

Kloudspot Gateway User Guide

Version 2.4 - Access-in-a-Box

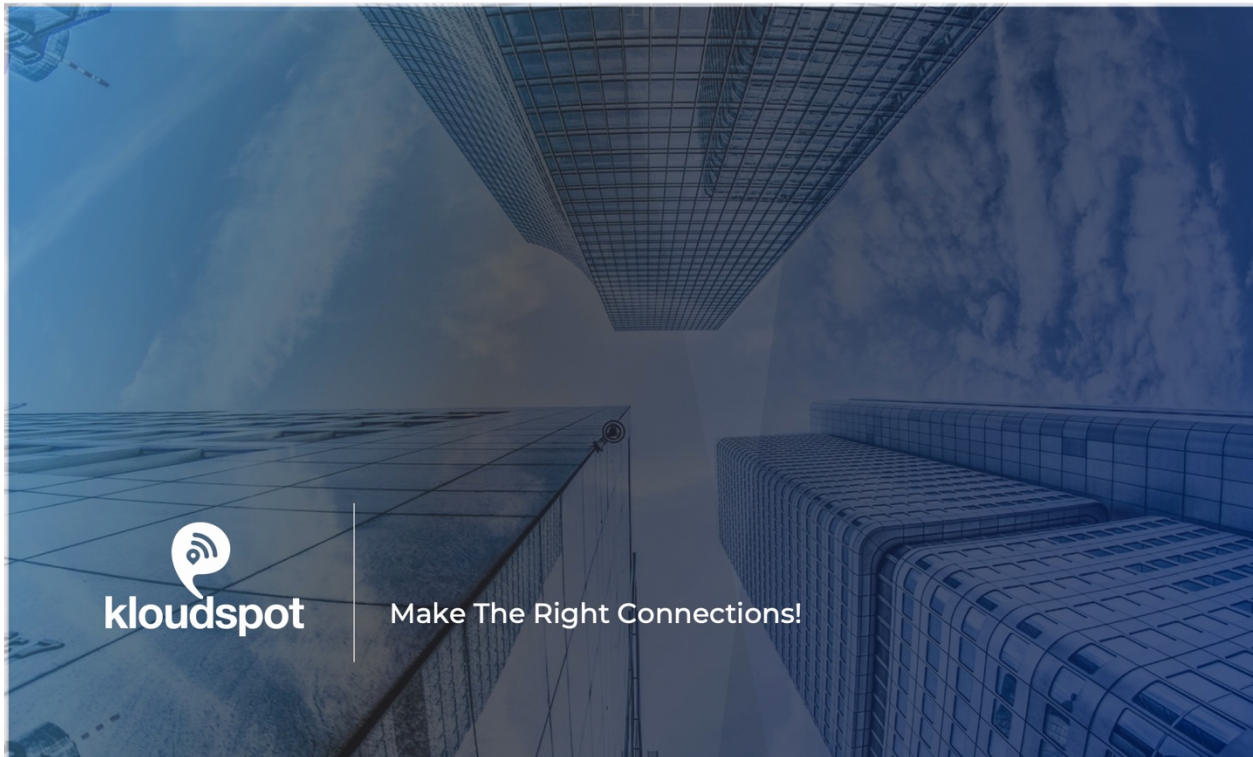


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Kloudspot Gateway User Guide

Overview

This guide is designed to give the user a working knowledge of the Kloudspot Gateway design used for providing Hotspot services when used with the Kloudspot Controller. The Gateway is designed using Mikrotik hardware with software plugins and configurations provided by Kloudspot. The Gateway provides router function for users of the Hotspot network. Most of the runtime operations of the Gateway are controlled by the Controller. However, there is additional information which can be used to troubleshoot the network using the Gateway UI. This document will focus only on the main UI items related to the Hotspot and DHCP operation.

Connecting to Gateway

The Gateway is based on the Mikrotik RouterOS operating system. A detailed manual is available [here](#). The User Interface can be accessed using a web interface on port 80, or by using a program called WinBox. As the name might imply, it was designed to run on Windows. Any of these services can be disabled so no IP UI connectivity is allowed to the Gateway. Kloudspot normally has the Winbox interface enabled on Port 8291. You can download a copy of Winbox for Windows [here](#). For more descriptions on installing Winbox look [here](#).

When you run Winbox you will see a screen as follows;

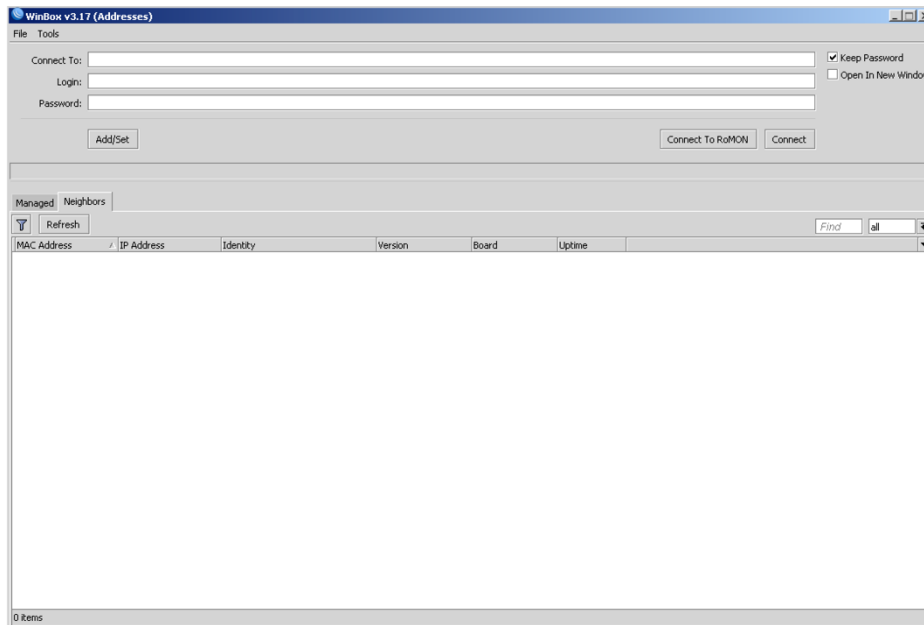


Figure 1-Winbox

In the “Connect To:” entry the IP address of the Gateway. Also, enter the “login:” and “Password:” and then click on Connect.

After connecting to the Gateway, you will see the following screen;

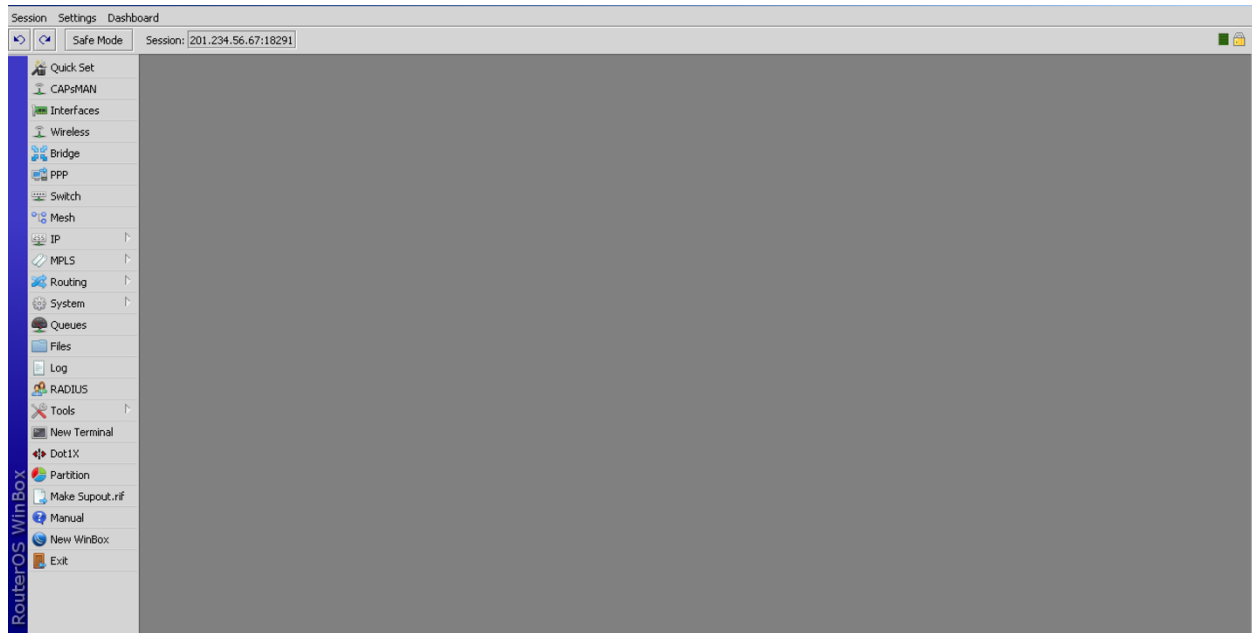


Figure 2-Winbox UI

The use of this UI will be described in the following sections of this document.

Functional Parts

The main functions of the Gateway are as follows;

1. Network Routing - Provide general network routing service for Hotspot Users
2. Hotspot Service - Provide the Network connectivity to the WIFI Splash page users.
3. Hotspot DHCP - Provide DHCP service to Hotspot location(s)
4. Hotspot Location/User controls - Provide rate shaping per user and/or per Hotspot region.
5. Hotspot authentication - redirection of http protocol to the Kloudspot Controller
6. Authorization Routing – API allows Kloudspot Controller to enable network connectivity for approved users
7. HA Routing Operation - VRRP is used for slave backup(s)

The Gateway does NOT keep any user details. All user information is contained at the controller. The Gateway knows the MAC address and IP Address of a Splash page user, but no other details.

Gateway User Interface

The section gives description of the most important items to view for operation of the Gateway. It is not required for the user to take any action using these interface commands. However, these this UI can be used as a good debugging tool in case of problems. This is NOT a complete description of all the commands available, rather it is a discussion of the more important commands. A complete guide to all the commands can be found [here](#).

Interface

When selecting the “Interface” tab in the left column, a list of all the interface are shown. The Gateway supports many different types of interfaces. Please reference the figure below.

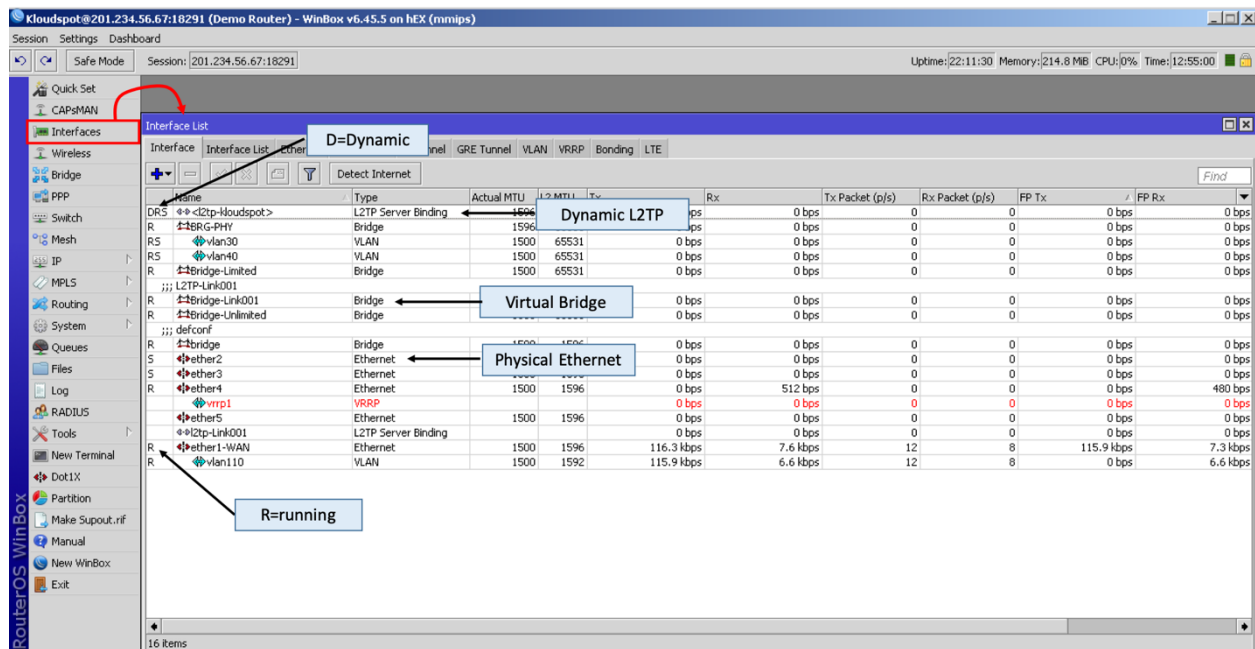


Figure 3 – Interface

Ethernet Interface

This is the physical ethernet interface on the front of the device. Depending on the model type the number of interfaces will change. In this sample device, there are five physical ethernet interfaces. The “R” in the left most side of the Interface window, indicates the interface is up and running. If the “R” is not present, the interface is not attached to another device.

Bridge Interface

The bridge interface allows for attachment to a virtual bridge within the Gateway. For example, two ethernet interface could be attached to the same virtual bridge. In the Kloudspot Gateway, Hotspots are attached to a Bridge interface. Therefore, for each Hotspot network there will be a virtual bridge for attachment. There will be at least one Hotspot network for each location requiring a different Splash page for the User to connect to the network. For example, there might be a “Parks”, a “School”, and a “Police” bridge network. A different Hotspot network with a different splash page can be assigned to each network.

Dynamic L2TP

The Gateway has a L2TP Server running which allows L2TP clients to attach to the gateway with a given username and password. When the Username/password is defined in the Gateway, it selects a given profile for the user. In this profile, a bridge is defined for the termination point of the L2TP link. In the previous section, three different Hotspot networks were defined. This means there would need to be at least three different username/passwords defined to select the correct bridge for the L2TP link termination.

It should be noted; a single bridge can terminate thousands of L2TP connections.

VLAN

VLAN(s) are defined as an interface and then assigned to other interfaces as a “child”. This allows VLANs to be used on most any interface type.

Bridge

The Bridge tab is used to define a virtual bridge within the Gateway device. It can also be used to assign other interface(s) to the defined virtual bridge(s). Typically, this tab is not that useful if debugging a problem, except to understand what interfaces are contained within a virtual bridge. Shown in Figure below is the bridge tab.

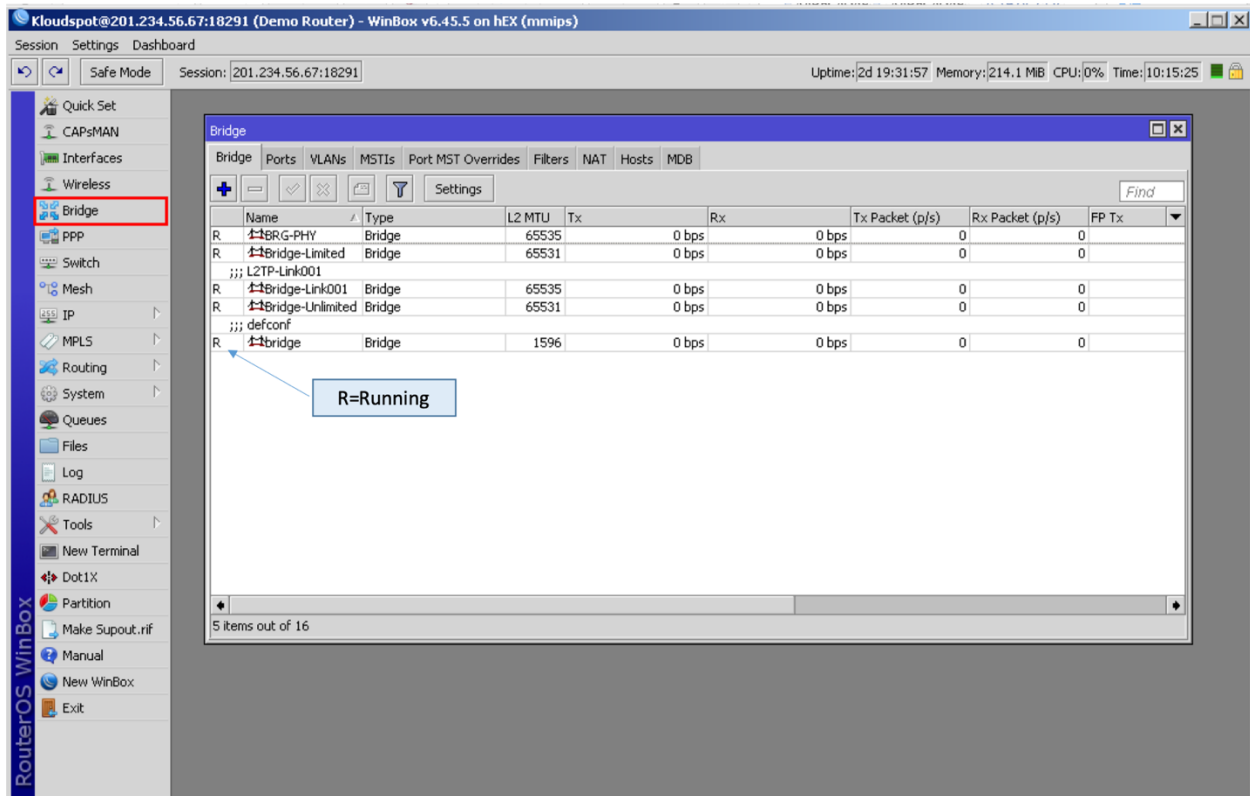


Figure 4-Bridge

In the Bridge main tab all the virtual bridges will be listed. Notice all bridges will show as “running” if the bridge is defined correctly. In the above example, BRG-PHY virtual bridge is a virtual bridge used to attach the VLAN interfaces. The bridge interface can be attached to another virtual bridge which will inherit the BRG-PHY and the VLANs as a child.

There is also a virtual bridge defined for each Hotspot network. In the above example, Bridge-Limited and Bridge-Unlimited are used for Hotspots. To understand how this is attached to the Hotspot the Bridge Port tab needs to be selected. This tab shows all the interfaces within a virtual bridge. Please refer to Bridge-Port Figure 5 below.

Bridge-Port

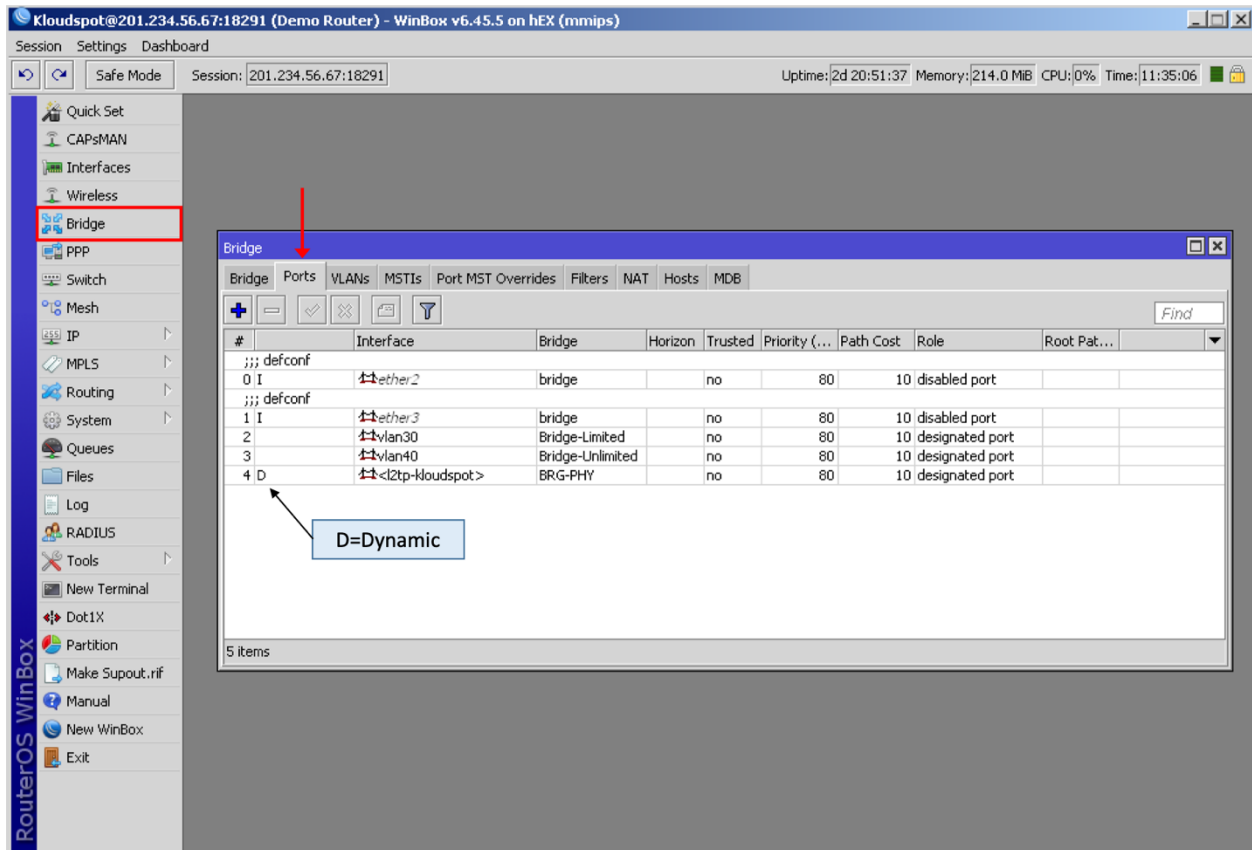


Figure 5-Bridge Port

The Bridge-Port tab shows which interfaces are attached to the virtual bridge. In the Figure 5, interface “l2tp-kloudspot” is attached to BRG-PHY. Referring back to Figure 3, BRD-PHY has two VLAN interface defined, vlan30 and vlan40. Figure 3 above shows these VLANs attached to the two Hotspot network. In the PPP tab (described in a later section), one of the profiles has the L2TP connection termination point as BRG-PHY. After the L2TP connection is established, a frame received with a VLAN tag of 30 will be sent to the Bridge-Limited virtual bridge. In turn, the Hotspot for the Limited network is attached to this virtual bridge.

PPP

The PPP tab is used to setup the point-to-point connections. In this network design, L2TP connections are used to bridge remote APs to the Hotspot network. Shown in the figure below is the PPP tab.

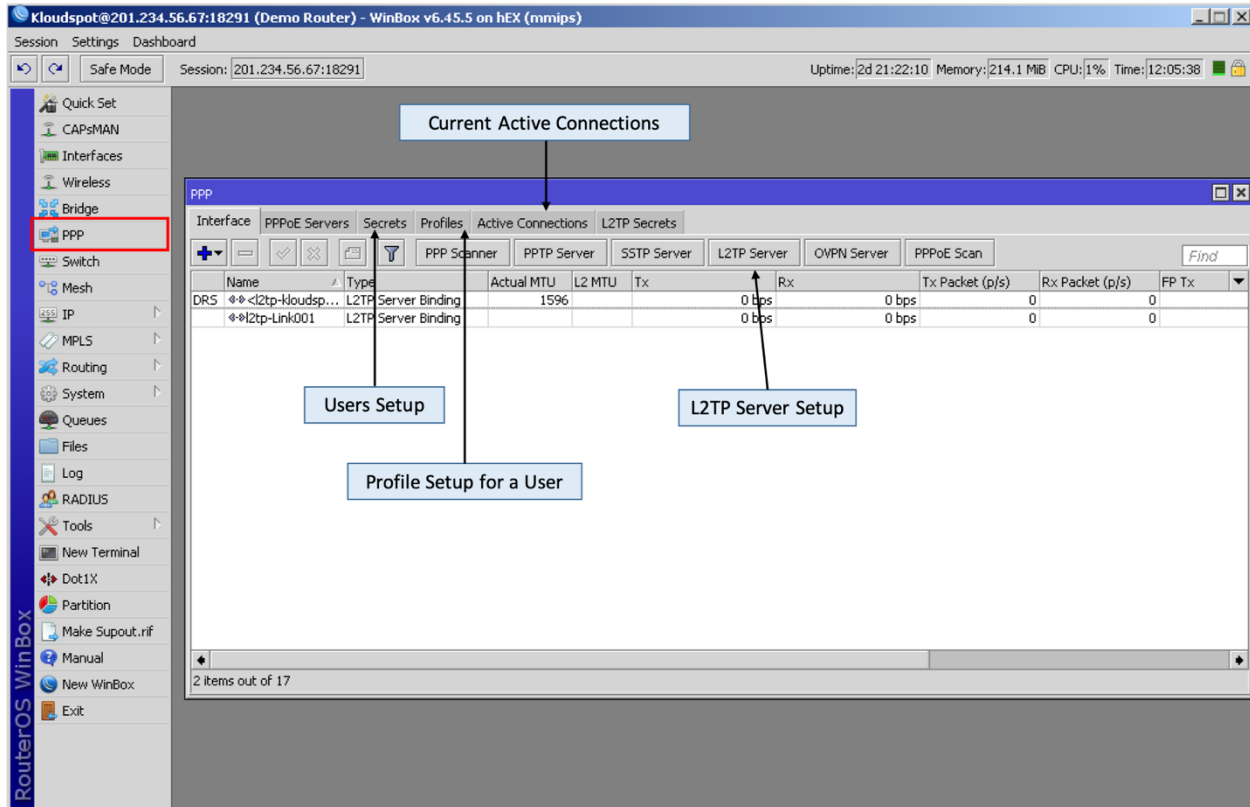


Figure 6-PPP

The L2TP server has been defined to receive connections from APs needing to attach to the Hotspot network. This was done using the “L2TP Server Setup” shown above in Figure 6. After the server is setup, a profile was established to define the L2TP connection endpoint. After the profile is setup, a User is setup to use the defined profile. When an AP makes a L2TP connection, the User set in the AP will define which virtual bridge the L2TP connection will terminated. This in turn establishes which Hotspot network will be attached to the AP.

Another very useful tab is the “Active Connections”. This can be used to see if there is an active connection from a given AP. It is shown in Figure 7 below.

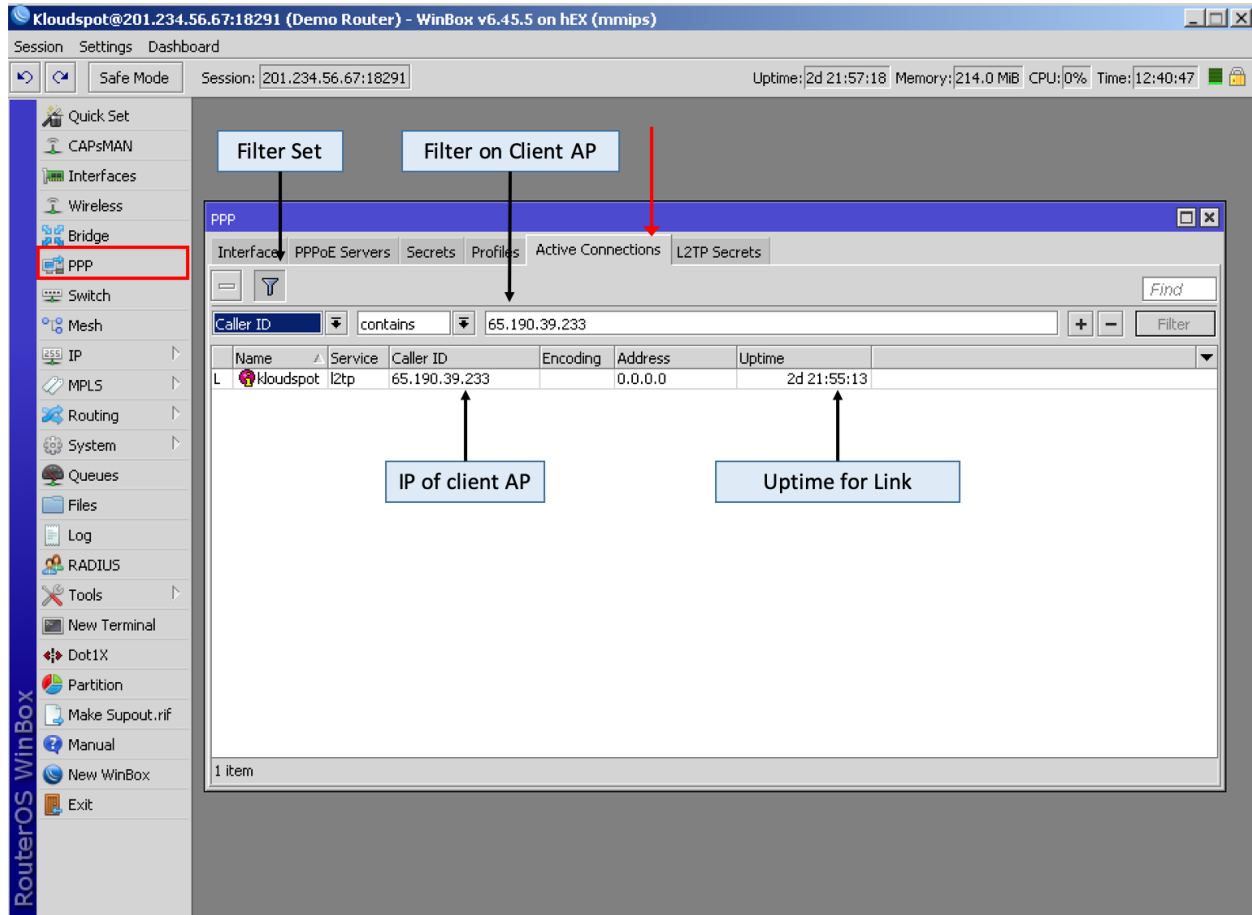


Figure 7-Active AP Connections

Shown in Figure 7 above is the active connections. This screen could have thousands of active connections, so checking for the exact one of interest will require a filter. Shown is the set filter function icon. The filter is set to the “caller ID” which will be the address of the AP of interest. Notice the filter is set to contain the IP address of AP. Listed in the screen of active connections will be the connection matching the IP address in the filter. Notice the IP address listed and the Uptime of this AP’s L2TP connection. If the connection is down, NO entry will be found in this table.

IP

The IP tab is perhaps the most important section of the UI. Most items of interest will be contained in the IP tab. This tab has many subsections. This document will only cover the most important subsections for the operation of the Hotspot.

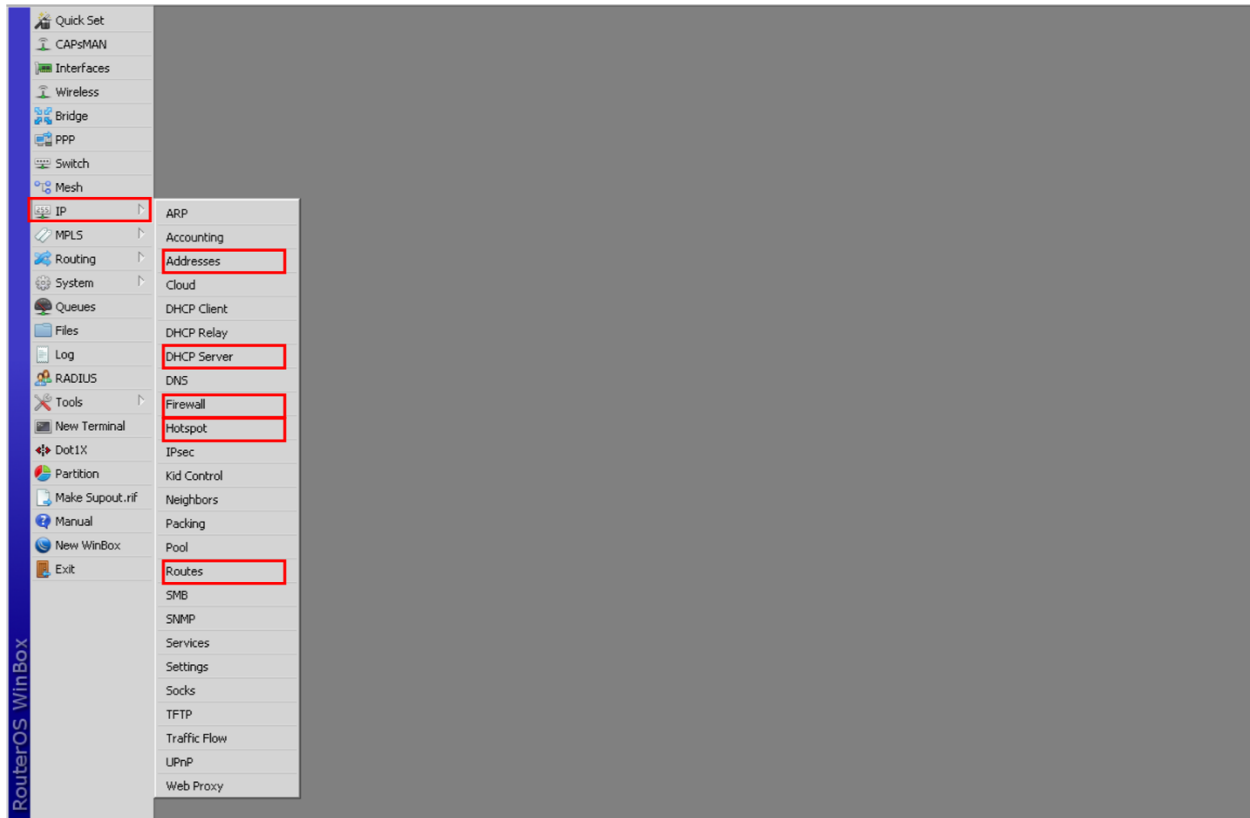


Figure 8-IP

Within the IP tab there are many subsections. The ones covered in this document are the following:

- Addresses
- DHCP Server
- Address Pool
- Hotspot
- Static Routes

IP->Addresses

The address section of IP is used to assign an IP address to an interface. Should before in the Interface section in Figure 3, there are many different types on interfaces. Below in the figure is an example of address assignments.

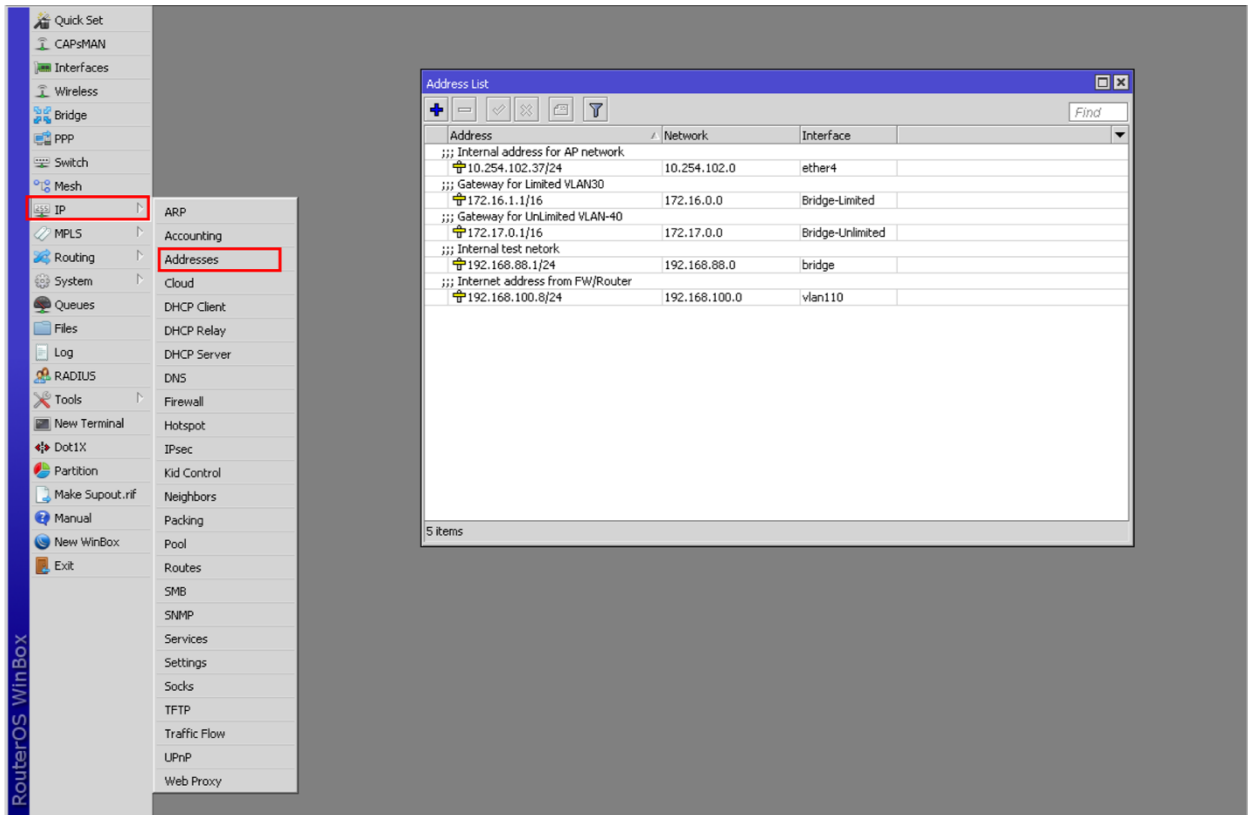


Figure 9-IP->Addresses

In the Figure 9, you will notice the address assignment to the internal address used for the APs to communicate to the Gateway device. Also, there are assignments for gateway address for each of the Hotspot networks. When a client attaches to a given Hotspot, this is the gateway address the client will receive. There is also an address assignment to the “Internet” side of the Gateway. This is the interface which is facing toward the router providing internet access.

IP->DHCP Server

This section is used to defined the DHCP servers on the Gateway device. There will be at least one DHCP server for each Hotspot network. It is recommended to use only one DHCP server per Hotspot. It is also recommended to use a lease time equal to the time a client is allowed to connect to the network.

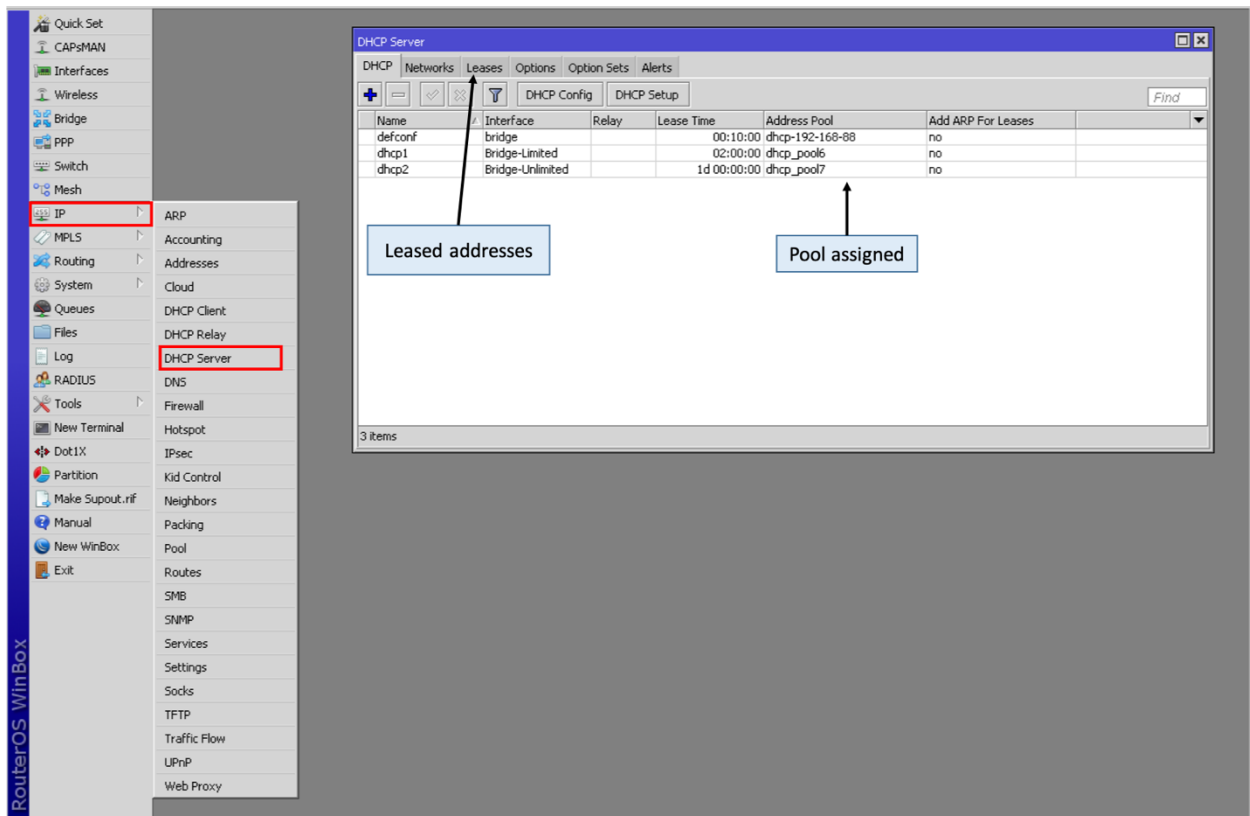


Figure 10 IP->DHCP Server

In Figure 10, the name of the DHCP server is shown along with the Interface it is attached. Also, the DHCP pool is listed. To view all addresses leased and see the remaining time on the lease, the “Leases” tab can be selected.

IP->Pool

The Pool tab is used to define the DHCP pools available. One or more pools are assigned to a DHCP Server. There will be at least one Pool assigned per each Hotspot. For HA setups, the overall pool for a Hotspot should be split between the two Gateways. This will prevent overlapping assignment of IP addresses in case of switch over.

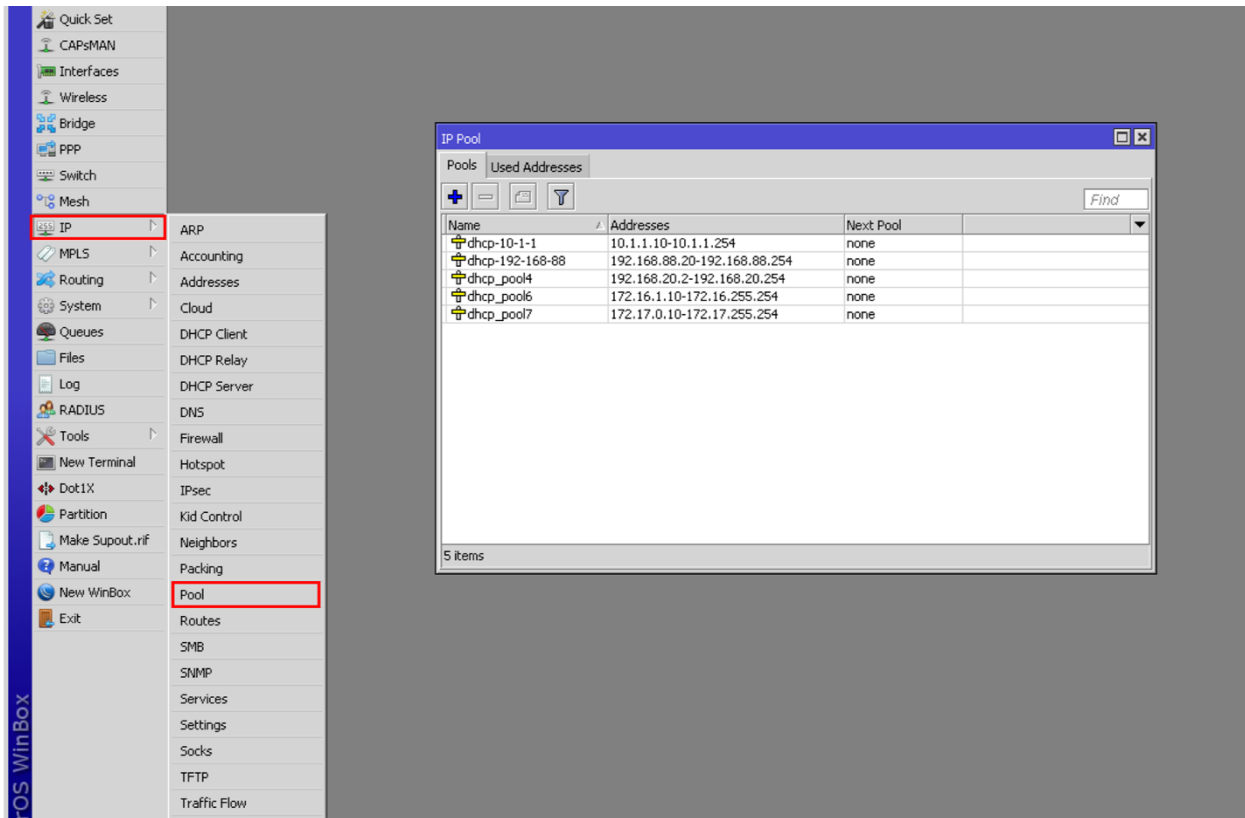


Figure 11 IP->Pool

In Figure 11, the pool name and the addresses are listed. The pool name is used for the assignment in the DHCP Server.

IP->Hotspot

The Hotspot tab is used to define the Hotspot and Hotspot profiles. Then Users and User Profiles are defined. All the sections in the Hotspot must match with the setup information in the Kloudspot Controller. It is advised not to modify any section of the Hotspot profiles or User Profiles without the assistant of Kloudspot’s technical staff. Within the Hotspot section information can be obtained on all the active clients attached to the network. There is a tab to show all the clients which have received a lease from the Hotspot network. When a client is active on the Hotspot, the client is in the “authorized” state. Since the Hotspot has an “open” SSID, many devices might join the WIFI network and be assigned a DHCP address but then never authenticate with the network using the splash page. In order to become “authorized” on the network, a devices MAC address must be registered at the Kloudspot Controller. All the authorization information is contained at the Kloudspot Controller. The Kloudspot Controller will program the Gateway as to which MAC addresses should be authorized. The Gateway does not store any information about passed session of a user on the Hotspot. All this type of information is contained at the controller.

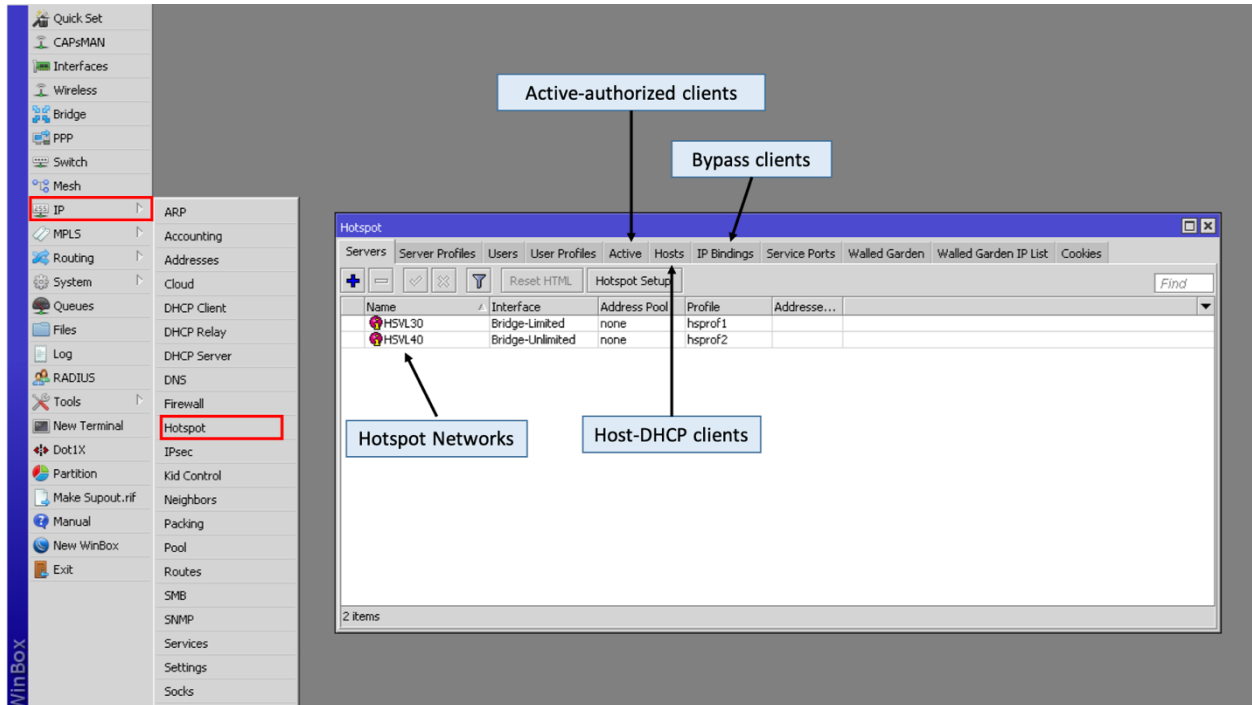


Figure 12 IP->Hotspot

Figure 12 shows the Hotspot tab. The Hotspot Networks are listed and then the profiles. The Active tab will show all the authorized clients for all the Hotspot networks. A filter can be used to limit what is shown. See Figure 13 for a sample screen output.

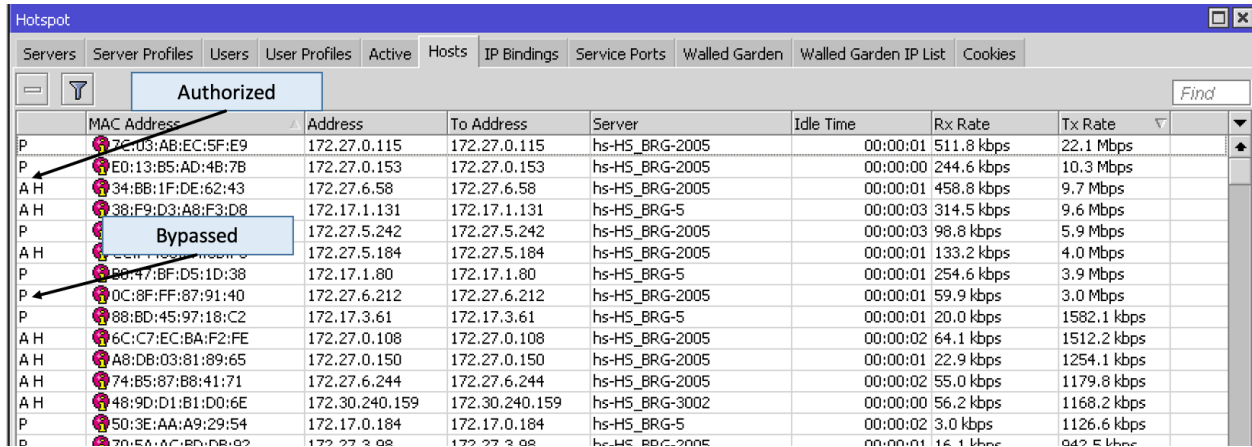
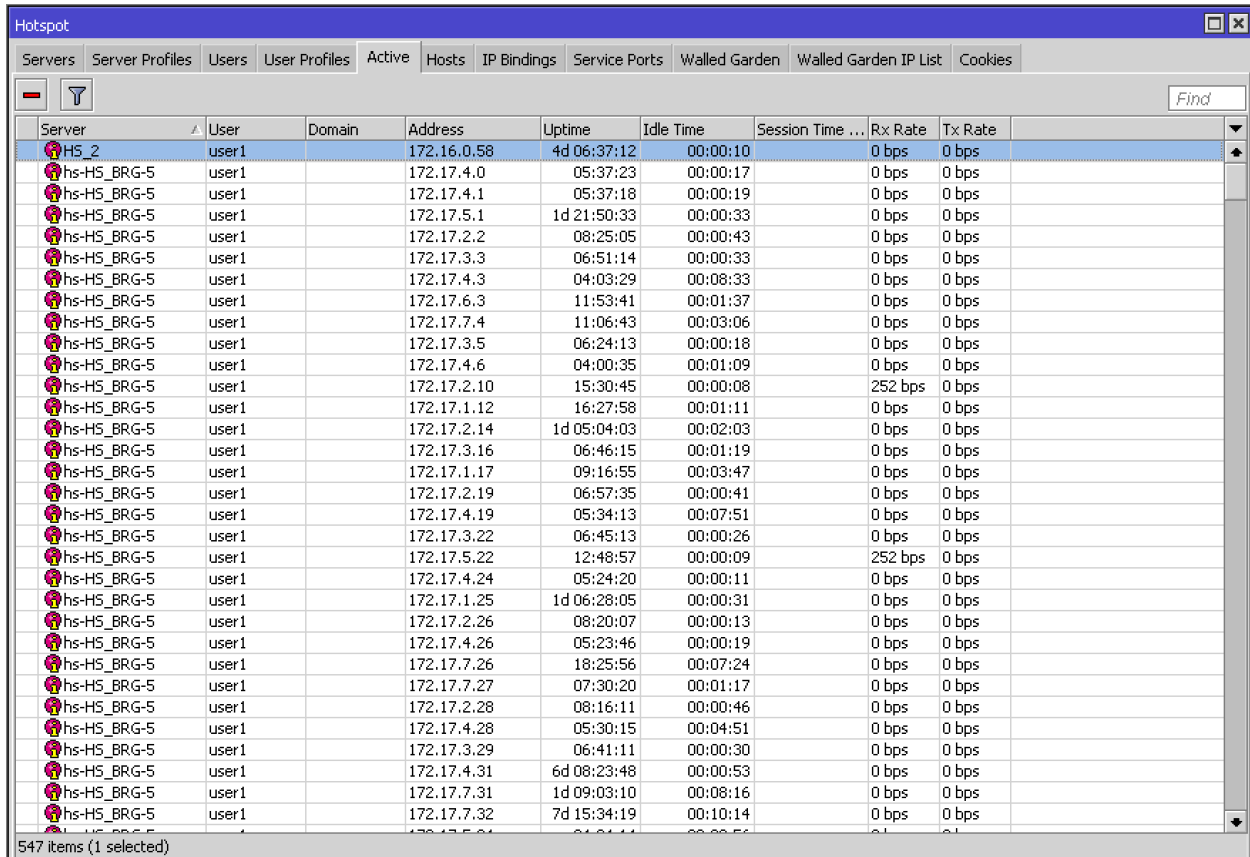


Figure 13 IP->Hotspot->Host

A sample screen of just the authorized clients looks as follows;



Server	User	Domain	Address	Uptime	Idle Time	Session Time ...	Rx Rate	Tx Rate
HS_2	user1		172.16.0.58	4d 06:37:12	00:00:10		0 bps	0 bps
hs-HS_BRG-5	user1		172.17.4.0	05:37:23	00:00:17		0 bps	0 bps
hs-HS_BRG-5	user1		172.17.4.1	05:37:18	00:00:19		0 bps	0 bps
hs-HS_BRG-5	user1		172.17.5.1	1d 21:50:33	00:00:33		0 bps	0 bps
hs-HS_BRG-5	user1		172.17.2.2	08:25:05	00:00:43		0 bps	0 bps
hs-HS_BRG-5	user1		172.17.3.3	06:51:14	00:00:33		0 bps	0 bps
hs-HS_BRG-5	user1		172.17.4.3	04:03:29	00:08:33		0 bps	0 bps
hs-HS_BRG-5	user1		172.17.6.3	11:53:41	00:01:37		0 bps	0 bps
hs-HS_BRG-5	user1		172.17.7.4	11:06:43	00:03:06		0 bps	0 bps
hs-HS_BRG-5	user1		172.17.3.5	06:24:13	00:00:18		0 bps	0 bps
hs-HS_BRG-5	user1		172.17.4.6	04:00:35	00:01:09		0 bps	0 bps
hs-HS_BRG-5	user1		172.17.2.10	15:30:45	00:00:08		252 bps	0 bps
hs-HS_BRG-5	user1		172.17.1.12	16:27:58	00:01:11		0 bps	0 bps
hs-HS_BRG-5	user1		172.17.2.14	1d 05:04:03	00:02:03		0 bps	0 bps
hs-HS_BRG-5	user1		172.17.3.16	06:46:15	00:01:19		0 bps	0 bps
hs-HS_BRG-5	user1		172.17.1.17	09:16:55	00:03:47		0 bps	0 bps
hs-HS_BRG-5	user1		172.17.2.19	06:57:35	00:00:41		0 bps	0 bps
hs-HS_BRG-5	user1		172.17.4.19	05:34:13	00:07:51		0 bps	0 bps
hs-HS_BRG-5	user1		172.17.3.22	06:45:13	00:00:26		0 bps	0 bps
hs-HS_BRG-5	user1		172.17.5.22	12:48:57	00:00:09		252 bps	0 bps
hs-HS_BRG-5	user1		172.17.4.24	05:24:20	00:00:11		0 bps	0 bps
hs-HS_BRG-5	user1		172.17.1.25	1d 06:28:05	00:00:31		0 bps	0 bps
hs-HS_BRG-5	user1		172.17.2.26	08:20:07	00:00:13		0 bps	0 bps
hs-HS_BRG-5	user1		172.17.4.26	05:23:46	00:00:19		0 bps	0 bps
hs-HS_BRG-5	user1		172.17.7.26	18:25:56	00:07:24		0 bps	0 bps
hs-HS_BRG-5	user1		172.17.7.27	07:30:20	00:01:17		0 bps	0 bps
hs-HS_BRG-5	user1		172.17.2.28	08:16:11	00:00:46		0 bps	0 bps
hs-HS_BRG-5	user1		172.17.4.28	05:30:15	00:04:51		0 bps	0 bps
hs-HS_BRG-5	user1		172.17.3.29	06:41:11	00:00:30		0 bps	0 bps
hs-HS_BRG-5	user1		172.17.4.31	6d 08:23:48	00:00:53		0 bps	0 bps
hs-HS_BRG-5	user1		172.17.7.31	1d 09:03:10	00:08:16		0 bps	0 bps
hs-HS_BRG-5	user1		172.17.7.32	7d 15:34:19	00:10:14		0 bps	0 bps

Figure 14 IP->Hotspot->Active

A filter can be applied to display a single or group of clients of interest.

IP->Routes

The Gateway is using static routes to define both default and non-default routes. For internal addressed frames, static routes are defined for the given network. For external frames, a default route is set to the external facing router. A sample route table is show below.

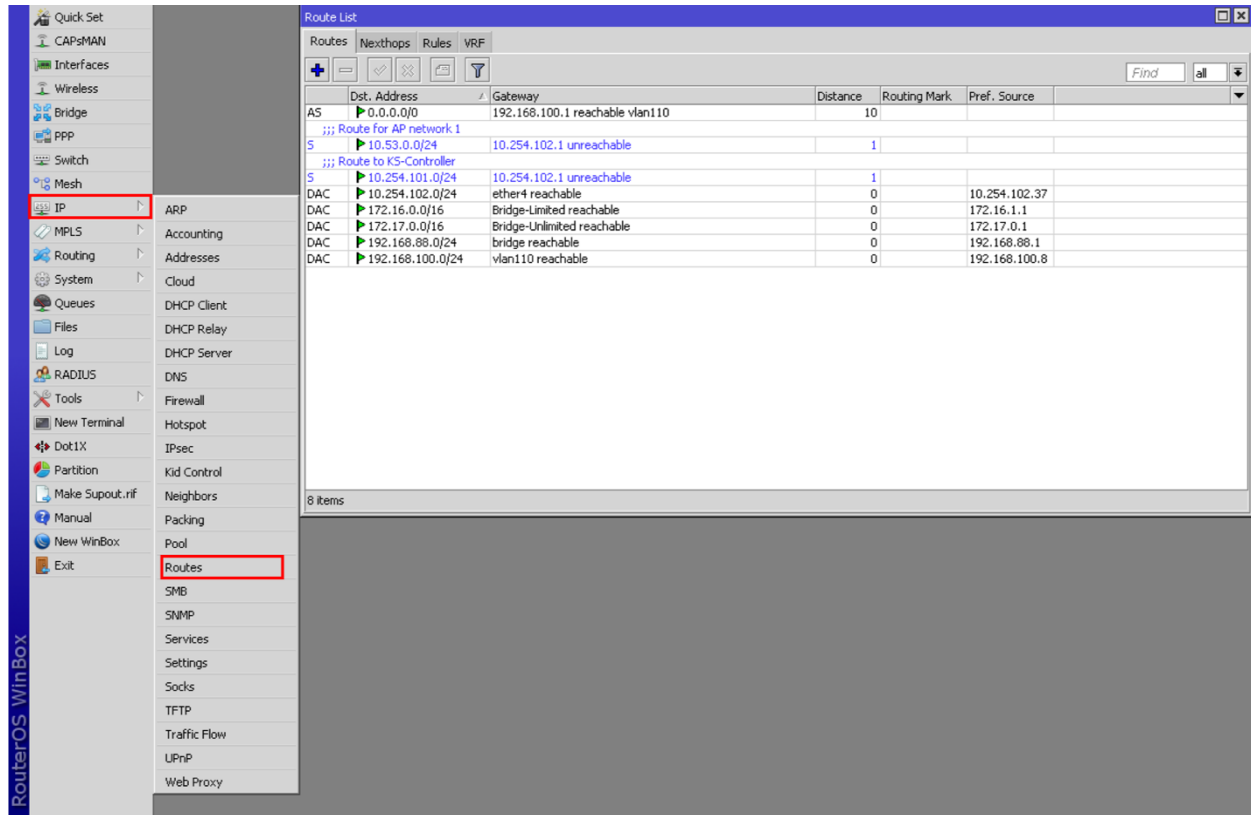


Figure 15 IP->Routes

Operation Overview

The following gives an overview of the operation of the Kloudspot Gateway. First, the setup will be discussed. It is assuming the following items have been done. (Please note: This is all done by the Kloudspot technical staff)

- The internal and external interface must be defined along with the IP addressing.
- The Hotspot Network must be defined along with the virtual bridge for these networks.
- The Hotspot html redirect page must be defined in the Gateway files section.
- The Hotspot networks must be configured in the Kloudspot Controller
- The DHCP pools must be defined for each Kloudspot Network.
- The DHCP Servers must be defined for each Hotspot Network
- The L2TP Server must be setup for APs to access
- L2TP Users must be defined and linked to the Hotspot virtual bridge.
- The static routes along with the default route(s) must be defined
-

About Kloudspot

Kloudspot is the leader in enabling digital transformation for businesses by creating intelligent and engagement systems over cloud managed wireless and sensor networks. By enhancing customer identification, understanding and analysis, Kloudspot customers achieve better customer engagement. Kloudspot's Situational Awareness platform provides business value through analytics that convert physical actions of people and devices, IoT, transforming them into real-time digital insights that can be harnessed to deliver better customer experiences and create revenue generating opportunities both online and offline.

For further details or to schedule a demo write to contact@kloudspot.com