

# USING DHCP SERVER LEASE AS A TOOL FOR NETWORK ADMINISTRATION

A SIMPLE GUIDE FOR NETWORK ADMINISTRATORS TO USE THE DHCP SERVER LEASES  
TO MONITOR, ADD RATE LIMIT AND ADDRESS LISTING TO THE DHCP CLIENT.

MUM PH 2018

MUM PH 2018 | SIENA COLLEGE OF TAYTAY | INGENU IT SOLUTIONS



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# MikroTik

A C A D E M Y



*Siena College of Taytay*







*Blessed be God forever*

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# GOVERNMENT FUNDED PROJECT

## CURRICULUM ENHANCEMENT THROUGH ACADEMIC INDUSTRY PARTNERSHIP WITH MIKROTIK ACADEMY FOR INCREASED EMPLOYABILITY OF GRADUATES

Institutional Development and Innovation Grants (IDIG)

Concept Paper - Siena College of Taytay



Mikrotik Academy - Siena College of Taytay



# GOVERNMENT FUNDED PROJECT

## SECTORAL ENGAGEMENT

CHED K-12 Transition Program  
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Mikrotik Student User Meeting





# USING DHCP SERVER LEASES AS A TOOL FOR NETWORK ADMINISTRATION

A SIMPLE GUIDE FOR NETWORK ADMINISTRATORS TO USE THE DHCP SERVER  
LEASES TO MONITOR, ADD RATE LIMIT AND ADDRESS LISTING TO THE DHCP  
CLIENT.

# OBJECTIVE

- For the Network Administrator
  - To be able to monitor all the device client who is connected to the network.
  - To set a Dynamic IP Address to Static within Mikrotik.
  - To enable Use Source Mac Address option to lock the device IP to the device mac.
  - To add the Rate Limit to the device client.
  - To use Address Listing option to be able to add the client to a certain firewall rule.





## REFERENCE:

[wiki.mikrotik.com](https://wiki.mikrotik.com)

[forum.mikrotik.com](https://forum.mikrotik.com)

# ROUTEROS: DHCP SERVER

## Dynamic Host Configuration Protocol

- For easy distribution of IP in a network
- IP Assignment
- Obtaining IP Settings



# ROUTEROS: DHCP SERVER

The screenshot shows the Mikrotik WinBox interface for configuring a DHCP server. The left sidebar has a tree view with categories like Switch, Mesh, IP, MPLS, Routing, System, Queues, Files, Log, and Radius. The 'IP' category is expanded, and the 'DHCP Server' option is highlighted with a red box. The main window displays the 'DHCP Server' configuration page. It has tabs for DHCP, Networks, Leases, Options, Option Sets, and Alerts. Below the tabs are buttons for adding (+), removing (-), enabling (checkmark), disabling (X), and filtering (funnel). A table lists existing DHCP servers:

Name	Interface	Relay	Lease
dhcp_ceit	LAB		
dhcp_comp	LAB NEW		
dhcp_convent	CONVENT		
dhcp_faculty	FACULTY		
dhcp_library	LIBRARY		
dhcp_local	LOCAL		
X dhcp_student	STUDENT		
dhcp_system	SYSTEM		

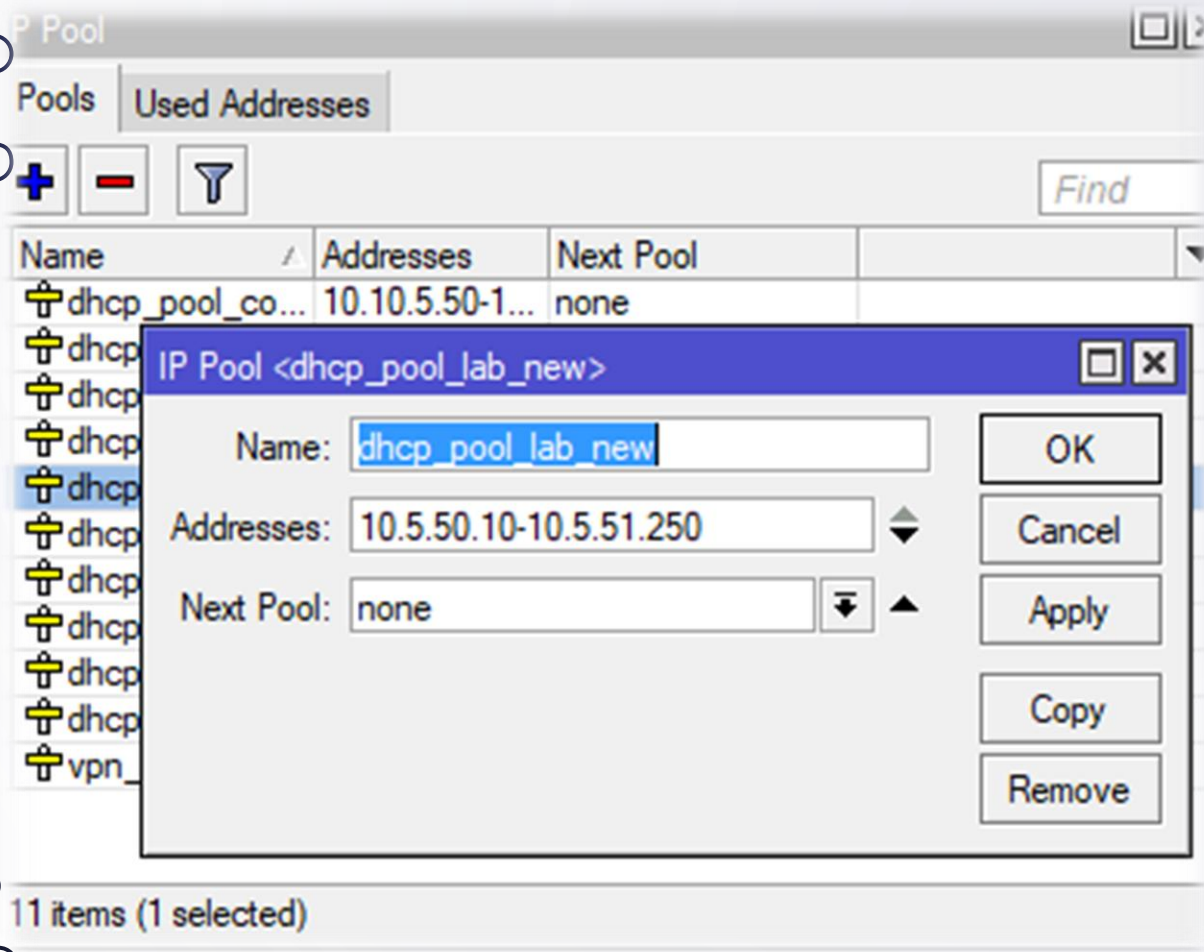
```
/ip dhcp-server
```



## PRE-REQUISITE:

- DHCP Server should be configured.
- There should be an IP Pool.
- IPv4 for the devices should be set to obtain an IP address automatically.
  - Note: Devices with manually configured IP cannot be probed in the DHCP lease.





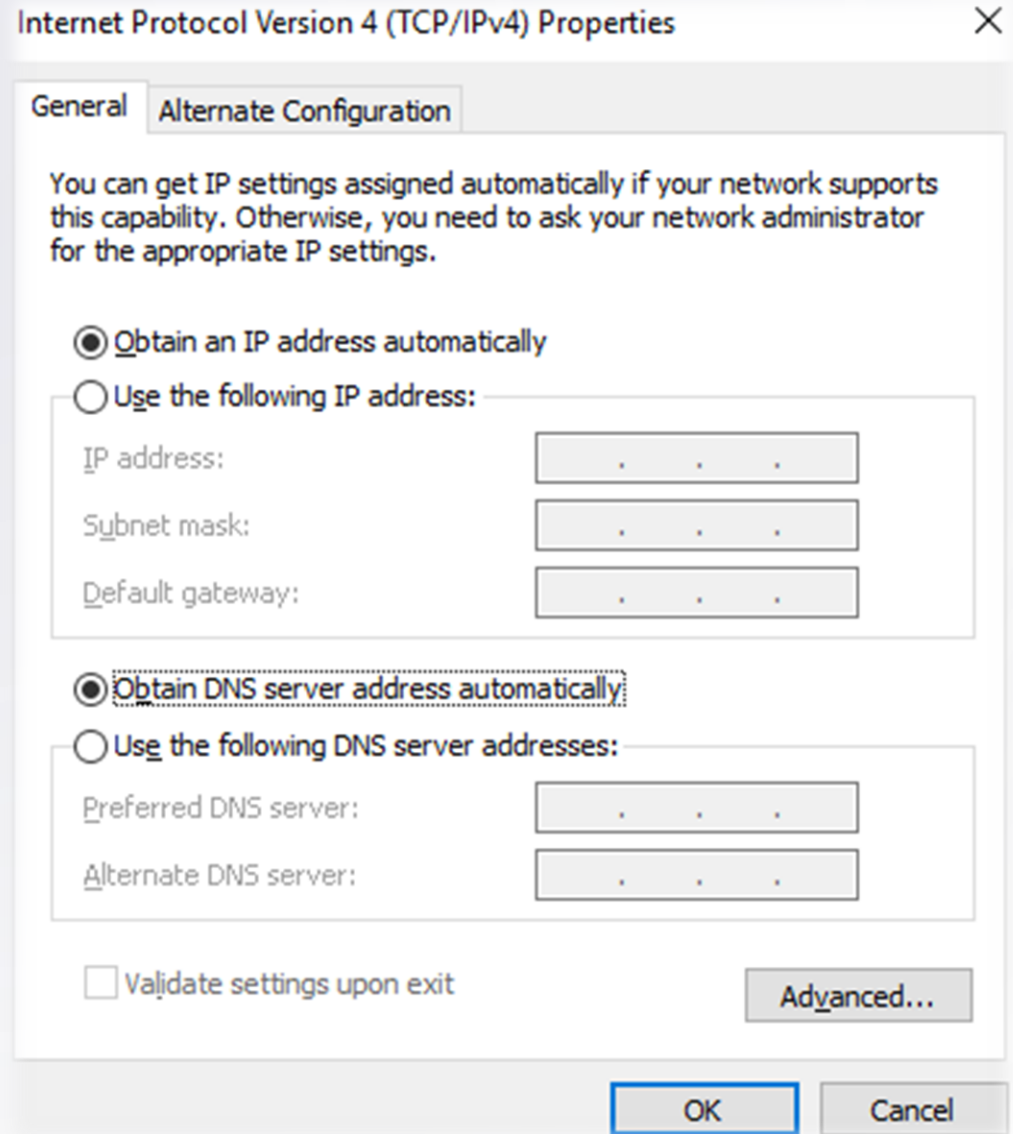
PRE-REQUISITE:

There should be an IP Pool.

Sub-menu: `/ip pool`

# PRE-REQUISITE:

IPv4 for the devices should be set to obtain an IP address automatically.



Internet Protocol Version 4 (TCP/IPv4) Properties

General Alternate Configuration

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

☒ Obtain an IP address automatically

☐ Use the following IP address:

IP address: . . .

Subnet mask: . . .

Default gateway: . . .

☒ Obtain DNS server address automatically

☐ Use the following DNS server addresses:

Preferred DNS server: . . .

Alternate DNS server: . . .

☐ Validate settings upon exit

Advanced...

OK Cancel



Safe Mode Session: 192.168.100.1 Memory: 1458.9 MiB CPU: 11% Date: Jan/05/2018 Time: 12:23:17

**DHCP Server**

DHCP Networks Leases Options Option Sets Alerts

+ - ✓ ✗ 📁 🔍 Check Status Find

	Address	MAC Address	Client ID	Server	Active Address	Activ...	Status
	10.5.50.143	10:78:D2:D4:F0:32	1:10:78:d...	dhcp_comp	10.5.50.143	HS4	bound
	10.5.50.22	10:78:D2:D4:F1:DF	1:10:78:d...	dhcp_comp	10.5.50.22	HS5	bound
	10.5.50.37	10:78:D2:D4:EF:02	1:10:78:d...	dhcp_comp	10.5.50.37	HS6	bound
	10.5.50.44	10:78:D2:D4:C4:44	1:10:78:d...	dhcp_comp	10.5.50.44	HS7	bound
	10.5.50.147	FA:DC:FE:FE:EB:69	1:fa:dc:fe...	dhcp_comp		HS8	waiting
	10.5.50.36	AA:DC:FE:FE:EB:...	1:aa:dc:f...	dhcp_comp		HS8	waiting
D	10.5.50.48	AA:DC:FE:FE:EF:69	1:aa:dc:f...	dhcp_comp	10.5.50.48	HS8	bound
D	10.5.50.52	74:C0:FB:CB:F4:CE	1:74:c0f...	dhcp_comp	10.5.50.52	HS9	bound
	10.5.50.29	10:78:D2:D5:3E:E4	1:10:78:d...	dhcp_comp	10.5.50.29	HS10	bound
	10.5.50.35	10:78:D2:D4:EE:AE	1:10:78:d...	dhcp_comp	10.5.50.35	HS11	bound
D	10.5.50.40	10:78:D2:D5:3F:08	1:10:78:d...	dhcp_comp	10.5.50.40	HS12	bound
	10.5.50.42	10:78:D2:D5:3E:9C	1:10:78:d...	dhcp_comp	10.5.50.42	HS14	bound
D	10.5.50.27	10:78:D2:D4:C2:97	1:10:78:d...	dhcp_comp	10.5.50.27	HS15	bound
	10.5.50.45	10:78:D2:D4:C5:DF	1:10:78:d...	dhcp_comp	10.5.50.45	HS16	bound
B	10.5.50.33	10:FF:2F:CF:FF:7F	1:10:ff:2f...	dhcp_comp		HS17	waiting
B	0.0.0.0	10:FF:2F:CF:FF:77	1:10:ff:2f...	dhcp_comp		HS17	waiting
D	10.5.50.49	10:F7:2F:CF:FF:77	1:10:f7:2f...	dhcp_comp	10.5.50.49	HS17	bound
D	10.5.50.50	00:80:AD:72:7E:2B	1:0:80:ad...	dhcp_comp	10.5.50.50	HS18	bound
	10.5.50.32	10:78:D2:D5:3F:2D	1:10:78:d...	dhcp_comp	10.5.50.32	HS19	bound
	10.5.50.30	10:78:D2:D4:ED:8C	1:10:78:d...	dhcp_comp	10.5.50.30	HS20	bound
	10.5.50.34	10:78:D2:D4:F2:6A	1:10:78:d...	dhcp_comp	10.5.50.34	HS23	bound
D	10.5.50.47	10:78:D2:D5:3E:E3	1:10:78:d...	dhcp_comp	10.5.50.47	HS24	bound
	10.5.50.24	10:78:D2:D4:C3:D7	1:10:78:d...	dhcp_comp	10.5.50.24	HS25	bound
	10.5.50.146	10:FF:C3:FE:FE:CA	1:10:ff:c3...	dhcp_comp		HS27	waiting
D	10.5.50.51	10:FF:32:FF:FE:EA	1:10:ff:32...	dhcp_comp	10.5.50.51	HS27	bound

695 items (1 selected)

# DHCP SERVER LEASE

DHCP server lease submenu is used to monitor and manage server's leases.

Sub-menu: `/ip dhcp-server lease`

# DHCP SERVER LEASE

## Options:

- Assign IP
- Bind IP to MAC Address
- Client ID
- Assign Server
- Lease Time
- Block Access
- Always Broadcast
- DHCP Options
- Rate Limit
- Queue
- Address List

The screenshot shows a DHCP Server configuration window with the following fields and options:

- General** tab is selected.
- Active** status is indicated.
- Address:** 10.5.50.48
- MAC Address:** AA:DC:FE:FE:EF:69
- ☒ **Use Src. MAC Address**
- Client ID:** 1:aa:dc:fe:fe:ef:69
- Server:** dhcp\_comp
- Lease Time:** (empty field)
- ☐ **Block Access**
- ☐ **Always Broadcast**
- DHCP Options:** (empty field)
- DHCP Option Set:** (empty field)
- Rate Limit:** 512k/2M
- Insert Queue Before:** first
- Address List:** Computer Lab

Buttons on the right side of the window:

- OK
- Cancel
- Apply
- Disable
- Comment
- Copy
- Remove
- Check Status



# DYNAMIC TO STATIC

- Double click on any dynamically assigned IP to view the DHCP Lease options.

DHCP Server

DHCP

Networks

Leases

Options

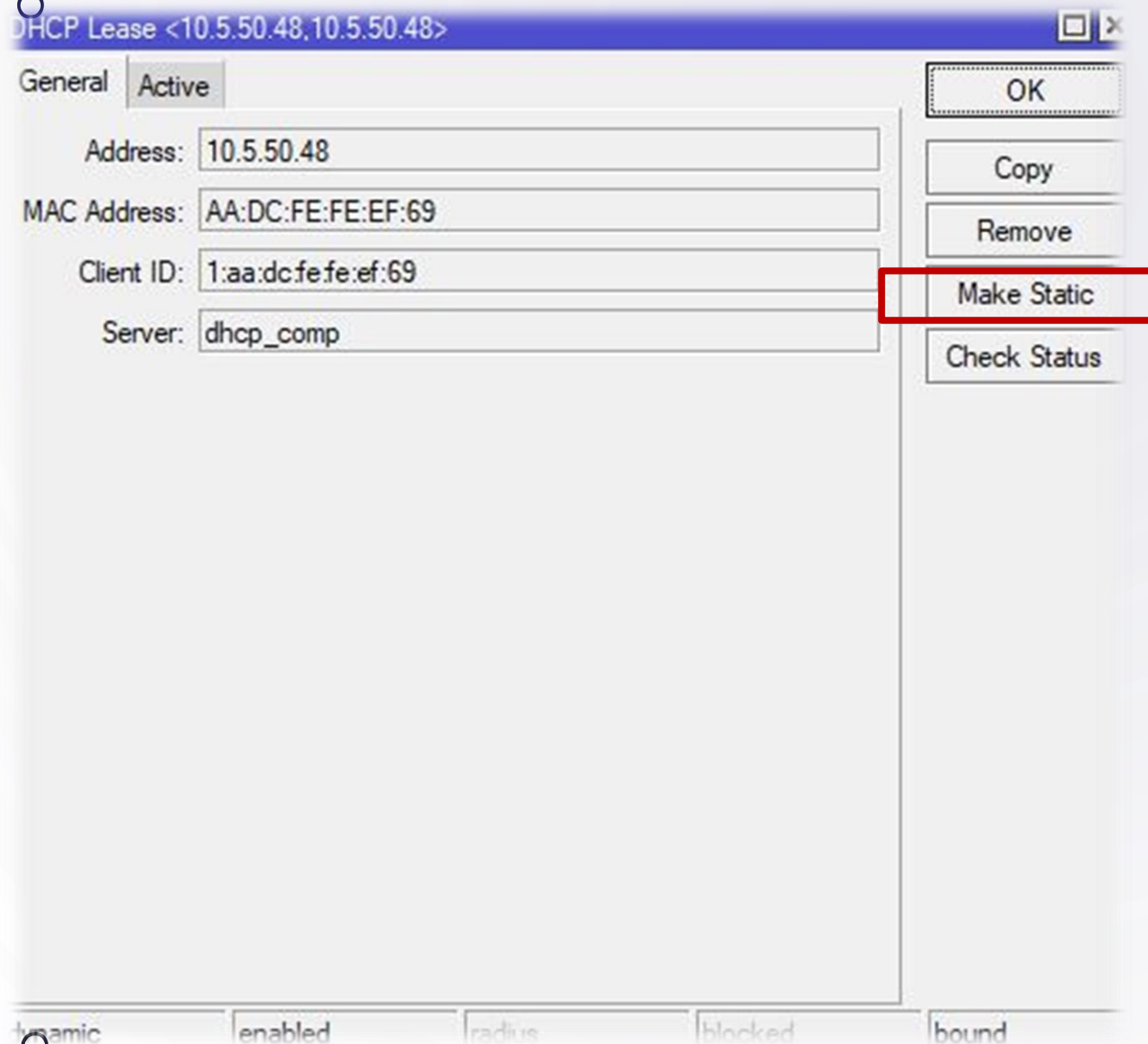
Option Sets

Alerts

Check Status

	Address	MAC Address	Client ID	Server	Active Address
	10.5.50.143	10:78:D2:D4:F0:32	1:10:78:d...	dhcp_comp	10.5.50.143
	10.5.50.22	10:78:D2:D4:F1:DF	1:10:78:d...	dhcp_comp	10.5.50.22
	10.5.50.37	10:78:D2:D4:EF:02	1:10:78:d...	dhcp_comp	10.5.50.37
	10.5.50.44	10:78:D2:D4:C4:44	1:10:78:d...	dhcp_comp	10.5.50.44
	10.5.50.147	FA:DC:FE:FE:EB:69	1:fa:dc:fe...	dhcp_comp	
	10.5.50.36	AA:DC:FE:FE:EB:...	1:aa:dc:f...	dhcp_comp	
D	10.5.50.48	AA:DC:FE:FE:EF:69	1:aa:dc:f...	dhcp_comp	10.5.50.48
D	10.5.50.52	74:C0:FB:CB:F4:CE	1:74:c0:f...	dhcp_comp	10.5.50.52
	10.5.50.29	10:78:D2:D5:3E:E4	1:10:78:d...	dhcp_comp	10.5.50.29





- Click Make Static.
- Close the DHCP Lease window and re-open it again.

DHCP Lease <10.5.50.48,10.5.50.48>

General Active

Address: 10.5.50.48

MAC Address: AA:DC:FE:FE:EF:69

☒ Use Src. MAC Address

Client ID: 1:aa:dc:fe:fe:ef:69

Server: dhcp\_comp

Lease Time:

☐ Block Access

☐ Always Broadcast

OK

Cancel

Apply

Disable

Comment

Copy

Remove

Check Status

- Type the IP address that will be assigned to the client.
- Tick the box of Use Src. MAC Address to bind the IP to the MAC Address

# ADDING RATE LIMIT

- Type the desired bandwidth limit on the Rate Limit field.

Example:  
512k Upload  
2M Download

DHCP Lease <10.5.50.48,10.5.50.48>

General Active

Address: 10.5.50.48

MAC Address: AA:DC:FE:FE:EF:69

☒ Use Src. MAC Address

Client ID: 1:aa:dc:fe:fe:ef:69

Server: dhcp\_comp

Lease Time:

☐ Block Access

☐ Always Broadcast

DHCP Options:

DHCP Option Set:

Rate Limit: 512k/2M

Insert Queue Before: first

OK

Cancel

Apply

Disable

Comment

Copy

Remove

Check Status

# ADDING RATE LIMIT

The image shows two screenshots from Mikrotik WinBox. The left screenshot displays the 'Queue List' window with the 'Simple Queues' tab selected. A table lists various queues, with the last entry '0 D dhcp<AA:DC:FE:FE:EF:69/1:aa:dc:fe:fe:ef:69/dhcp\_comp>' highlighted. The right screenshot shows the configuration for this selected queue. The 'General' tab is active, showing the queue name, target IP (10.5.50.48), and destination. The 'Advanced' tab shows rate limiting settings: Max Limit (512k upload, 2M download), Burst Limit (unlimited), Burst Threshold (unlimited), and Burst Time (0).

#	Name	Target
9	WP - FACULTY	10.10.7.0/
10	WP - LAB	10.10.1.0/
11	WP - LAB NEW	10.5.50.0/
12	WP - LOCAL	192.168.1.0/
14	WP - STUDENT	10.10.2.0/
15	WP - SYSTEM	10.10.0.0/
0 D	dhcp<AA:DC:FE:FE:EF:69/1:aa:dc:fe:fe:ef:69/dhcp_comp>	10.5.50.48

40 items (1 selected) | 0 B queued | 0 packets queued

**Simple Queue <dhcp<AA:DC:FE:FE:EF:69/1:aa:dc:fe:fe:ef:69/dhcp\_comp>>**

General | Advanced | Statistics | Traffic | Total | Total Statistics

Name: dhcp<AA:DC:FE:FE:EF:69/1:aa:dc:fe:fe:ef:69/dhcp\_comp>  
Target: 10.5.50.48  
Dst.:

Max Limit: 512k (Target Upload) 2M (Target Download)

Burst Limit: unlimited (Target Upload) unlimited (Target Download)

Burst Threshold: unlimited (Target Upload) unlimited (Target Download)

Burst Time: 0 (Target Upload) 0 (Target Download)

Buttons: OK, Copy, Remove, Reset Counters, Reset All Counters, Torch

- It will be automatically be added on the Queue List

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The screenshot shows the 'Queue List' window in Wireshark. The 'Simple Queues' tab is active. The queue list contains the following entries:

#	Name	Target
9	WP - FACULTY	10.10.7.0/
10	WP - LAB	10.10.1.0/
11	WP - LAB NEW	10.5.50.0/
12	WP - LOCAL	192.168.1.0/
14	WP - STUDENT	10.10.2.0/
15	WP - SYSTEM	10.10.0.0/
0 D	dhcp<AA:DC:FE:FE:EF:69/1:aa:dc:fe:fe:ef:69/dhcp_comp>	10.5.50.48

The status bar at the bottom shows: 40 items (1 selected), 0 B queued, and 0 packets queued.

Simple Queue <dhcp<AA:DC:FE:FE:EF:69/1:aa:dc:fe:fe:ef:69/dhcp\_comp>>

General Advanced Statistics Traffic Total Total Statistics

Name: dhcp<AA:DC:FE:FE:EF:69/1:aa:dc:fe:fe:ef:69/dhcp

Target: 10.5.50.48

Dst.:

Target Upload Target Download

Max Limit: 512k 2M

Burst

Burst Limit: unlimited unlimited

Burst Threshold: unlimited unlimited

Burst Time: 0 0

Time

OK

Copy

Remove

Reset Counters

Reset All Counters

Torch

- It will be automatically be added on the Queue List



# ASSIGN ADDRESS LIST

- Type a name/group where the client device will be assigned.

DHCP Lease <10.5.50.48,10.5.50.48>

General Active

Address: 10.5.50.48

MAC Address: AA:DC:FE:FE:EF:69

☒ Use Src. MAC Address

Client ID: 1:aa:dc:fe:fe:ef:69

Server: dhcp\_comp

Lease Time:   
☐ Block Access  
☐ Always Broadcast

DHCP Options:   
DHCP Option Set:   
Rate Limit: 512k/2M  
Insert Queue Before: first

Address List: Computer Lab

OK  
Cancel  
Apply  
Disable  
Comment  
Copy  
Remove  
Check Status

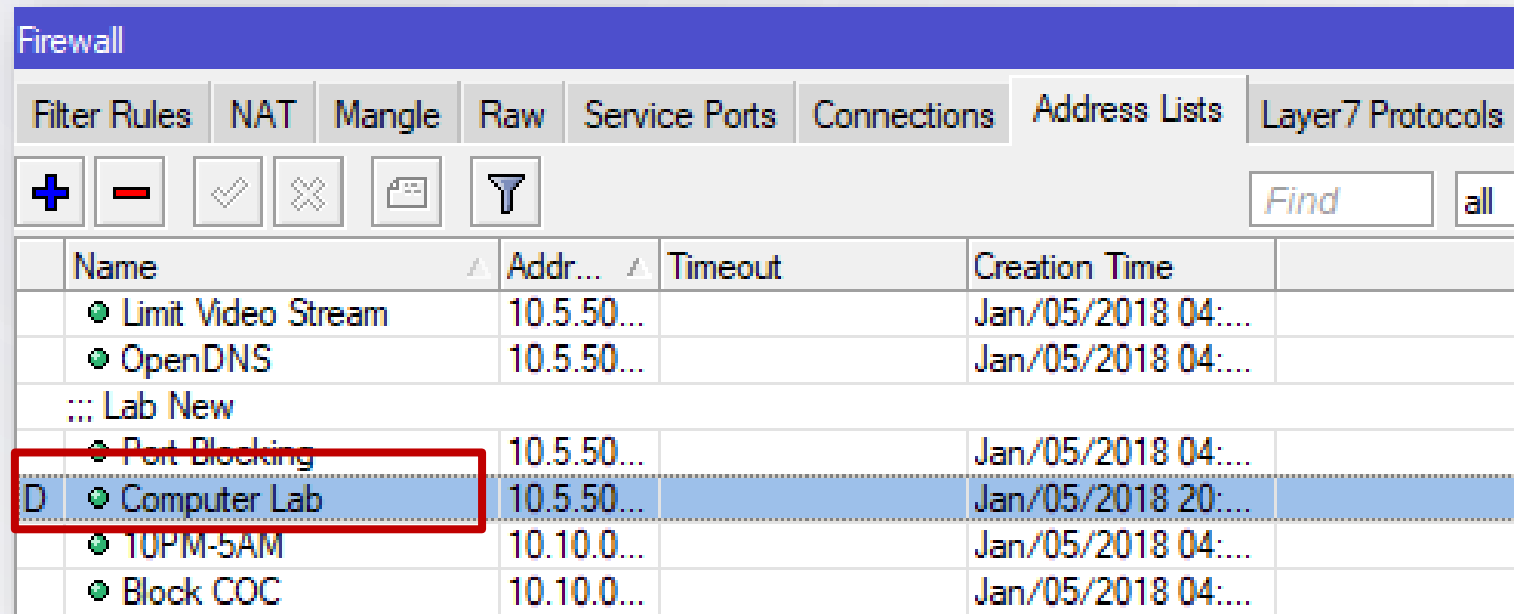
enabled radius blocked bound

# ASSIGN ADDRESS LIST

- It will automatically be added in the Address list which can be used in creating filter rules.

Example:

Filter Rules for Computer Lab Internet Hours

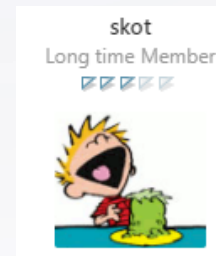
The screenshot shows the Mikrotik WinBox interface with the 'Firewall' menu open and the 'Address Lists' tab selected. A table lists several address lists. The 'Computer Lab' entry is highlighted with a blue background and a red rectangular box around it. The table has columns for Name, Address, Timeout, and Creation Time. Other entries include 'Limit Video Stream', 'OpenDNS', 'Port Blocking', '10PM-5AM', and 'Block COC'.

Name	Addr...	Timeout	Creation Time
Limit Video Stream	10.5.50...		Jan/05/2018 04:...
OpenDNS	10.5.50...		Jan/05/2018 04:...
Lab New			
Port Blocking	10.5.50...		Jan/05/2018 04:...
D Computer Lab	10.5.50...		Jan/05/2018 20:...
10PM-5AM	10.10.0...		Jan/05/2018 04:...
Block COC	10.10.0...		Jan/05/2018 04:...

# SCRIPT: EXTRACTING LEASES

This script will help you extract the necessary information from the lease that you want to include in your CSV file.

```
/ip dhcp-server lease :foreach i in=[find] do={ :put ([get $i address].",".[get $i mac-address].",".[get $i client-id].",".[get $i server])) }
```




BIG THANKS to **skot** for this  
post contribution @ Mikrotik Forum

# SCRIPT: EXTRACTING LEASES

```
@SCT RB1100AHx2 Main Router] /ip dhcp-server lease> :foreach i in=[find] do={ :put {[get $i  
active-address      address-lists      blocked      disabled      last-seen      server  
active-client-id    agent-circuit-id  client-id     dynamic        lease-time      src-mac-address  
active-mac-address  agent-remote-id  comment       expires-after   mac-address      status  
active-server       always-broadcast dhcp-option    host-name       radius           use-src-mac  
address             block-access     dhcp-option-set insert-queue-before rate-limit      value-name
```

`/ip dhcp-server lease> :foreach I in=[find] do=( :put {[get $I`



Note: Typing this script and pressing  will show the available options that you may include in the command.



# SCRIPT: EXTRACTING LEASES

Here is the script if we want to extract the list of block-access client with client-id and dhcp-server included

```
:foreach i in=[find] do={ :put ([get $i block-access].",".[get $i  
client-id].",".[get $i server]) }
```

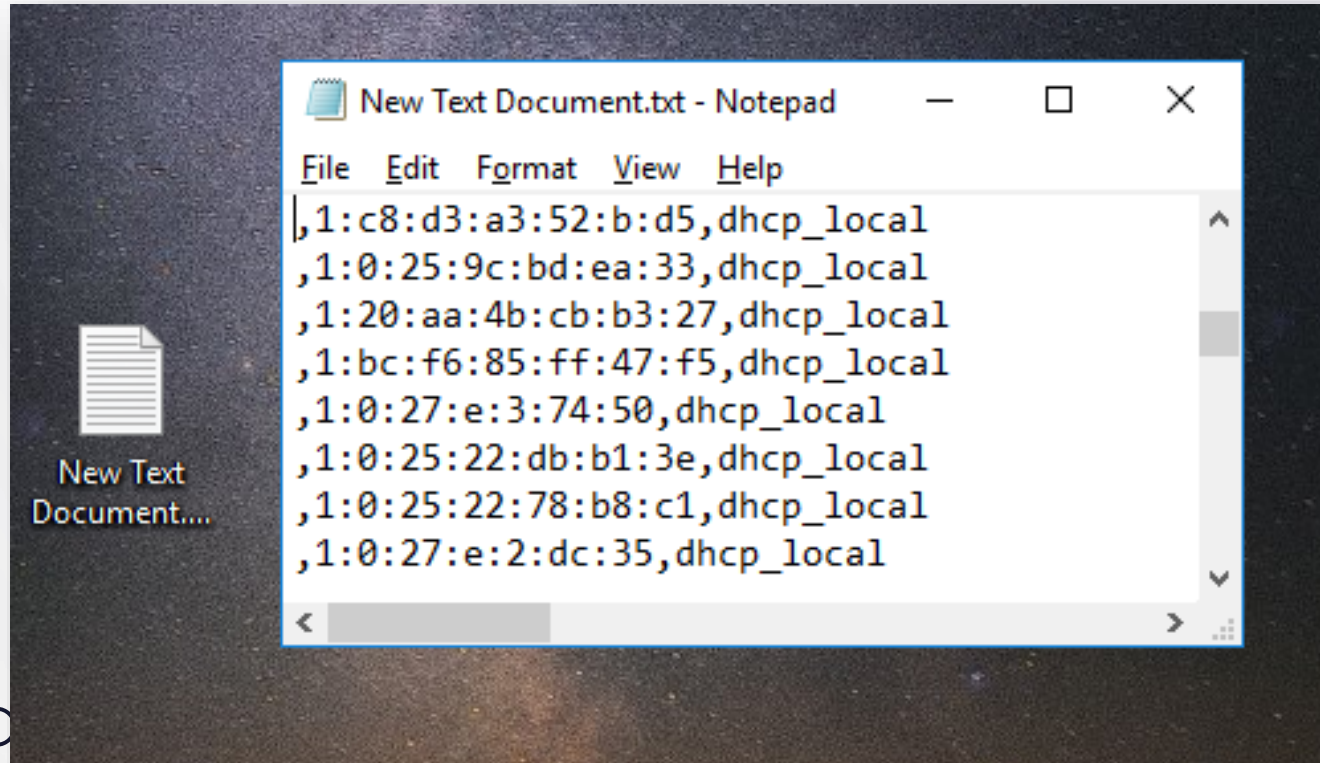
# SCRIPT: EXTRACTING LEASES

```
@SCT RB1100AHx2 Main Router] /ip dhcp-server lease> :foreach i in=[find] do={ :put ([get $i block-access].",". [get $i client-id].",". [get $i server]) }  
,1:78:54:2e:a1:ca:7f,dhcp_local  
,1:c8:d3:a3:52:b:d5,dhcp_local  
,1:0:25:9c:bd:ea:33,dhcp_local  
,1:20:aa:4b:cb:b3:27,dhcp_local  
,1:bc:f6:85:ff:47:f5,dhcp_local  
,1:0:27:e:3:74:50,dhcp_local  
,1:0:25:22:db:b1:3e,dhcp_local  
,1:0:25:22:78:b8:c1,dhcp_local
```

- Highlight the extracted information and copy paste it in a text file in your desktop.

```
,1:f0:3:8c:26:a1:63,dhcp_faculty  
,1:cc:b0:da:8e:9:93,dhcp_faculty  
,1:78:fd:94:bb:8d:39,dhcp_library  
,1:0:26:82:10:b6:59,dhcp_local  
,,dhcp_ceit  
,1:c:d2:92:73:f7:21,dhcp_library  
,1:40:b8:37:c1:f2:b2,dhcp_faculty  
,1:c:8f:ff:83:b8:1c,dhcp_faculty  
,1:40:b8:37:c1:f2:b2,dhcp_local  
,1:b8:86:87:db:51:f3,dhcp_ceit  
,1:c8:38:70:83:86:15,dhcp_library  
,,dhcp_local  
,1:f8:d0:bd:1:68:3e,dhcp_local  
,,dhcp_faculty
```

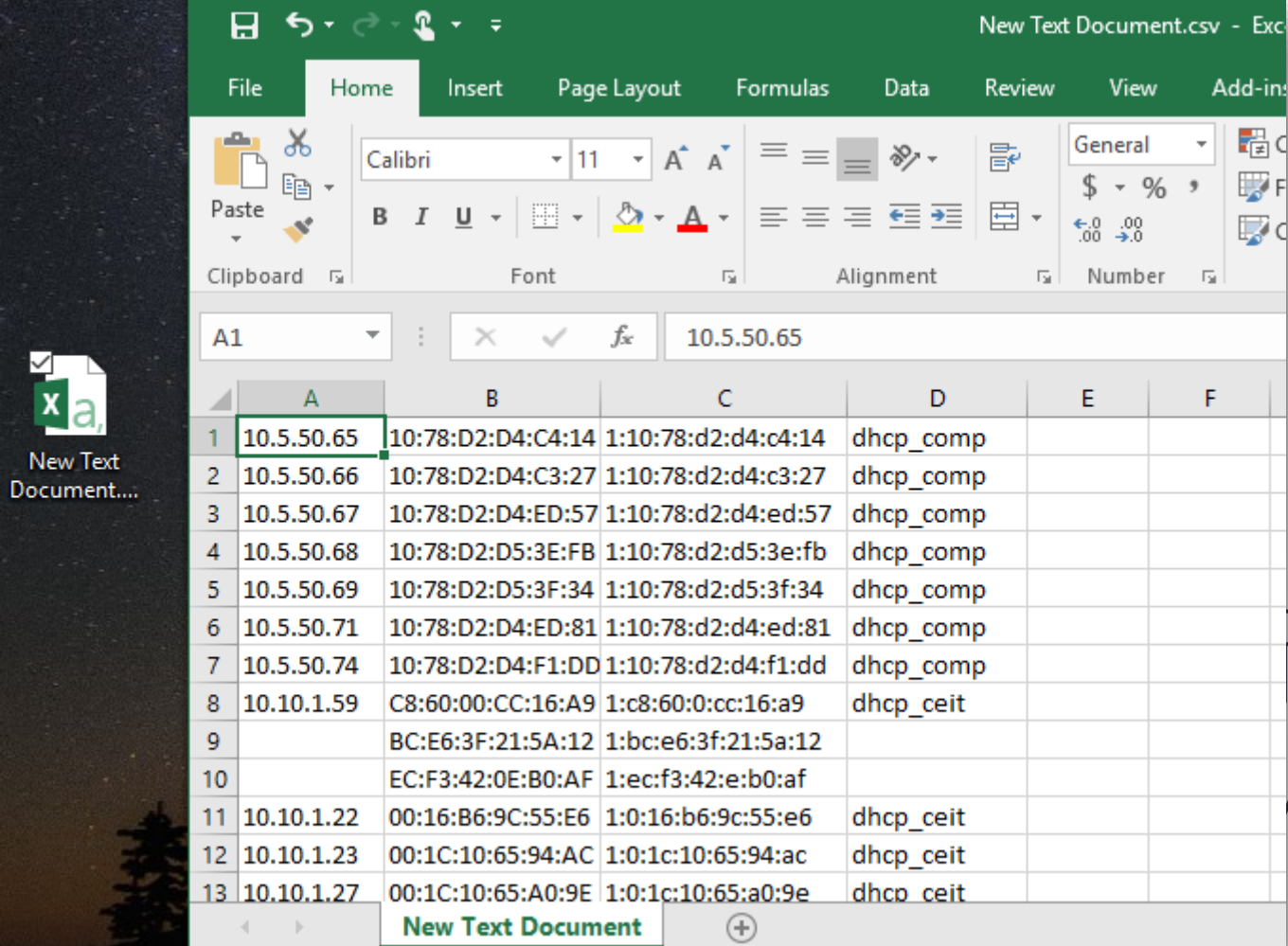
# SCRIPT: EXTRACTING LEASES



- Create a text file in your desktop.
- Copy paste the extracted fields from the terminal.

# SCRIPT: EXTRACTING LEASES

- Change the extension name to CSV. Open the CSV file.
- You successfully extracted the list in your desktop



	A	B	C	D	E	F
1	10.5.50.65	10:78:D2:D4:C4:14	1:10:78:d2:d4:c4:14	dhcp_comp		
2	10.5.50.66	10:78:D2:D4:C3:27	1:10:78:d2:d4:c3:27	dhcp_comp		
3	10.5.50.67	10:78:D2:D4:ED:57	1:10:78:d2:d4:ed:57	dhcp_comp		
4	10.5.50.68	10:78:D2:D5:3E:FB	1:10:78:d2:d5:3e:fb	dhcp_comp		
5	10.5.50.69	10:78:D2:D5:3F:34	1:10:78:d2:d5:3f:34	dhcp_comp		
6	10.5.50.71	10:78:D2:D4:ED:81	1:10:78:d2:d4:ed:81	dhcp_comp		
7	10.5.50.74	10:78:D2:D4:F1:DD	1:10:78:d2:d4:f1:dd	dhcp_comp		
8	10.10.1.59	C8:60:00:CC:16:A9	1:c8:60:0:cc:16:a9	dhcp_ceit		
9		BC:E6:3F:21:5A:12	1:bc:e6:3f:21:5a:12			
10		EC:F3:42:0E:B0:AF	1:ec:f3:42:e:b0:af			
11	10.10.1.22	00:16:B6:9C:55:E6	1:0:16:b6:9c:55:e6	dhcp_ceit		
12	10.10.1.23	00:1C:10:65:94:AC	1:0:1c:10:65:94:ac	dhcp_ceit		
13	10.10.1.27	00:1C:10:65:A0:9E	1:0:1c:10:65:a0:9e	dhcp ceit		



# THANK YOU AND ENJOY A HAPPY MUM PH 2018

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