profile is configured to transparently proxy their requests.

```
15 I chain=hs-auth action=jump jump-target=hs-smtp dst-port=25 protocol=tcp
```

Providing SMTP proxy for authorized users (the same as in rule #13).

Packet filter rules

From **/ip firewall filter print dynamic** command, you can get something like this (comments follow after each of the rules):

```
 0 D chain=forward action=jump jump-target=hs-unauth hotspot=from-client,!auth
```

Any packet that traverse the router from an unauthorized client will be sent to the **hs-unauth** chain. The **hs-unauth** implements the IP-based Walled Garden filter.

```
 1 D chain=forward action=jump jump-target=hs-unauth-to hotspot=to-client,!auth
```

Everything that comes to clients through the router, gets redirected to another chain, called **hs-unauth-to**. This chain should reject unauthorized requests to the clients.

```
 2 D chain=input action=jump jump-target=hs-input hotspot=from-client
```

Everything that comes from clients to the router itself, gets to yet another chain, called **hs-input**.

```
 3 I chain=hs-input action=jump jump-target=pre-hs-input
```

Before proceeding with [predefined] dynamic rules, the packet gets to the administratively controlled **pre-hs-input** chain, which is empty by default, hence the invalid state of the jump rule.

```
  4 D chain=hs-input action=accept dst-port=64872 protocol=udp
  5 D chain=hs-input action=accept dst-port=64872-64875 protocol=tcp
```

Allow client access to the local authentication and proxy services (as described earlier).

```
  6 D chain=hs-input action=jump jump-target=hs-unauth hotspot=!auth
```

All other traffic from unauthorized clients to the router itself will be treated the same way as the traffic traversing the routers.

```
  7 D chain=hs-unauth action=return protocol=icmp
  8 D ;;; www.mikrotik.com
      chain=hs-unauth action=return dst-address=66.228.113.26 dst-port=80 protocol=tcp
```

Unlike NAT table where only TCP-protocol related Walled Garden entries were added, in the packet filter **hs-unauth** chain is added everything you have set in the **/ip hotspot walled-garden ip** menu. That is why although you have seen only one entry in the NAT table, there are two rules here.

```
  9 D chain=hs-unauth action=reject reject-with=tcp-reset protocol=tcp
 10 D chain=hs-unauth action=reject reject-with=icmp-net-prohibited
```

Everything else that has not been while-listed by the Walled Garden will be rejected. Note usage of TCP Reset for rejecting TCP connections.

```
 11 D chain=hs-unauth-to action=return protocol=icmp
 12 D ;;; www.mikrotik.com
      chain=hs-unauth-to action=return src-address=66.228.113.26 src-port=80
 protocol=tcp
```

Same action as in rules #7 and #8 is performed for the packets destined to the clients (chain **hs-unauth-to**) as well.

```
 13 D chain=hs-unauth-to action=reject reject-with=icmp-host-prohibited
```

Reject all packets to the clients with ICMP reject message.

Customizing HotSpot: HTTP Servlet Pages

Description

You can create a completely different set of servlet pages for each HotSpot server you have, specifying the directory it will be stored in **html-directory** property of a HotSpot server profile (**/ip hotspot profile**). The default servlet pages are copied in the directory of your choice right after you create the profile. This directory can be accessed by connecting to the router with an FTP client. You can modify the pages as you like using the information from this section of the manual. Note that it is suggested to edit the files manually, as automated HTML editing tools may corrupt the pages by removing variables or other vital parts.

Available Servlet Pages

Main HTML servlet pages, which are shown to user:

- **redirect.html** - redirects user to another url (for example, to login page)
- **login.html** - login page shown to a user to ask for username and password. This page may take the following parameters:
  - **username** - username
  - **password** - either plain-text password (in case of PAP authentication) or MD5 hash of chap-id variable, password and CHAP challenge (in case of CHAP authentication). This value is used as e-mail address for trial users
  - **dst** - original URL requested before the redirect. This will be opened on successfull login
  - **popup** - whether to pop-up a status window on successfull login
  - **radius<id>** - send the attribute identified with <id> in text string form to the RADIUS server (in case RADIUS authentication is used; lost otherwise)
  - **radius<id>u** - send the attribute identified with <id> in unsigned integer form to the RADIUS server (in case RADIUS authentication is used; lost otherwise)
  - **radius<id>-<vnd-id>** - send the attribute identified with <id> and vendor ID <vnd-id> in text string form to the RADIUS server (in case RADIUS authentication is used; lost otherwise)
  - **radius<id>-<vnd-id>u** - send the attribute identified with <id> and vendor ID <vnd-id> in unsigned integer form to the RADIUS server (in case RADIUS authentication is used; lost otherwise)
- **md5.js** - JavaScript for MD5 password hashing. Used together with **http-chap** login method
- alogin.html - page shown after client has logged in. It pops-up status page and redirects browser to originally requested page (before he/she was redirected to the HotSpot login page)
- **status.html** - status page, shows statistics for the client. It is also able to display advertisements automatically
- **logout.html** - logout page, shown after user is logged out. Shows final statistics about the finished session. This page may take the following additional parameters:
  - **erase-cookie** - whether to erase cookies from the HotSpot server on logout (makes impossible to log in with cookie next time from the same browser, might be useful in multiuser environments)
- **error.html** - error page, shown on fatal errors only
  - **rlogin.html** - page, which redirects client from some other URL to the login page, if authorization of the client is required to access that URL
  - **rstatus.html** - similarly to rlogin.html, only in case if the client is already logged in and the original URL is not known
  - **radvert.html** - redirects client to the scheduled advertisement link

- **flogin.html** - shown instead of login.html, if some error has happened (invalid username or password, for example)
- **fstatus.html** - shown instead of redirect, if status page is requested, but client is not logged in
- **flogout.html** - shown instead of redirect, if logout page is requested, but client is not logged in

Some other pages are available as well, if more control is needed:

Serving Servlet Pages

The HotSpot servlet recognizes 5 different request types:

1. request for a remote host
   - if user is logged in and advertisement is due to be displayed, **radvert.html** is displayed. This page makes redirect to the scheduled advertisment page
   - if user is logged in and advertisement is not scheduled for this user, the requested page is served
   - if user is not logged in, but the destination host is allowed by walled garden, then the request is also served
   - if user is not logged in, and the destination host is disallowed by walled garden, **rlogin.html** is displayed; if **rlogin.html** is not found, **redirect.html** is used to redirect to the login page
2. request for "/" on the HotSpot host
   - if user is logged in, **rstatus.html** is displayed; if **rstatus.html** is not found, **redirect.html** is used to redirect to the status page
   - if user is not logged in, **rlogin.html** is displayed; if **rlogin.html** is not found, **redirect.html** is used to redirect to the login page
3. request for "/login" page
   - if user has successfully logged in (or is already logged in), **alogin.html** is displayed; if **alogin.html** is not found, **redirect.html** is used to redirect to the originally requested page or the status page (in case, original destination page was not given)
   - if user is not logged in (username was not supplied, no error message appeared), **login.html** is showed
   - if login procedure has failed (error message is supplied), **flogin.html** is displayed; if **flogin.html** is not found, **login.html** is used
   - in case of fatal errors, **error.html** is showed
4. request for "/status" page
   - if user is logged in, **status.html** is displayed
   - if user is not logged in, **fstatus.html** is displayed; if **fstatus.html** is not found, **redirect.html** is used to redirect to the login page
5. request for '/logout' page

  - if user is logged in, **logout.html** is displayed
  - if user is not logged in, **flogout.html** is displayed; if **flogout.html** is not found, **redirect.html** is used to redirect to the login page

Note that if it is not possible to meet a request using the pages stored on the router's FTP server, Error 404 is displayed

There are many possibilities to customize what the HotSpot authentication pages look like:

- The pages are easily modifiable. They are stored on the router's FTP server in the directory you choose for the respective HotSpot server profile.
- By changing the variables, which client sends to the HotSpot servlet, it is possible to reduce keyword count to one (username or password; for example, the client's MAC address may be used as the other value) or even to zero (License Agreement; some predefined values general for all users or client's MAC address may be used as username and password)
- Registration may occur on a different server (for example, on a server that is able to charge Credit Cards). Client's MAC address may be passed to it, so that this information need not be written in manually. After the registration, the server should change RADIUS database enabling client to log in for some amount of time.

To insert variable in some place in HTML file, the $(var_name) syntax is used, where the "var_name" is the name of the variable (without quotes). This construction may be used in any HotSpot HTML file accessed as '/', '/login', '/status' or '/logout', as well as any text or HTML (**.txt**, **.htm** or **.html**) file stored on the HotSpot server (with the exception of traffic counters, which are available in status page only, and **error**, **error-orig**, **chap-id**, **chap-challenge** and **popup** variables, which are available in login page only). For example, to show a link to the login page, following construction can be used:

```
<a href="$(link-login)">login</a>
```

Variables

All of the Servlet HTML pages use variables to show user specific values. Variable names appear only in the HTML source of the servlet pages - they are automatically replaced with the respective values by the HotSpot Servlet. For most variables there is an example of their possible value included in brackets. All the described variables are valid in all servlet pages, but some of them just might be empty at the time they are accesses (for example, there is no uptime before a user has logged in).

- Common server variables:
  - **hostname** - DNS name or IP address (if DNS name is not given) of the HotSpot Servlet ("hotspot.example.net")
  - **identity** - RouterOS identity name ("MikroTik")
  - **login-by** - authentication method used by user
  - **plain-passwd** - a "yes/no" representation of whether HTTP-PAP login method is allowed ("no")
  - **server-address** - HotSpot server address ("10.5.50.1:80")
  - **ssl-login** - a "yes/no" representation of whether HTTPS method was used to access that servlet page ("no")

- **server-name** - HotSpot server name (set in the /ip hotspot menu, as the name property)

- Links:
  - **link-login** - link to login page including original URL requested ("http://10.5.50.1/login?dst=http://www.example.com/")
  - **link-login-only** - link to login page, not including original URL requested ("http://10.5.50.1/login")
  - **link-logout** - link to logout page ("http://10.5.50.1/logout")
  - **link-status** - link to status page ("http://10.5.50.1/status")
  - **link-orig** - original URL requested ("http://www.example.com/")

- General client information
  - **domain** - domain name of the user ("example.com")
  - **interface-name** - physical HotSpot interface name (in case of bridged interfaces, this will return the actual bridge port name)
  - **ip** - IP address of the client ("10.5.50.2")
  - **logged-in** - "yes" if the user is logged in, otherwise - "no" ("yes")
  - **mac** - MAC address of the user ("01:23:45:67:89:AB")
  - **trial** - a "yes/no" representation of whether the user has access to trial time. If users trial time has expired, the value is "no"
  - **username** - the name of the user ("John")

- User status information:
  - **idle-timeout** - idle timeout ("20m" or "" if none)
  - **idle-timeout-secs** - idle timeout in seconds ("88" or "0" if there is such timeout)
  - **limit-bytes-in** - byte limit for send ("1000000" or "---" if there is no limit)
  - **limit-bytes-out** - byte limit for receive ("1000000" or "---" if there is no limit)
  - **refresh-timeout** - status page refresh timeout ("1m30s" or "" if none)
  - **refresh-timeout-secs** - status page refresh timeout in seconds ("90s" or "0" if none)
  - **session-timeout** - session time left for the user ("5h" or "" if none)
  - **session-timeout-secs** - session time left for the user, in seconds ("3475" or "0" if there is such timeout)
  - **session-time-left** - session time left for the user ("5h" or "" if none)
  - **session-time-left-secs** - session time left for the user, in seconds ("3475" or "0" if there is such timeout)
  - **uptime** - current session uptime ("10h2m33s")
  - **uptime-secs** - current session uptime in seconds ("125")

- Traffic counters, which are available only in the status page:
  - **bytes-in** - number of bytes received from the user ("15423")
  - **bytes-in-nice** - user-friendly form of number of bytes received from the user ("15423")
  - **bytes-out** - number of bytes sent to the user ("11352")

  - **bytes-out-nice** - user-friendly form of number of bytes sent to the user ("11352")
  - **packets-in** - number of packets received from the user ("251")
  - **packets-out** - number of packets sent to the user ("211")
  - **remain-bytes-in** - remaining bytes until limit-bytes-in will be reached ("337465" or "---" if there is no limit)
  - **remain-bytes-out** - remaining bytes until limit-bytes-out will be reached ("124455" or "---" if there is no limit)

- Miscellaneous variables
  - **session-id** - value of 'session-id' parameter in the last request
  - **var** - value of 'var' parameter in the last request
  - **error** - error message, if something failed ("invalid username or password")
  - **error-orig** - original error message (without translations retrieved from errors.txt), if something failed ("invalid username or password")
  - **chap-id** - value of chap ID ("\371")
  - **chap-challenge** - value of chap challenge ("\357\015\330\013\021\234\145\245\303\253\142\246\133\175\375\316")
  - **popup** - whether to pop-up checkbox ("true" or "false")
  - **advert-pending** - whether an advertisement is pending to be displayed ("yes" or "no")

- RADIUS-related variables
  - **radius<id>** - show the attribute identified with <id> in text string form (in case RADIUS authentication was used; "" otherwise)
  - **radius<id>u** - show the attribute identified with <id> in unsigned integer form (in case RADIUS authentication was used; "0" otherwise)
  - **radius<id>-<vnd-id>** - show the attribute identified with <id> and vendor ID <vnd-id> in text string form (in case RADIUS authentication was used; "" otherwise)
  - **radius<id>-<vnd-id>u** - show the attribute identified with <id> and vendor ID <vnd-id> in unsigned integer form (in case RADIUS authentication was used; "0" otherwise)

Working with variables

`$(if <var_name>)` statements can be used in theses pages. Following content will be included, if value of <var_name> will not be an empty string. It is an equivalent to `$(if <var_name> != "")` It is possible to compare on equivalence as well: `$(if <var_name> == <value>)` These statements have effect until `$(elif <var_name>)`, `$(else)` or `$(endif)`. In general case it looks like this:

```
some content, which will always be displayed
$(if username == john)
Hey, your username is john
$(elif username == dizzy)
Hello, Dizzy! How are you? Your administrator.
$(elif ip == 10.1.2.3)
You are sitting at that crappy computer, which is damn slow...
$(elif mac == 00:01:02:03:04:05)
This is an ethernet card, which was stolen few months ago...
$(else)
I don't know who you are, so lets live in peace.
```

```
$(endif)
other content, which will always be displayed
```

Only one of those expressions will be shown. Which one - depends on values of those variables for each client.

Customizing Error Messages

All error messages are stored in the **errors.txt** file within the respective HotSpot servlet directory. You can change and translate all these messages to your native language. To do so, edit the **errors.txt** file. You can also use variables in the messages. All instructions are given in that file.

Multiple Versions of HotSpot Pages

Multiple HotSpot page sets for the same HotSpot server are supported. They can be chosen by user (to select language) or automatically by JavaScript (to select PDA/regular version of HTML pages).

To utilize this feature, create subdirectories in HotSpot HTML directory, and place those HTML files, which are different, in that subdirectory. For example, to translate everything in Latvian, subdirectory "lv" can be created with login.html, logout.html, status.html, alogin.html, radvert.html and errors.txt files, which are translated into Latvian. If the requested HTML page can not be found in the requested subdirectory, the corresponding HTML file from the main directory will be used. Then main login.html file would contain link to "/lv/login?dst=$(link-orig-esc)", which then displays Latvian version of login page: `<a href="/lv/login?dst=$(link-orig-esc)">Latviski</a>` . And Latvian version would contain link to English version: `<a href="/login?dst=$(link-orig-esc)">English</a>`

Another way of referencing directories is to specify 'target' variable:

```
        <a href="$(link-login-only)?dst=$(link-orig-esc)&target=lv">Latviski</a>
        <a href="$(link-login-only)?dst=$(link-orig-esc)&target=%2F">English</a>
```

After preferred directory has been selected (for example, "lv"), all links to local HotSpot pages will contain that path (for example, `$(link-status) = "http://hotspot.mt.lv/lv/status"`). So, if all HotSpot pages reference links using "$(link-xxx)" variables, then no more changes are to be made - each client will stay within the selected directory all the time.

Notes

If you want to use HTTP-CHAP authentication method it is supposed that you include the **doLogin()** function (which references to the **md5.js** which must be already loaded) before the **Submit** action of the login form. Otherwise, CHAP login will fail.

The resulting password to be sent to the HotSpot gateway in case of HTTP-CHAP method, is formed MD5-hashing the concatenation of the following: chap-id, the password of the user and chap-challenge (in the given order)

In case variables are to be used in link directly, then they must be escaped accordingly. For example, in login page, <a href="https://login.example.com/login?mac=$(mac)&user=$(username)">link</a> will not work as intended, if username will be "123&456=1 2". In this case instead of $(user), its escaped version must be used: $(user-esc): <a href="https://login.server.serv/login?mac=$(mac-esc)&user=$(user-esc)">link</a>. Now the same username will be converted to "123%26456%3D1+2", which is the valid representation of "123&456=1 2" in URL. This trick may be used with any variables, not only with $(username).

There is a boolean parameter "erase-cookie" to the logout page, which may be either "on" or "true" to delete user cookie on logout (so that the user would not be automatically logged on when he/she opens a browser next time.

Example

With basic HTML language knowledge and the examples below it should be easy to implement the ideas described above.

- To provide predefined value as username, in login.html change:

```
<type="text" value="$(username)>
```

to this line:

```
<input type="hidden" name="username" value="hsuser">
```

(where **hsuser** is the username you are providing)

- To provide predefined value as password, in login.html change:

```
<input type="password">
```

to this line:

```
<input type="hidden" name="password" value="hspass">
```

(where **hspass** is the password you are providing)

- To send client's MAC address to a registration server in form of:

```
https://www.example.com/register.html?mac=XX:XX:XX:XX:XX:XX
```

change the Login button link in login.html to:

```
https://www.example.com/register.html?mac=$(mac)
```

(you should correct the link to point to your server)

- To show a banner after user login, in alogin.html after

```
$(if popup == 'true')
```

add the following line:

```
open('http://www.example.com/your-banner-page.html', 'my-banner-name','');
```

(you should correct the link to point to the page you want to show)

- To choose different page shown after login, in login.html change:

```
<input type="hidden" name="dst" value="$(link-orig)">
```

to this line:

```
<input type="hidden" name="dst" value="http://www.example.com">
```

(you should correct the link to point to your server)

- To erase the cookie on logoff, in the page containing link to the logout (for example, in status.html) change:

```
open('$(link-logout)', 'hotspot_logout', ...
```

to this:

```
open('$(link-logout)?erase-cookie=on', 'hotspot_logout', ...
```

or alternatively add this line:

```
<input type="hidden" name="erase-cookie" value="on">
```

before this one:

```
<input type="submit" value="log off">
```

An another example is making HotSpot to authenticate on a remote server (which may, for example, perform creditcard charging):

- Allow direct access to the external server in walled-garden (either HTTP-based, or IP-based)
- Modify login page of the HotSpot servlet to redirect to the external authentication server. The external server should modify RADIUS database as needed
  Here is an example of such a login page to put on the HotSpot router (it is redirecting to https://auth.example.com/login.php, replace with the actual address of an external authentication server):

```
<html>
<title>...</title>
<body>
<form name="redirect" action="https://auth.example.com/login.php" method="post">
<input type="hidden" name="mac" value="$(mac)">
<input type="hidden" name="ip" value="$(ip)">
<input type="hidden" name="username" value="$(username)">
<input type="hidden" name="link-login" value="$(link-login)">
<input type="hidden" name="link-orig" value="$(link-orig)">
<input type="hidden" name="error" value="$(error)">
</form>
<script language="JavaScript">
<!--
        document.redirect.submit();
//-->
</script>
</body>
</html>
```

- The external server can log in a HotSpot client by redirecting it back to the original HotSpot servlet login page, specifying the correct username and password
  Here is an example of such a page (it is redirecting to https://hotspot.example.com/login, replace with the actual address of a HotSpot router; also, it is displaying www.mikrotik.com after successful login, replace with what needed):

```
<html>
<title>Hotspot login page</title>
<body>
<form name="login" action="https://hotspot.example.com/login" method="post">
<input type="text" name="username" value="demo">
<input type="password" name="password" value="none">
<input type="hidden" name="domain" value="">
<input type="hidden" name="dst" value="http://www.mikrotik.com/">
<input type="submit" name="login" value="log in">
</form>
</body>
</html>
```

- Hotspot will ask RADIUS server whether to allow the login or not. If not allowed, alogin.html page will be displayed (it can be modified to do anything). If not allowed, flogin.html (or login.html) page will be displayed, which will redirect client back to the external authentication server.
- Note: as shown in these examples, HTTPS protocol and POST method can be used to secure communications.

Possible Error Messages

Description

There are two kinds of errors: fatal and non-fatal. Fatal errors are shown on a separate HTML page called error.html. Non-fatal errors are basically indicating incorrect user actions and are shown on the login form.

General non-fatal errors:

- **You are not logged in** - trying to access the status page or log off while not logged in. Solution: log in
- **already authorizing, retry later** - authorization in progress. Client already has issued an authorization request which is not yet complete. Solution: wait for the current request to be completed, and then try again
- **chap-missing = web browser did not send challenge response (try again, enable JavaScript)** - trying to log in with HTTP-CHAP method using MD5 hash, but HotSpot server does not know the challenge used for the hash. This may happen if you use BACK buttons in browser; if JavaScript is not enabled in web browser; if login.html page is not valid; or if challenge value has expired on server (more than 1h of inactivity). Solution: instructing browser to reload (refresh) the login page usually helps if JavaScript is enabled and login.html page is valid
- **invalid username ($(username)): this MAC address is not yours** - trying to log in using a MAC address username different from the actual user's MAC address. Solution: no - users with usernames that look like a MAC address (eg., 12:34:56:78:9a:bc) may only log in from the MAC address specified as their user name
- **session limit reached ($(error-orig))** - depending on licence number of active HotSpot clients is limited to some number. The error is displayed when this limit is reached. Solution: try to log in later when there will be less concurrent user sessions, or buy an another license that allows more simultaneous sessions
- **hotspot service is shutting down** - RouterOS is currently being restarted or shut down. Solution: wait until the service will be available again

General fatal errors:

- **internal error ($(error-orig))** - this should never happen. If it will, error page will be shown displaying this error message (error-orig will describe what has happened). Solution: correct the error reported
- **configuration error ($(error-orig))** - the HotSpot server is not configured properly (error-orig will describe what has happened). Solution: correct the error reported
- **cannot assign ip address - no more free addresses from pool** - unable to get an IP address from an IP pool as there is no more free IP addresses in that pool. Solution: make sure there is a

sufficient amount of free IP addresses in IP pool

Local HotSpot user database non-fatal errors:

- **invalid username or password** - self-explanatory
- **user $(username) is not allowed to log in from this MAC address** - trying to log in from a MAC address different from specified in user database. Solution: log in from the correct MAC address or take out the limitation
- **user $(username) has reached uptime limit** - self-explanatory
- **user $(username) has reached traffic limit** - either limit-bytes-in or limit-bytes-out limit is reached
- **no more sessions are allowed for user $(username)** - the shared-users limit for the user's profile is reached. Solution: wait until someone with this username logs out, use different login name or extend the shared-users limit

RADIUS client non-fatal errors:

- **invalid username or password** - RADIUS server has rejected the username and password sent to it without specifying a reason. Cause: either wrong username and/or password, or other error. Solution: should be clarified in RADIUS server's log files
- **<error_message_sent_by_radius_server>** - this may be any message (any text string) sent back by RADIUS server. Consult with your RADIUS server's documentation for further information

RADIUS client fatal errors:

- **RADIUS server is not responding** - user is being authenticated by RADIUS server, but no response is received from it. Solution: check whether the RADIUS server is running and is reachable from the HotSpot router

Application Examples

Description

This section will focus on some simple examples of how to use your HotSpot system, as well as give some useful ideas.

Setting up HTTPS authorization

At first certificate must be present with decrypted private key:

```
[admin@MikroTik] > /certificate print
Flags: K - decrypted-private-key, Q - private-key, R - rsa, D - dsa
 0 KR name="hotspot.example.net"
      subject=C=LV,L=Riga,O=MT,OU=dev,CN=hotspot.example.net,
              emailAddress=admin@hotsot.example.net
      issuer=C=LV,L=Riga,O=MT,OU=dev,CN=hotsot.example.net,
             emailAddress=admin@hotsot.example.net
      serial-number="0" email=admin@hotsot.example.net
      invalid-before=oct/27/2004 11:43:22 invalid-after=oct/27/2005 11:43:22
      ca=yes
```

Then we can use that certificate for HotSpot:

```
/ip hotspot profile set default login-by=cookie,http-chap,https \
ssl-certificate=hotsot.example.net
```

After that we can see, that HTTPS is running on HotSpot interface:

```
[admin@MikroTik] > /ip hotspot print
Flags: X - disabled, I - invalid, S - HTTPS
 #   NAME                        INTERFACE    ADDRESS-POOL PROFILE IDLE-TIMEOUT
 0 S hs-local                    local                     default 00:05:00
```

Bypass HotSpot for some devices in HotSpot network

All IP binding entries with **type** property set to **bypassed**, will not be asked to authorize - it means that they will have login-free access:

```
[admin@MikroTik] ip hotspot ip-binding> print
Flags: X - disabled, P - bypassed, B - blocked
 #   MAC-ADDRESS       ADDRESS         TO-ADDRESS      SERVER
 0 P                   10.11.12.3
```

If all fields has been filled in the ip-binding table and **type** has been set to **bypassed**, then the IP address of this entry will be accessible from public interfaces immediately:

```
[admin@MikroTik] ip hotspot ip-binding> print
Flags: X - disabled, P - bypassed, B - blocked
 #   MAC-ADDRESS       ADDRESS         TO-ADDRESS      SERVER
 0 P                   10.11.12.3
 1 P 00:01:02:03:04:05 10.11.12.3      10.11.12.3      hs-local
[admin@MikroTik] ip hotspot ip-binding> .. host print
Flags: S - static, H - DHCP, D - dynamic, A - authorized, P - bypassed
 #    MAC-ADDRESS       ADDRESS         TO-ADDRESS      SERVER   IDLE-TIMEOUT
 0  P 00:01:02:03:04:05 10.11.12.3      10.11.12.3      hs-local
```