

Meraki - Implementation of RingCentral Layer3 Firewall and Traffic Shaping Rules Using API Client

Rev 1.2

April 11, 2022

Tim McKee

Proper implementation of RingCentral Layer3 Firewall rules, as of the date/time this document was written, requires manually keying in 38 rules for each appliance template or appliance network. Implementation of the Traffic Shaping rules requires manually keying in 4 rules with 55 match conditions for each appliance template or appliance network. This task quickly becomes overwhelming and is quite error-prone; thus, it was determined that an API client was needed to perform the detailed, repetitive work.

A Python client has been developed which interfaces with the Meraki dashboard API to manage the RingCentral rules. It allows separate management of the Layer3 and Traffic Shaping rules and it allows for automated rule removal. This client dynamically updates the rules by downloading a JSON file from the RingCentral Custom Engineering Lab site every time it is run.

Please note: This is a **terminal based** client. It IS NOT a GUI based client.

INSTALLATION

You must install an operational PYTHON3 environment on your management computer, which is beyond the scope of this document. Instructions for installing PYTHON3 are readily available online. Once PYTHON3 is installed, you must use the python3 'pip' utility to install the following python modules:

- meraki
- re
- sys
- json
- config
- pprint
- requests

Once your PYTHON3 environment is established, you should download the RingCentral / Meraki API code from the website <https://www.celab.ringcentral.com>. As of this writing, the zipfile is named Meraki-1-2.zip. Using a terminal client, create an 'rc-meraki' directory/folder. Unzip the contents of the zipfile into this directory. There are no subdirectories created.

MERAKI API KEY

You must have your Meraki Dashboard API key available to proceed. If you do not have one, log into the Meraki Dashboard site and click on your username in the upper right corner. Select 'My Profile'. Partway down the page is the section named 'API access'. You may use the 'Generate new API key' button to create a new API key locked to your account. Please note that it will display the 40 character hexadecimal API key EXACTLY ONE TIME. You must copy it and save it somewhere securely. There is NO WAY to recover it – you must revoke it and generate a new one if it is lost or compromised.

The screenshot shows the 'Two-factor authentication' section with 'SMS authentication is OFF' and a 'Set up two-factor authentication' button. Below that is the 'API access' section, which contains a table of API keys. The table has columns for 'Key', 'Created at', and 'Last used'. A single key is listed with a red 'Revoke' button next to it. Below the table is a 'Generate new API key' button. At the bottom, there is a 'Color blind assist mode (ON - Red/Green)' section with a 'Disable' button.

Key	Created at	Last used
*****7db3	Mar 21 2022 18:18 UTC	Apr 08 2022 14:39 UTC

OPERATION

Open a terminal window, PowerShell window, or CMD window and change directories to the 'rc-meraki' directory/folder that you created upon installation. There are 3 files present, a config.py file, an rc_rules.json (a cached version of the RingCentral rulesets), and rc-l3-ts.py (the client program). You may or may not see an additional file named `__pycache__` depending on your operating system and python build.

```
tim@tim-mate-21-10:~/Desktop/Meraki-working-dev$ ls -l
total 20
-rw-rw-r-- 1 tim tim 637 Apr 6 16:28 config.py
drwxrwxr-x 2 tim tim 3 Apr 7 11:23 __pycache__
-rwxrwxr-x 1 tim tim 16326 Apr 8 10:53 rc-l3-ts.py
-rw-rw-r-- 1 tim tim 20035 Apr 8 10:39 rc_rules.json
tim@tim-mate-21-10:~/Desktop/Meraki-working-dev$
```

You may take the 'convenient' approach and store the API key in the config.py file if your security folks allow it. If you do this, you will not be prompted for it when the client is started.

Start the client by entering './rc-l3-ts.py', 'python3 rc-l3-ts.py', or whatever mechanism your computer requires to start a python3 script. You will not be prompted for the API key if you stored it in the config.py file, otherwise you must enter it.

```
tim@tim-mate-21-10:~/Desktop/Meraki-working-dev$ ./rc-l3-ts.py

#####
#
# Add Traffic Shaping Rules and/or Layer3 Firewall Rules
# to Meraki appliances and appliance templates.
#
# Specific to RingCentral Services as of March 30, 2022
#
# API Client Version 1.2 | 2022-04-07 by Tim McKee
#
#####

Enter API key for Meraki dashboard login (blank or q to quit):
```

Once you enter a valid API key, the client will query the Meraki dashboard system and obtain a list of Organizations to which your login has administrative management rights. In most cases there will only be one organization associated with your account and the client will automatically select that organization as shown below:

```
Since you only have management rights for one organization
it has been automatically selected for you

=====
* Auto-selected 811429 (RingCentral) for use
=====
```

The client will query you as to what action should be taken for both the Layer3 Firewall ruleset and for the Traffic Shaping ruleset. Actions are taken on each type of ruleset individually. You may 'A'pply the ruleset, 'R'emove the ruleset, take 'N'o action on the ruleset, or 'Q'uit. For the Layer3 Firewall rules ONLY, selecting 'R'emove will result in a query as to whether you wish to delete *all* rules or just the RingCentral Firewall rules. The client will access the RingCentral repository site and, if needed, prompt you to download an updated ruleset. You may update the ruleset *in place* by simply selecting to 'A'pply the rules. Note that the Layer3 Firewall rules can be updated while retaining the existing non-RingCentral rules whereas the Traffic Shaping rules will be replaced in their entirety, losing any non-RingCentral rules.

```

Take what action with RingCentral Layer 3 Firewall Rules ?
Select type of action: Enter 'None', 'Apply', 'Remove', or 'Quit': a

Take what action with RingCentral Traffic Shaping Rules ?
Select type of action: Enter 'None', 'Apply', 'Remove', or 'Quit': a

Layer3 Firewall Action is Apply

Traffic Shaping Action is Apply

Checking cached rules against RingCentral repository...
Accessed repository successfully.

Processing rules using version 20220407

```

Once the ruleset actions have been selected, the client will prompt you to select the Appliance Templates and Appliance Networks on which the actions will be performed. Appliance Networks that are bound to an Appliance Template will not be listed separately.

```

There are 2 appliance templates in this organization.
*=====
1) Template: BasicTemplate - appliance | ID: N_647955396388017847   Bound to : 0 Appliances
2) Template: TP_SITE | ID: L_647955396387979321   Bound to : 1 Appliances
*=====

Select template index number (1 - 2 or 0 when finished): 2
Select template index number (1 - 2 or 0 when finished): 0

There are 3 unbound appliance networks in this organization.
*=====
1) Network: CLT - appliance | ID: N_647955396387956671
2) Network: Hub-2 | ID: N_647955396388090776
3) Network: Hub-1 | ID: N_647955396388091175
*=====

Select appliance network index number (1 - 3 or 0 when finished): 2
Select appliance network index number (1 - 3 or 0 when finished): 3
Select appliance network index number (1 - 3 or 0 when finished): 0

```

You will be prompted to confirm that you really want to perform the actions.

```

=====
Continue and perform the requested actions on the selected templates/networks ? (Y/N): y

Working on Layer3 for network L_647955396387979321
Working on Layer3 for network N_647955396388090776
Working on Layer3 for network N_647955396388091175

Working on Traffic Shaping for network L_647955396387979321
Working on Traffic Shaping for network N_647955396388090776
Working on Traffic Shaping for network N_647955396388091175

Requested Actions **Completed** - Goodbye!

```

You are now done with Layer3 Firewall rules and Traffic Shaping rules.