

Lenovo Network

Python Programming Guide

For Cloud Network Operating System 10.1

LenovoTM

Note: Before using this information and the product it supports, read the general information in the *Safety information and Environmental Notices and User Guide* documents on the *Lenovo Documentation CD* and the *Warranty Information* document that comes with the product.

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Chapter 1. Preface

The *Lenovo Network OS™ 10.1 Python Programming Guide for the RackSwitch G8272* describes how to configure and use the Cloud Network Operating System 10.1 software on the RackSwitch G8272 (referred to as G8272 throughout this document). For documentation on installing the switch physically, see the *Installation Guide* for your G8272.

Who Should Use This Guide

This guide is intended for network installers and system administrators engaged in configuring and maintaining a network. The administrator should be familiar with Ethernet concepts, IP addressing, Spanning Tree Protocol, and SNMP configuration parameters.

Additional References

Additional information about installing and configuring the G8272 is available in the following guides:

- *Lenovo RackSwitch G8272 Installation Guide*
- *Lenovo Network Application Guide for Lenovo Cloud Network Operating System 10.1*
- *Lenovo Network Command Reference for Lenovo Cloud Network Operating System 10.1*

Terminology

In every programming endeavor, terminology is used in a slightly different manner in different environments.

Following is a list of the terminology used in this guide.

Table 1. *Terminology Used in This Guide*

Term	Description
Function	Lists an action and associated arguments, for example: <code>python_get_vlan(<i>vid</i>)</code>
Function Arguments	Objects passed to a function when it is called inside a script or in the Python interpreter
N/OS Python API	Extensions to the Python library provided by Lenovo
Python scheduler	An engine to run scripts when specified events occurs.
Script Arguments	Strings passed to a script at run time

Typographic Conventions

The following table describes the typographic styles used in this book.

Table 2. *Typographic Conventions*

Typeface or Symbol	Meaning	Example
ABC123	This type is used for names of commands, files, and directories used within the text. It also depicts on-screen computer output and prompts.	View the <code>readme.txt</code> file. Main#
ABC123	This bold type appears in command examples. It shows text that must be typed in exactly as shown.	Main# sys
<ABC123>	This italicized type appears in command examples as a parameter placeholder. Replace the indicated text with the appropriate real name or value when using the command. Do not type the brackets. This also shows book titles, special terms, or words to be emphasized.	To establish a Telnet session, enter: host# telnet <i><IP address></i> Read your <i>User's Guide</i> thoroughly.
[]	Command items shown inside brackets are optional and can be used or excluded as the situation demands. Do not type the brackets.	host# ls [-a]
	The vertical bar () is used in command examples to separate choices where multiple options exist. Select only one of the listed options. Do not type the vertical bar.	host# set left right
AaBbCc123	This block type depicts menus, buttons, and other controls that appear in Web browsers and other graphical interfaces.	Click the Save button.

Chapter 2. Introduction to Python Scripting

The Lenovo Cloud Network Operating System (CNOS) version 10.1 Python function API is a set of libraries of API functions that are embedded into the Lenovo RackSwitch G8272 Command-Line Interface (CLI) to support script execution.

About Python

Python is a widely used general-purpose, high-level programming language. Its design philosophy emphasizes code readability, and its syntax allows programmers to express concepts in fewer lines of code than would be possible in other languages. The language provides constructs intended to enable clear programs on both a small and large scale. Like other dynamic languages, Python is often used as a scripting language, but is also used in a wide range of non-scripting contexts.

Python is supported by the Python Software Organization, which is open source with an active user community. Python provides comprehensive set of libraries that includes many built-in modules and the ability to write scripts and functional extensions. Organizations from NASA to gaming and data security companies use Python for development. Python version 2.7 is installed on the G8272 version 10.1.

About CNOS Python

Lenovo's CNOS Python API library extends the standard Python library with functions that allow you to write your own scripts to manage your switch.

CNOS Python comes with the following features:

- Automated switch provision and management
- The ability to perform switch monitoring tasks
- Automatic G8272 firmware update
- Automatic configuration file generation
- Notifications sent to users via email or system logger (syslog) messages

You can schedule CNOS Python scripts to run either at startup or when an event occurs. These scripts can send configuration and display commands to the G8272, save variables, and send system log messages. [Chapter 3, "Running Python Scripts via the ISCLI,"](#) contains information about how to run CNOS Python scripts in real time. [Chapter 5, "Using the CNOS Python Scheduler,"](#) explains how to schedule a script to run when an event occurs.

Chapter 3. Running Python Scripts via the ISCLI

The most straightforward method to run a script on the RackSwitch G8272 is to execute it directly:

```
G8272# python <script filename> [arguments list]
```

The script will be run in the foreground. You can use **Ctrl+C** to stop the script execution.

For information about transferring scripts to the G8272, see [Chapter 3, “Managing Scripts](#).

Running a Basic Script

The following is an example of a simple “Hello World!” script:

```
G8272#  
G8272# display script helloWorld.py  
  
print "Hello world!"  
  
G8272# python helloWorld.py  
Hello world!  
G8272#
```

Running a Basic Script with Arguments

The following is an example of a basic script with arguments:

```
G8272# display script scriptWithArgs.py  
import sys  
  
for i in range(1, len(sys.argv)):  
    print "Argument {0} is: {1}".format(i, sys.argv[i])  
  
G8272# python scriptWithArgs.py 2 secondArgument 3rdArgument  
Argument 1 is: 2  
Argument 2 is: secondArgument  
Argument 3 is: 3rdArgument  
G8272#
```

Entering and Exiting the Python Shell

You can enter the Python shell, the interactive mode of the Python interpreter, directly via the ISCLI `python` command. After entering the Python shell, you can get the online help for each Python API function and test it before calling it in your script.

Note: You must be a privileged administrator to use the Python shell,

To enter the Python shell, enter **python** at the switch command prompt.

```
G8272# python
>>>
```

To exit the Python shell, enter **exit ()** or press **Ctrl+D** (end of file).

Chapter 4. Managing Python Scripts

Script files are saved in persistent storage on the G8272, while the script log files are saved to volatile storage. The maximum storage for script files is 2.8 M bytes.

Lenovo Cloud Network Operating System (CNOS) for the G8272 provides the following managing actions on scripts:

- [Downloading a Script from a TFTP Server](#)
- [Uploading a Script to a TFTP Server](#)
- [Editing a Script Directly on the G8272](#)
- [Deleting a Script](#)
- [Viewing A List of Script Files](#)
- [Viewing Script File Content](#)
- [Viewing Configured Scheduler Jobs](#)

Downloading a Script from a TFTP Server

To download a TFTP script, use the following command:

```
G8272# cp tftp tftp://<IPv4 address>/<remote script> obs <local script>
```

where:

Parameter	Description
<i>IPv4 address</i>	The IPv4 address of the TFTP server.
<i>remote script</i>	The path and filename of the remote script.
<i>local script</i>	The filename for the script on the switch.

Uploading a Script to a TFTP Server

To upload a script to a TFTP server, use the following command:

```
G8272# cp obs <local script> tftp tftp://<IPv4 address>/<remote script path>
```

where:

Parameter	Description
<i>IPv4 address</i>	The IPv4 address of the TFTP server.
<i>local script</i>	The filename for the script on the switch.
<i>remote script</i>	The path and filename of the remote script.

Editing a Script Directly on the G8272

To create or edit a script directly on the G8272, use the following command:

```
G8272# edit script <script filename>
```

where *script filename* is the name of your script.

Deleting a Script

To delete a script, use the following command:

```
G8272# no script <script filename>
```

where *script filename* is the name of your script.

To delete all Python scripts, use the following command:

```
G8272# no script all
```

Viewing A List of Script Files

To view a list of script files, use the following command:

```
G8272# display script
```

Viewing Script File Content

To view a script file, use the following command

```
G8272# display script <script filename>
```

Viewing Configured Scheduler Jobs

To view the scheduler jobs configured on the G8272, use the following command:

```
G8272# display script-job [<script filename>]
```

where *script filename* is the name of your script. To view all scheduler jobs, use the command without a script filename.

Running jobs will be displayed in the running configuration display.

For more information about scheduling CNOS Python scripts, see [Chapter 5, “Using the CNOS Python Scheduler.”](#)

Chapter 5. Using the CNOS Python Scheduler

The Lenovo Cloud Network Operating System scheduler's main responsibility is to provide a programmatic mechanism to run Python scripts when specified events occur. These events are defined by RackSwitch G8272 administrators and can be triggered by a timer, which is aligned to the `crond` service.

You can schedule scripts to run as a response to an event using scheduler jobs and monitor the script execution.

Using the Python Scheduler

The CNOS Python scheduler is an engine that can run Python scripts at specified times or intervals, similar to the UNIX-based `crontab` utility.

Creating a Scheduled Python Job

To create a job that runs a Python script at a scheduled time, use the command:

```
G8272(config)# script-job <Python script> [<arguments>] time <time parameter>
```

where:

Parameter	Description
<i>Python script</i>	The name of the Python script.
<i>arguments</i>	Any arguments the script needs.
<i>time parameter</i>	When the script is to be run.

The following time parameters are available:

Parameter	Description
<i>Crontab format</i>	Run a script periodically, in the format of the UNIX <code>crontab</code> utility. See <code>xx</code> for more information on this argument.
<i>daily</i>	Run once a day at 12:00:01 AM.
<i>hourly</i>	Run once an hour at the beginning of the hour.
<i>monthly</i>	Run once a month at 12:00:01 AM the first day of the month.
<i>reboot</i>	Run at startup.
<i>weekly</i>	Run once a week at 12:00:01 AM Sunday.
<i>yearly</i>	run once a year at 12:00:01 AM on January 1.

For example, to create a job to run the Python script `myScript.py` with arguments "1 2 3" on a daily basis, enter:

```
G8272(config)# script-job myScript.py "1 2 3" time daily
```

Using Crontab Format Arguments

The *Crontab format* date and time string uses the format:

<minute> <hour> <day of month> <month> <day of week>

where:

Parameter	Description
<i>minute</i>	An integer from 0-59.
<i>hour</i>	An integer from 0-23.
<i>day of month</i>	An integer from 1-31.
<i>month</i>	An integer from 1-12 or the three-letter abbreviation for the month: <ul style="list-style-type: none"> • Jan • Feb • Mar • Apr • May • Jun • Jul • Aug • Sep • Oct • Nov • Dec
<i>day of week</i>	An integer from 1-7 or the three-letter abbreviation for the day of the week: <ul style="list-style-type: none"> • Sun • Mon • Tues • Wed • Thu • Fri • Sat

An asterisk in place of any of these fields means “use all values from first to last.”

Note: All time values must be surrounded by quotation marks.

For example, to run the Python script `myScript.py` with arguments “1 2 3” every July 4th at 10:55 AM, enter:

```
G8272(config)# script-job myScript.py "1 2 3" time "55 10 4 7 **"
```

You can use ranges for the numeric values, separating them with commas or using hyphens for sequential ranges, such as “1, 2, 5-9” or “0-4, 8-12”. For example, to run the Python script `myScript.py` with arguments “1 2 3” every July 4th-July 11th at 10:55 AM and 10:55 PM, enter:

```
G8272(config)# script-job myScript.py "1 2 3" time "55 10,22 4-11 7 **"
```

Note: Ranges or lists of month or day of week names are not allowed.

You can also specify step values or intervals using a slash (/). For example, to run the Python script `myScript.py` with arguments “1 2 3” every July 4th every two hours, enter:

```
G8272(config)# script-job myScript.py "1 2 3" time "0 */2 4 7 **"
```

Crontab format commands are executed when the minute, hour, and month of year fields match the *current* time, and when either the day of month or day of week match the current day.

Note: If you specify the day of a command's execution by both day of month and day of week, the command will be run when *either* field matches the current date and time. For example, the Crontab format date "30 4 1,15 * 5" would cause a command to be run at 4:30 AM on the 1st and 15th of each month *and* every Friday.

Deleting a Job

To delete a job, use the following command:

```
G8272(config)# no script-job <Python filename>
```

Monitoring a Running Job

To monitor a running job, use the following command:

```
G8272# display script running
```

Stopping a Running Job

To stop a running job:

1. :Check the list of running scripts:

```
G8272# display script running
Current running scripts:
1 myscript.py arg1 arg2
```

2. Copy the *exact* string from the list and use it as the argument for the following command

```
G8272# stop running-script "<argument>"
```

Using the output from [Step 1](#), the command would be:

```
G8272# stop running-script "myscript.py arg1 arg2"
```

Viewing Python Logs

To view a list of the log files created by OBS jobs, enter:

```
G8272# display script-log
```

To view an individual log file, enter:

```
G8272# display script-log <filename>
```

Creating Syslog Messages

Python scripts can send log messages to the system logger (syslog). These messages will be stored in the syslog repository and can be managed using the ISCLI commands.

System logs generated by a Python script have the same format as the current CNOS system log where the facility name is “PYRUN” and the mnemonic is “OBS”. The format is:

```
<timestamp> <hostname> %PYRUN-<SEVERITY>-OBS: [<LIB_NAME> | <THREAD_NAME>]  
Description [@function:line]
```

For example:

```
2014-08-15T04:50:33+00:00 switch %PYRUN-6-OBS: Message=I am a testing log  
from OBS
```

Chapter 6. Writing Python Scripts

This chapter describes script components, modules, and the API functions and arguments that you can use to create Python scripts to run on the RackSwitch G8272. Python API functions extend the standard Python library to provide configuration, management, and monitoring abilities. These are located in several Python modules.

Script Components

The CNOS Python API contains the following modules:

- `systemApi`: Functions that open and close an SMI client connect.
Note: You must import this module before importing anything else.
- `vlanApi`: Functions that configure VLAN properties.
- `lldpApi`: Functions that get and set LLDP configurations and LLDP interface configurations, and functions that get LLDP statistics and LLDP neighbor information.
- `lacpApi`: Functions that provide system and interface LACP configuration.
- `lagApi`: Classes and functions that configure LAGs and find information about LAGs and associated interfaces.
- `mstpApi`: Classes and functions that configure and get information about MSTP.
- `igmpApi`: classes and functions in this module manage Internet Group Management Protocol (IGMP) snooping.
- `ipApi`: Functions that manage IP addresses.
- `routeApi`: Functions that manage static routes.
- `vrrpApi`: Functions that manage Virtual Router Redundancy Protocol (VRRP).
- `arpApi`: Functions that manage Address Resolution Protocol (ARP).
- `vrfApi`: A function that manage Virtual Routing and Forwarding (VRF).
- `platformApi`: Functions that get and provide port information.

The following is a sample Python shell session:

```
G8272# python
>>> import systemApi
>>> systemApi.client_connect()
>>> systemApi.SystemInfo().get_systemInfo()
{'switch_type': 'G8272', 'fw_version': '10.1.0.0'}
>>> import lldpApi
>>> lldpApi.LldpNeighbor().python_lldp_get_all_neighbor()
[{'capability': 'BR', 'system name': 'Mars2', 'rx ttl': 120L, 'if_name':
'Ethernet1/8', 'system description': 'LENOVO RackSwitch G8272, LENOVO NOS
version 10.1.0.0'}]
>>> systemApi.client_disconnect()
>>> exit()
G8272#
```

Viewing Online Help

The Python API modules have built-in help. To obtain help on a particular module or class, enter:

```
>>> help(<module>[.<class>][.<function>])
```

For example, to get help on the `python_lldp_get_all_neighbor()` function from the previous example, enter the text shown in the following example::

```
>>> help(lldpApi.LldpNeighbor().python_lldp_get_all_neighbor)
Help on method python_lldp_get_all_neighbor in module lldpApi:

python_lldp_get_all_neighbor(self) method of lldpApi.LldpNeighbor
instance
  API's description: Get neighbor information of all ports
  Mandatory arguments: None
  Optional arguments: None
  Output: list of dictionaries of LLDP neighbor
  [
    {
      if_name(Str),
      capability(Int),
      rx ttl(Int),
      system name(Str),
      system description(Str)
    }
  ]
>>>
```

Python API Function Arguments

Python API functions have mandatory and optional arguments. Mandatory arguments must be set with correct types. Optional arguments will use their default values.

Python API functions can verify user arguments. The API functions can detect if mandatory arguments are missing or are in the incorrect type of mandatory arguments. If argument verification fails, it will report the error and not execute the API function.

Python API functions return useful information on either success or failure. For example: configuration API functions return `True` if the command is successful, and `False` if the command fails, and displays an error message. Query API functions return information from the G8272.

All Python API functions use keyword arguments.

Script Examples

This section contains a set of sample Lenovo Python API scripts.

ARP Configuration Example

This script demonstrates how to use the Python API to create and delete an Address Resolution Protocol (ARP) entry.

```
import sys

#Import python object APIs from modules
from systemApi import *
from ipApi import *
from arpApi import *

#Create class instance
ipobj = IP()
arpobj = ARP()

#Calling client_connect to establish the SMI client-server connection
client_connect()

#Make sure the interface is one routed interface
ipobj.unset_bridge_port('Ethernet1/1')

#Calling set_ip_addr defined in module ipApi to set IP address
ipobj.set_ip_addr('Ethernet1/1', '10.0.0.1/8', 0)

#Calling set_ip_arp defined in module arpApi to create ARP entry
arpobj.set_ip_arp('10.0.0.100', '0000.0000.0100', 'Ethernet1/1')
arpobj.set_ip_arp('10.0.0.101', '0000.0000.0101', 'Ethernet1/1')

#Calling get_all_static_arp_entry to check if ARP entry is created
successfully
print arpobj.get_all_static_arp_entry('Ethernet1/1')

#Calling delete_ip_arp defined in module arpApi to delete ARP entry
arpobj.delete_ip_arp('10.0.0.100', 'Ethernet1/1')
arpobj.delete_ip_arp('10.0.0.101', 'Ethernet1/1')

#Calling get_all_static_arp_entry to check if ARP entry is created
successfully
print arpobj.get_all_static_arp_entry('Ethernet1/1')

#Calling client_disconnect to disconnect the SMI client-server connection
client_disconnect()
```

IP Configuration Example

The following script demonstrates how to use the Python API to configure IP interfaces.

```
#Import modules
import systemApi, ipApi

#Calling client_connect to establish the SMI client-server connection
systemApi.client_connect()

print ' #Configure port  '
print ipApi.IP().unset_bridge_port('Ethernet1/1')
print '\n'

print ' #Configure IP on a routed interface  '
print ipApi.IP().set_ip_addr('Ethernet1/1', '11.0.0.10/16', 0 )
print '\n'

print ' #Verify IP interface'
print ipApi.IP().get_ipinfo('Ethernet1/1')
print '\n'

print ' #Verify IP interface'
print ipApi.IP().set_if_flagup('Ethernet1/11')
print '\n'

print ' #Configure IP on a routed interface  '
print ipApi.IP().set_ip_addr('Ethernet1/1', '10.0.0.10/16', 0 )
print '\n'

print ' #Verify IP interface'
print ipApi.IP().get_ipinfo('Ethernet1/1')
print '\n'

print ' #Calling client_disconnect to disconnect the SMI client-server
connection'
systemApi.client_disconnect()
```

LAG Configuration Example

The following script demonstrates how to use the Python API to create, view, update, and delete a Link Aggregation Group.

```
#Import modules
import systemApi, lagApi

#Calling client_connect to establish the SMI client-server connection
systemApi.client_connect()

print ' #Create LAG '
print lagApi.LAG().python_create_lag_id({'lag_id': 1, 'interfaces' :
[{'lacp_prio': 32768, 'lacp_timeout': 'long', 'lag_mode':'lacp_active',
'if_name': 'Ethernet1/11'}, {'lacp_prio': 32768, 'lacp_timeout': 'long',
'lag_mode':'lacp_active', 'if_name': 'Ethernet1/12'}] })
print '\n'

print ' #Verify LAG information'
print lagApi.LAG().python_get_lag_id(1)
print '\n'

print ' #Update LAG '
print lagApi.LAG().python_update_lag_id_details({'lag_id': 1,
'interfaces' : [{'lacp_prio': 100, 'lacp_timeout': 'long',
'lag_mode':'lacp_active', 'if_name': 'Ethernet1/11'}, {'lacp_prio': 100,
'lacp_timeout': 'long', 'lag_mode':'lacp_active', 'if_name':
'Ethernet1/12'}] })
print '\n'

print ' #Verify LAG information'
print lagApi.LAG().python_get_lag()
print '\n'

print ' #Delete LAG '
print lagApi.LAG().python_delete_lag_id(1)
print '\n'

print ' #Calling client_disconnect to disconnect the SMI client-server
connection'
systemApi.client_disconnect()
```


LLDP Configuration Example

The following script demonstrates how to use the Python API to administer Link Layer Discovery Protocol (LLDP).

```
#Import modules
import systemApi, lldpApi

#Calling client_connect to establish the SMI client-server connection
systemApi.client_connect()

print '#Verify lldp reinit delay'
print lldpApi.LldpSystem().python_lldp_get_reinit_delay()
print '\n'

print '#Verify lldp tx interval'
print lldpApi.LldpSystem().python_lldp_get_msg_tx_interval()
print '\n'

print '#Verify lldp tx delay'
print lldpApi.LldpSystem().python_lldp_get_tx_delay()
print '\n'

print '#Set lldp reinit delay'
print lldpApi.LldpSystem().python_lldp_set_reinit_delay(15)
print '\n'

print '#Set lldp tx interval'
print lldpApi.LldpSystem().python_lldp_set_msg_tx_interval(2000)
print '\n'

print '#Set lldp tx delay'
print lldpApi.LldpSystem().python_lldp_set_tx_delay(3)
print '\n'

print '#Get lldp neighbor'
print lldpApi.LldpNeighbor().python_lldp_get_all_neighbor()
print '\n'

print '#Calling client_disconnect to disconnect the SMI client-server
connection'
systemApi.client_disconnect()
```

VLAN Configuration Example

This script demonstrates how to use the Python API to administer VLANs.

```
#Import modules
import systemApi, vlanApi

#Calling client_connect to establish the SMI client-server connection
systemApi.client_connect()

print ' #Verify vlan status - default'
print('Check vlan status by calling the "python_get_vlan" method with no
argument')
print vlanApi.VlanSystem().python_get_vlan()
print '\n'

print('Check vlan 1-default')
print vlanApi.VlanSystem().python_get_vlan(1)
print '\n'

print ' #Create vlan 10 - test vlan'
print vlanApi.VlanSystem().python_create_vlan({'vlan_name':'TEST',
'vlan_id':10, 'admin_state': 'up'})

print ' #Verify that vlan 10 was created '
print vlanApi.VlanSystem().python_get_vlan(10)
print '\n'

print ' #Update vlan 10 - new_name vlan '
print vlanApi.VlanSystem().python_update_vlan_name(10, 'new_name')
print '\n'

print ' #Verify vlan 10 '
print vlanApi.VlanSystem().python_get_vlan(10)
print '\n'

print ' #Update vlan 10 - admin_state down '
print vlanApi.VlanSystem().python_update_vlan_admin_state(10, 'down')
print '\n'

print ' #Verify vlan 10 '
print vlanApi.VlanSystem().python_get_vlan(10)
print '\n'

print ' #Update vlan properties for a given interface'
print
vlanApi.VlanEthIf().python_update_vlan_properties({'if_name':'Ethernet1/1
1', 'bridgeport_mode':'access', 'pvid':1, 'vlans':[1]})
print '\n'

print ' #Call get_vlan_properties for a given interface'
print vlanApi.VlanEthIf().python_get_vlan_properties('Ethernet1/1')
print '\n'

print ' #Delete vlan 10 - test vlan '
print vlanApi.VlanSystem().python_delete_vlan(10)
print '\n'

print ' #Calling client_disconnect to disconnect the SMI client-server
connection'
systemApi.client_disconnect()
```

Chapter 7. The CNOS Python API

This chapter explains the contents of all the modules included in the Lenovo Cloud Network Operating System:

- [“System Module” on page 44](#)
- [“VLAN Module” on page 45](#)
- [“LLDP Module” on page 49](#)
- [“LACP Module” on page 55](#)
- [“LAG Module” on page 57](#)
- [“MSTP Module” on page 61](#)
- [“IGMP Module” on page 69](#)
- [“IP Module” on page 72](#)
- [“Route Module” on page 75](#)
- [“VRRP Module” on page 78](#)
- [“ARP Module” on page 88](#)
- [“VRF Module” on page 92](#)
- [“Platform Module” on page 93](#)

System Module

These classes and functions manage and monitor the system and the client-server connection. To use this module, in the Python file or in the Python interpreter, enter:

```
import systemApi
```

Top-Level System Functions

The following functions are special and are not part of a class.

client_connect()

Establishes the SMI client-server connection.

Note: This must be the first function you call in any CNOS Python script.

Syntax

```
client_connect()
```

Returns

Boolean (True on success, otherwise False).

client_disconnect()

Ends the SMI client-server connection and frees up related data structures and global memory.

Note: This must be the last function you call in any CNOS Python script.

Syntax

```
client_disconnect()
```

Returns

Boolean (True on success, otherwise False).

class SystemInfo()

The function in this class returns basic system properties.

get_systemInfo()

Returns switch type and version number.

Syntax

```
get_systemInfo()
```

Returns

A dictionary containing the switch type and version number.

VLAN Module

The following classes configure VLAN properties. To use this module, in the Python file or in the Python interpreter, enter:

```
import vlanApi
```

class VlanSystem()

This class has methods for getting and setting VLAN configurations.

python_get_vlan()

Get properties of a VLAN if the VLAN identifier (*vid*) is a valid VLAN ID or of all VLANs if *vid* is None.

Syntax

```
python_get_vlan(vid)
```

where:

Variable	Description
<i>vid</i>	The VLAN ID (Int)

Returns

A dictionary with VLAN properties if (*vid*) is a valid VLAN ID or of all VLANs if *vid* is None.:

Element	Description
<code>vlan_name</code>	The name of the VLAN (Str).
<code>interfaces</code>	List of interface members of the VLAN containing the following properties: <ul style="list-style-type: none">• <code>pvid</code>• <code>bridgeport_mode</code>• <code>if_name</code>
<code>pvid</code>	Native VLAN ID for a trunk port; an integer from 1-3999. Default value: 1.
<code>bridgeport_mode</code>	Bridge port mode (Str); one of access, trunk.
<code>if_name</code>	Ethernet interface name (Str)
<code>admin_state</code>	The admin status of the VLAN (Str); one of up, down.
<code>vlan_id</code>	The VLAN identifier; an integer from 1-3999.
<code>mst_inst_id</code>	MST instance identifier; an integer from 1-64. 0 refers to CIST. Default value: 0.

python_create_vlan()

Create a VLAN.

Syntax

```
python_create_vlan(vlan_info)
```

where: 'pf

Variable	Description
<i>vlan_info</i>	A dictionary with the following VLAN information: <ul style="list-style-type: none">• <i>vlan_name</i>• <i>vlan_id</i>• <i>admin_state</i> If <i>vlan_name</i> is null, a VLAN with a default name will be created.
<i>vlan_name</i>	The VLAN name (Str). To create a VLAN with the default name, this field must be null.
<i>vlan_id</i>	The VLAN identifier; an integer from 2-3999.
<i>admin_state</i>	The admin status (Str); one of up, down.

Returns

Boolean (True on success, otherwise False).

python_delete_vlan()

Delete a VLAN

Syntax

```
python_delete_vlan(vid)
```

where:

Variable	Description
<i>vid</i>	VLAN ID (Int) If <i>vid=all</i> , all user-created VLANs are deleted.

Returns

Boolean (True on success, otherwise False).

python_update_vlan_name()

Update VLAN name

Syntax

```
python_update_vlan_name(vid, vlan_name)
```

where:

Variable	Description
<i>vid</i>	VLAN ID (Int)
<i>vlan_name</i>	The VLAN name (Str)

Returns

Boolean (True on success, otherwise False).

python_update_vlan_admin_state()

Update VLAN admin state

Syntax

```
python_update_vlan_admin_state(vid, admin_state)
```

where:

Variable	Description
<i>vid</i>	VLAN ID (Int)
<i>admin_state</i>	The administrative state (Str); one of up, down.

Returns

Boolean (True on success, otherwise False).

class VlanEthIf

The methods in this class affect VLAN properties of Ethernet interfaces.

python_get_vlan_properties()

Get the VLAN properties of an Ethernet Interface or of all Ethernet Interfaces if the interface name (*ifname* argument) is None.

Syntax

```
python_get_vlan_properties(ifname)
```

where:

Variable	Description
<i>ifname</i>	The interface name (Str)

Returns

A dictionary with VLAN properties of the specified interface or of all interfaces:

Element	Description
<code>if_name</code>	Ethernet interface name (Str)
<code>bridgeport_mode</code>	Bridge port mode (Str); one of <code>access</code> , <code>trunk</code> .
<code>pvid</code>	Native VLAN ID for a trunk port; an integer from 1-3999. Default value: 1.
<code>vlangs</code>	A list of all VLANs attached to this interface.

python_update_vlan_properties()

Update VLAN Interface Properties

Syntax

```
python_update_vlan_properties(if_new_info)
```

where:

Variable	Description
<i>if_new_info</i>	A dictionary with information that is being updated. At least one of the following properties must be defined in the dictionary: <ul style="list-style-type: none">• <code>if_name</code>• <code>bridgeport_mode</code>• <code>pvid</code>• <code>vlangs</code> (each with a <code>vlan_id</code>)
<i>if_name</i>	Ethernet interface name (Str)
<i>bridgeport_mode</i>	Bridge port mode (Str); one of <code>access</code> , <code>trunk</code> .
<i>pvid</i>	Native VLAN ID for a trunk port; an integer from 1-3999. Default value: 1.
<i>vlangs</i>	A list of all VLANs attached to this interface.

Returns

Boolean (`True` on success, otherwise `False`).

LLDP Module

The following classes provide functions for getting and setting LLDP configurations and LLDP interface configurations, and getting LLDP statistics and LLDP neighbor information. To use this module, in the Python file or in the Python interpreter, enter:

```
import lldpApi
```

class LldpSystem

The functions in this class get and set LLDP configurations and LLDP interface configurations.

python_lldp_get_reinit_delay()

Get the number of seconds until LLDP re-initialization is attempted on an interface

Syntax

```
python_lldp_get_reinit_delay()
```

Returns

The delay value, in seconds (Int).

python_lldp_get_msg_tx_interval()

Get the time interval in seconds between transmissions of LLDP messages

Syntax

```
python_lldp_get_msg_tx_interval()
```

Returns

The transmit interval value, in seconds (Int).

python_lldp_get_tx_delay()

Get the number of seconds for LLDP transmission delay

Syntax

```
python_lldp_get_tx_delay()
```

Returns

The transmit delay value, in seconds, (Int).

python_lldp_set_reinit_delay()

Set the time to wait, in seconds, before initializing an interface.

Syntax

```
python_lldp_set_reinit_delay(reinit_delay)
```

where:

Variable	Description
<i>reinit_delay</i>	The time to wait, in seconds (Int).

Returns

Boolean (True on success, otherwise False).

python_lldp_set_msg_tx_interval()

Set the rate, in seconds, for LLDP packets to be sent.

Syntax

```
python_lldp_set_msg_tx_interval(tx_interval)
```

where:

Variable	Description
<i>tx_interval</i>	The transmission rate, in seconds (Int).

Returns

Boolean (True on success, otherwise False).

python_lldp_set_tx_delay()

Set the delay time in seconds.

Syntax

```
python_lldp_set_tx_delay(tx_delay)
```

where:

Variable	Description
<i>tx_delay</i>	The transmission delay, in seconds (Int). Note: This value must not be greater than 25% of the transmit interval value.

Returns

Boolean (True on success, otherwise False).

class LldpNeighbor

The following methods get neighbor port information.

python_lldp_get_neighbor()

Get neighbor information of a port

Syntax

```
python_lldp_get_neighbor(ifname)
```

where:

Variable	Description
<i>ifname</i>	The interface port name (Str).

Returns

A dictionary containing information about the specified port.

Element	Description
<i>if_name</i>	The ethernet interface name (Str).
<i>capability</i>	Remote switch capability (Str). One or more of: B (Bridge) R (Router).
<i>rx ttl</i>	The receiving time-to-live (TTL) value (Long).
<i>system name</i>	Remote system name (Str).
<i>system description</i>	Remote system description (Str).

python_lldp_get_all_neighbor()

Get neighbor information of all ports

Syntax

```
python_lldp_get_all_neighbor()
```

Returns

A list of dictionaries containing information about all LLDP neighbor ports:

Element	Description
<i>if_name</i>	The ethernet interface name (Str).
<i>capability</i>	Remote switch capability (Str). One or more of: B (Bridge) R (Router).
<i>rx ttl</i>	The receiving time-to-live (TTL) value (Long).
<i>system name</i>	Remote system name (Str).
<i>system description</i>	Remote system description (Str).

class LldpStats

The method in this class gets LLDP statistics.

python_lldp_get_statistics()

Get LLDP port statistics

```
python_lldp_get_statistics(ifname)
```

where:

Variable	Description
<i>ifname</i>	The interface port name (Str).

Returns

A dictionary of LLDP statistics:

Element	Description
total frames	The total number of LLDP frames received (Int).
total tlvs discarded	The total number of LLDP TLVs discarded (Int).
total frames transmitted	The total number of LLDP frames transmitted (Int).
total errored frames	The total number of frames received with errors (Int).
total frames discarded	The total number of discarded frames (Int).
total entries aged	The total number of aged-out entries (Int).
total tlvs unrecognized	The total number of unrecognized LLDP TLVs (Int).

class LldpInterface

The methods in this class get and set LLDP interface information.

python_lldp_get_interface()

Get LLDP interface admin status of a specific interface

Syntax

```
python_lldp_get_interface(ifname)
```

where:

Variable	Description
<i>ifname</i>	The interface port name (Str).

Returns

A dictionary of LLDP status information for the specified interface:

Element	Description
<i>if_name</i>	The ethernet interface name (Str).
<i>ena_lldp_rx</i>	Whether LLDP frame reception is enabled on a physical interface (Str); one of Yes, No. Default value: Yes.
<i>ena_lldp_tx</i>	Whether LLDP frame transmission is enabled on a physical interface (Str); one of Yes, No. Default value: Yes.

python_lldp_get_all_interface()

Get LLDP interface admin status for all interfaces

Syntax

```
python_lldp_get_all_interface()
```

Returns

A list of dictionaries containing LLDP status information for all interfaces:

Element	Description
<i>if_name</i>	The ethernet interface name (Str).
<i>ena_lldp_rx</i>	Whether LLDP frame reception is enabled on a physical interface (Str); one of Yes, No. Default value: Yes.
<i>ena_lldp_tx</i>	Whether LLDP frame transmission is enabled on a physical interface (Str); one of Yes, No. Default value: Yes.

python_lldp_set_interface()

Set LLDP interface admin status based on the *lldp_interface_admin_status* dictionary values

Syntax

```
python_lldp_set_interface(lldp_interface_port_status)
```

where:

Variable	Description
<i>lldp_interface_port_status</i>	The LLDP interface status (dictionary) containing: <ul style="list-style-type: none">• <i>if_name</i>• <i>ena_lldp_rx</i>• <i>ena_lldp_tx</i>
<i>if_name</i>	The ethernet interface name (Str).
<i>ena_lldp_rx</i>	Whether LLDP frame reception is enabled on a physical interface (Str); one of Yes, No. Default value: Yes.
<i>ena_lldp_tx</i>	Whether LLDP frame transmission is enabled on a physical interface (Str); one of Yes, No. Default value: Yes.

Returns

Boolean (True on success, otherwise False).

LACP Module

The class in this module has functions that provide system and interface LACP configuration. To use this module, in the Python file or in the Python interpreter, enter:

```
import lacpApi
```

class LACPSystem

This class contains methods to get and set an LACP system configuration.

python_lacp_get_sys_priority()

Get LACP system priority.

Syntax

```
python_lacp_get_sys_priority()
```

Returns

The LACP system priority (Int)

python_lacp_get_max_bundle()

Get the LACP max bundle, which is the supported maximum number of links per LAG .

Syntax

```
python_lacp_get_max_bundle()
```

Returns

The supported maximum number of links per LAG (Int)

python_lacp_get_all_link_details()

Get all LACP interface details.

Syntax

```
python_lacp_get_all_link_details()
```

Returns

A list of dictionaries containing LACP link details, where:

Element	Description
if_name	Ethernet interface name (Str). Note: The interface must exist.
lag_mode	LAG mode; one of lacp_active, lacp_passive

Element	Description
lacp_prio	LACP priority for the physical port; a positive integer from 1-65535. Default value: 32768.
lacp_timeout	LACP timeout for the physical port; one of short, long (default).

python_lacp_set_system()

Set LACP system priority

Syntax

```
python_lacp_set_system(sys_prio)
```

where:

Variable	Description
<i>sys_prio</i>	The interface system priority (Int).

Returns

Boolean (True on success, otherwise False).

LAG Module

The following module has classes and functions that configure LAGs and find information about LAGs and associated interfaces. To use this module, in the Python file or in the Python interpreter, enter:

```
import lagApi
```

class LAG

This class contains methods to configure and get information about LAG.

python_get_lag()

Get list of all the LAG information on the device.

Syntax

```
python_get_lag()
```

Returns

A list of LAG dictionaries containing:

Element	Description
lag_name	LAG name (Str)
interfaces	A dictionary containing physical interface members of the LAG: <ul style="list-style-type: none">• if_name• lag_mode• lacp_prio• lacp_timeout Up to 32 interfaces can be added.
if_name	Ethernet interface name (Str). Note: The interface must exist.
lag_mode	LAG mode (Str); one of lacp_active, lacp_passive, no_lacp.
lacp_prio	LACP priority for the physical port; a positive integer from 1-65535. Default value: 32768.
lacp_timeout	LACP timeout for the physical port (Str); one of short, long. Default value: long.
lag_id	LAG identifier; a positive integer from 1-65535.

python_get_lag_id()

Get LAG information for the specified LAG ID.

Syntax

```
python_get_lag_id(lag_id)
```

Returns

A dictionary containing LAG information for the specified LAG ID:

Element	Description
lag_name	LAG name (Str).
lag_id	LAG identifier; a positive integer from 1-65535.
interfaces	A list of interfaces associated with this LAG, containing: <ul style="list-style-type: none">• if_name• lag_mode• lacp_prio• lacp_timeout Up to 32 interfaces can be added.
if_name	Ethernet interface name (Str). Note: The interface must exist.
lag_mode	LAG mode (Str); one of lacp_active, lacp_passive, no_lacp.
lacp_prio	LACP priority for the physical port; a positive integer from 1-65535. Default value: 32768.
lacp_timeout	LACP timeout for the physical port (Str); one of short, long. Default value: long.

python_create_lag_id()

Creates a new LAG with the information provided.

Syntax

```
python_create_lag_id(lag)
```

where:

Variable	Description
LAG	A dictionary containing LAG information for the specified LAG.

This dictionary contains:

Element	Description
lag_id	LAG identifier; a positive integer from 1-65535.
interfaces	A list of interfaces associated with this LAG, each containing: <ul style="list-style-type: none">• if_name• lag_mode• lacp_prio• lacp_timeout Up to 32 interfaces can be added.
if_name	Ethernet interface name (Str). Note: The interface must exist.
lag_mode	LAG mode (Str); one of lacp_active, lacp_passive, no_lacp.
lacp_prio	LACP priority for the physical port; a positive integer from 1-65535. Default value: 32768.
lacp_timeout	LACP timeout for the physical port (Str); one of short, long. Default value: long.

Returns

Boolean (True on success, otherwise False).

python_delete_lag_all()

Delete all LAGs on the device.

Syntax

```
python_delete_lag_all()
```

Returns

Boolean (True on success, otherwise False).

python_delete_lag_id()

Syntax

```
python_delete_lag_id(lag_id)
```

where:

Element	Description
<i>lag_id</i>	LAG identifier; a positive integer from 1-65535.

Returns

Boolean (`True` on success, otherwise `False`).

MSTP Module

The following module has classes and functions that configure and get information about MSTP. To use this module, in the Python file or in the Python interpreter, enter:

```
import mstpApi
```

class StpInterface

This class has methods that get and set interface STP properties.

python_stp_get_all_interface_info()

Syntax

```
python_stp_get_all_interface_info()
```

Returns

A list of dictionaries containing the following STP information:

Element	Description
if_name	Interface name (Str). Note: The interface must exist.
edge_port	Configures the interface as an edge port, which allows the port to automatically transition to the STP forwarding state; either yes or no (default).
bpdu_guard	Enables BPDU guard on a port, which automatically shuts down the interface upon receipt of a BPDU; either enable or disable (default).

python_stp_get_interface_info()

Syntax

```
python_stp_get_interface_info(ifname)
```

where:

Variable	Description
<i>ifname</i>	The name of the interface (Str)

Returns

A dictionary containing the following values:

Element	Description
<code>if_name</code>	Interface name (Str). Note: The interface must exist.
<code>edge_port</code>	Configures the interface as an edge port, which allows the port to automatically transition to the STP forwarding state; either <code>yes</code> or <code>no</code> (default).
<code>bpdu_guard</code>	Enables BPDU guard on a port, which automatically shuts down the interface upon receipt of a BPDU (Str); either <code>enable</code> or <code>disable</code> (default).

python_stp_set_bpduguard()

Syntax

```
python_stp_set_bpduguard(ifname, bpdu_guard)
```

where:

Variable	Description
<i>ifname</i>	The name of the interface (Str)
<i>bpdu_guard</i>	Enables BPDU guard on a port, which automatically shuts down the interface upon receipt of a BPDU (Str); either <code>enable</code> or <code>disable</code> (default).

Returns

Boolean (True on success, otherwise False).

python_stp_set_edge_type()

Syntax

```
python_stp_set_edge_type(ifname, status)
```

where:

Variable	Description
<i>ifname</i>	The name of the interface (Str)
<i>status</i>	Status of the port (Str); either <code>yes</code> or <code>no</code> (default).

Returns

Boolean (True on success, otherwise False).

class MSTP

This class contains methods that get and set the MSTP region name.

python_mstp_set_region_name()

Sets the MSTP region name.

Syntax

```
python_mstp_set_region_name(region_name)
```

where:

Variable	Description
<i>region_name</i>	Region name; a string up to 32 characters long.

Returns

Boolean (True on success, otherwise False).

python_mstp_get_region_name()

Gets the MSTP region name.

Syntax

```
python_mstp_get_region_name()
```

Returns

The region name; string up to 32 characters long.

python_mstp_get_revision()

Gets the revision number for the MSTP bridge

Syntax

```
python_mstp_set_revision()
```

Returns

The MSTP revision number (Int).

python_mstp_set_revision()

Sets the revision number for the MSTP bridge

Syntax

```
python_mstp_set_revision(revision)
```

where:

Variable	Description
<i>revision</i>	The MSTP revision number (Int).

Returns

Boolean (True on success, otherwise False).

class MstpInstance

This class contains methods that control MSTP instances.

python_mstp_add_instance()

Adds an MSTP instance.

Syntax

```
python_mstp_add_instance(instance_id, vlan_list)
```

where:

Element	Description
<i>instance_id</i>	MST instance ID; an integer from 0-64. Instance 0 refers to the CIST.
<i>vlan_list</i>	A list of dictionaries containing VLAN numbers; each VLAN number must be an integer from 1-3999.

Returns

Boolean (True on success, otherwise False).

python_mstp_delete_instance()

Deletes an MSTP instance.

Syntax

```
python_mstp_delete_instance([instance_id])
```

where:

Variable	Description
<i>instance_id</i>	(Optional) MST instance ID; an integer from 0-64. Instance 0 refers to the CIST. If no arguments are given, all user-created MSTP instances are deleted

Returns

Boolean (True on success, otherwise False).

python_mstp_update_instance()

Updates MSTP instance configurations.

Syntax

```
python_mstp_update_instance(instance_id, vlan_list)
```

where:

Variable	Description
<i>instance_id</i>	MST instance ID; an integer from 0-64. Instance 0 refers to the CIST.
<i>vlan_list</i>	A list of dictionaries containing VLAN numbers; each VLAN number must be an integer from 1-3999.

Returns

Boolean (True on success, otherwise False).

python_mstp_set_instance_priority()

Sets MSTP instance priority.

Syntax

```
python_mstp_set_instance_priority(instance_id, instance_prio)
```

where:

Variable	Description
<i>instance_id</i>	MST instance ID; an integer from 0-64. Instance 0 refers to the CIST.
<i>instance_prio</i>	Sets the instance bridge priority; an integer from 0-61440. Default value: 32768.

Returns

Boolean (True on success, otherwise False).

python_mstp_check_instance_exist()

Check whether the specified MSTP instance exists.

Syntax

```
python_mstp_check_instance_exist(instance_id)
```

where:

Variable	Description
<i>instance_id</i>	MST instance ID; an integer from 0-64. Instance 0 refers to the CIST.

Returns

If the instance exists, returns `True`. If the instance does not exist, returns `False`. If the instance ID is invalid, returns an error along with `False`.

class MstpInterface

This class contains methods that get and set MSTP interface properties.

python_mstp_get_port_path_cost()

Gets the MSTP interface path cost.

Syntax

```
python_mstp_get_port_path_cost(ifname, instance_id)
```

where:

Variable	Description
<i>ifname</i>	The name of the interface (Str)
<i>instance_id</i>	MST instance ID; an integer from 0-64. Instance 0 refers to the CIST.

Returns

The MSTP path cost (Int).

python_mstp_set_port_path_cost()

Sets the MSTP interface path cost.

Syntax

```
python_mstp_set_port_path_cost(ifname, instance_id, path_cost)
```

where:

Variable	Description
<i>ifname</i>	The name of the interface (Str). Note: The interface must exist.

Variable	Description
<i>instance_id</i>	MST instance ID; an integer from 0-64. Instance 0 refers to the CIST.
<i>path_cost</i>	The port path-cost value on the specified MST instance; either an integer from 1-200000000 or <code>auto</code> (default) to base the path-cost on port speed.

Returns

Boolean (True on success, otherwise False).

python_mstp_get_port_priority()

Gets the MSTP interface port priority.

Syntax

```
python_mstp_get_port_priority(ifname, instance_id)
```

where:

Variable	Description
<i>ifname</i>	The name of the interface (Str). Note: The interface must exist.
<i>instance_id</i>	MST instance ID; an integer from 0-64. Instance 0 refers to the CIST.

Returns

The port priority (Int):

Element	Description
<i>port_prio</i>	The port priority, in increments of 32, on the specified MST instance; a multiple of 32 from 0-224. Default value: 128.

python_mstp_set_port_priority()

Syntax

```
python_mstp_set_port_priority(ifname, instance_id, port_prio)
```

where:

Variable	Description
<i>ifname</i>	The name of the interface (Str). Note: The interface must exist.
<i>instance_id</i>	MST instance ID; an integer from 0-64. Instance 0 refers to the CIST.
<i>port_prio</i>	The port priority, in increments of 32, on the specified MST instance; a multiple of 32 from 0-224. Default value: 128.

Returns

Boolean (**True** on success, otherwise **False**).

IGMP Module

The classes and functions in this module manage Internet Group Management Protocol (IGMP) snooping. To use this module, in the Python file or in the Python interpreter, enter:

```
import igmpApi
```

class IgmpSnooping

This class contains methods for getting and setting IGMP snooping status.

python_igmp_snoop_get()

Get the IGMP snooping status on the device.

Syntax

```
python_igmp_snoop_get()
```

Returns

A dictionary containing IGMP status information where:

Element	Description
<i>ena_igmp_snoop</i>	Whether IGMP snooping is enabled (Str); either yes (default) or no.

python_igmp_snoop_set()

Set the IGMP snooping status on the device

Syntax

```
python_igmp_snoop_set(dict_igmp_snoop_status)
```

where:

Variable	Description
<i>dict_igmp_snoop_status</i>	A dictionary that indicates whether IGMP snooping is enabled; contains <i>ena_igmp_snoop</i> .
<i>ena_igmp_snoop</i>	Indicates whether IGMP snooping is enabled (Str); either yes (default) or no.

Returns

Boolean (True on success, otherwise False).

class IgmpMcVlan

This class contains methods for getting and setting IGMP snooping status for VLANs.

python_igmp_snoop_if_get()

Get the IGMP snooping status for a VLAN

Syntax

```
python_igmp_snoop_if_get(vid)
```

where:

Variable	Description
<i>vid</i>	The VLAN ID; an integer from 1-3999.

Returns

A dictionary containing the IGMP snooping status:

Element	Description
<i>vid</i>	The VLAN ID; an integer from 1-3999.
<i>ena_igmp_snoop</i>	Whether IGMP snooping is enabled (Str); either yes (default) or no.

python_igmp_snoop_if_get()

Get the IGMP snooping status for a specified VLAN

Syntax

```
python_igmp_snoop_if_get(vid)
```

where:

Variable	Description
<i>vid</i>	The VLAN ID; an integer from 1-3999.

Returns

A dictionary containing the IGMP snooping status:

Element	Description
<i>vid</i>	The VLAN ID; an integer from 1-3999.
<i>ena_igmp_snoop</i>	Whether IGMP snooping is enabled (Str); either yes or no.

python_igmp_snoop_all_if_get()

Get the IGMP snooping status for all VLANs

Syntax

```
python_igmp_snoop_all_if_get()
```

Returns

A list of dictionaries, each containing the IGMP snooping status:

Element	Description
<i>vid</i>	The VLAN ID; an integer from 1-3999.
<i>ena_igmp_snoop</i>	Whether IGMP snooping is enabled (Str); either yes or no.

python_igmp_snoop_vlan_set()

Set the IGMP snooping status for a specified VLAN

Syntax

```
python_igmp_snoop_vlan_set(dict_vlan_igmp_snoop_status)
```

where:

Variable	Description
<i>dict_vlan_igmp_snoop_status</i>	A dictionary containing the IGMP snoop status with the following parameters: <ul style="list-style-type: none">• <i>vid</i>• <i>ena_igmp_snoop</i>
<i>vid</i>	The VLAN ID; an integer from 1-3999.
<i>ena_igmp_snoop</i>	Whether IGMP snooping is enabled (Str); either yes or no.

Returns

Boolean (True on success, otherwise False).

IP Module

The class and functions in this module manage IP addresses. To use this module, in the Python file or in the Python interpreter, enter:

```
import ipApi
```

class IP()

This class provides functions that manage IP addresses.

get_ipinfo()

Get the IP properties of a specified interface

Syntax

```
get_ipinfo([<if_name>])
```

where:

Variable	Description
<i>if_name</i>	(Optional) The interface name (Str); default value is None.

Returns

A dictionary containing the IP details:

Element	Description
<i>if_name</i>	IP interface name. Note: The interface must exist.
<i>switchport</i>	Whether or not the port is a switchport; one of yes (default), no.
<i>mtu</i>	The maximum transmission unit, in bytes; an integer from 64-9216. Default value: 1500.
<i>ip_addr</i>	IP address for the interface.
<i>ip_prefix_len</i>	IP address mask; a positive integer from 1-32.
<i>vrf_name</i>	The name of the VRF to which the interface belongs (if applicable).
<i>admin_state</i>	The admin status; one of up, down.

set_ip_addr()

Set the IP address of a specified interface

Syntax

```
set_ip_addr(if_name, ip_addr, secondary)
```

where:

Variable	Description
<i>if_name</i>	IP interface name. Note: The interface must exist.
<i>ip_addr</i>	IP address for the interface.
<i>secondary</i>	Secondary value for an interface (Int).

Returns

Boolean (True on success, otherwise False).

set_switchport()

Make the specified interface a switchport

Syntax

```
set_switchport(if_name)
```

where:

Variable	Description
<i>if_name</i>	IP interface name. Note: The interface must exist.

Returns

Boolean (True on success, otherwise False).

unset_switchport()

Change the specified interface from a switchport to a routed port

Syntax

```
unset_switchport(if_name)
```

where:

Variable	Description
<i>if_name</i>	IP interface name (Str). Note: The interface must exist.

Returns

Boolean (True on success, otherwise False).

set_if_flagup()

Set the interface flag to make it operational

Syntax

```
set_if_flagup(if_name)
```

where:

Variable	Description
<i>if_name</i>	IP interface name. Note: The interface must exist.

Returns

Boolean (True on success, otherwise False).

unset_if_flagup()

Unset the interface flag to make it non-operational

Syntax

```
unset_if_flagup(if_name)
```

where:

Variable	Description
<i>if_name</i>	IP interface name (Str). Note: The interface must exist.

Returns

Boolean (True on success, otherwise False).

Route Module

The class and functions in this module manage static routes. To use this module, in the Python file or in the Python interpreter, enter:

```
import routeApi
```

class Route

This class contains functions that manage static routes.

set_route()

Add a static IPv4 route for a subnet mask

Syntax

```
set_route(ip_addr, ip_prefix_len, ip_gw, dist, tag, desc, vrf_name, if_name)
```

where:

Variable	Description
<i>ip_addr</i>	The IPv4 address of the route.
<i>ip_prefix_len</i>	The IP prefix length; an integer from 0-32, with 0 being the default gateway.
<i>ip_gw</i>	The gateway IP address.
<i>dist</i>	The distance value for the route; an integer from 1-255. Default value: 1.
<i>tag</i>	The tag value; an integer from 0-4294967295.
<i>desc</i>	Description of the static route (Str).
<i>vrf_name</i>	The VRF name (Str). Note: The named VRF must exist.
<i>if_name</i>	Interface name used for communication (Str). Note: The interface must exist.

Returns

Boolean (True on success, otherwise False).

delete_route()

Delete a static IPv4 route

Syntax

```
delete_route(ip_addr, ip_prefix_len, ip_gw, dist, tag, desc, vrf_name, if_name)
```

where:

Variable	Description
<i>ip_addr</i>	The IPv4 address of the route.
<i>ip_prefix_len</i>	The IP prefix length; an integer from 0-32, with 0 being the default gateway.
<i>ip_gw</i>	The gateway IP address.
<i>dist</i>	The distance value for the route; an integer from 1-255. Default value: 1.
<i>tag</i>	The tag value; an integer from 0-4294967295.
<i>desc</i>	Description of the static route (Str)
<i>vrf_name</i>	The VRF name (Str). Note: The named VRF must exist.
<i>if_name</i>	Interface name used for communication (Str). Note: The interface must exist.

Returns

Boolean (True on success, otherwise False).

get_route()

Get all IPv4 routes from the routing table

Syntax

```
get_route(vrf_name, [ip_dest], [ip_prefix_len])
```

where:

Variable	Description
<i>vrf_name</i>	The VRF name (Str). Note: The named VRF must exist.
<i>ip_dest</i>	(Optional) The destination IP address (Str); default value is None.
<i>ip_prefix_len</i>	(Optional) The IP prefix length; an integer from 0-32, with 0 being the default gateway.

Returns

A list of routes with the following details:

Element	Description
tag	The tag value; an integer from 0-4294967295.
dist	The distance value for the route; an integer from 1-255. Default value: 1.
ip_gw	The gateway IP address.
ip_addr	The IPv4 address of the route.
ip_prefix_len	The IP prefix length; an integer from 0-32, with 0 being the default gateway.
desc	Description of the static route (Str).
vrf_name	The VRF name (Str).
if_name	Interface name used for communication (Str).

VRRP Module

The class and functions in this module manage Virtual Router Redundancy Protocol (VRRP). To use this module, in the Python file or in the Python interpreter, enter:

```
import vrrpApi
```

class VRRP()

This class contains functions for managing Virtual Router Redundancy Protocol (VRRP).

get_vrrp()

Get properties of all VRRP Virtual Routers (VRs) for all interfaces or for the specified interface.

Syntax

```
get_vrrp([vr_id], [if_name])
```

where:

Variable	Description
<i>vr_id</i>	(Optional) The VRRP session Virtual Router (VR) ID; an integer from 1-255. Default value is None.
<i>if_name</i>	(Optional) Interface name used for communication (Str); default value is None. Note: The interface must exist.

Returns

A list of VRRP VR information:

Element	Description
<i>if_name</i>	The Ethernet interface name (Str).
<i>vr_id</i>	The VRRP session Virtual Router (VR) ID; an integer from 1-255. Default value is 0.
<i>ip_addr</i>	The IP address of the VR; a valid IPv4 address.
<i>ad_intvl</i>	Advertisement interval (The number of centi-seconds between advertisements for VRRPv3); a multiple of 5 from 5-4095. Default value: 100 centi-seconds.
<i>preempt</i>	Enable the preemption of a lower priority master; one of yes (default), no.
<i>prio</i>	The priority of the VR on the switch; an integer from 1-254. Default value: 100.

Element	Description
admin_state	Enable the VR (Str); one of up (default), down.
oper_state	The operation state of the VR (Str); one of master, backup, init.
track_if	The interface to track by this VR (Str). Default value: none. Note: If an interface is specified, it must exist.
accept_mode	Enables or disables the accept mode for this session (Str); one of yes (default), no.
switch_back_delay	The switch back delay interval; an integer from 1-500000, or 0 to disable (default).
v2_compt	Enables backward compatibility for VRRPv2 for the VR (Str); one of yes, no (default).

get_vrrp_intf()

Get properties of all VRRP VRs of specified interfaces

Syntax

`get_vrrp_intf(if_name)`

where:

Variable	Description
<i>if_name</i>	The Ethernet interface name (Str). Note: The interface must exist.

Returns

A list of VRRP properties:

Element	Description
if_name	The Ethernet interface name (Str).
vr_id	The VRRP session Virtual Router (VR) ID; an integer from 1-255. Default value is 0.
ip_addr	The IP address of the VR; a valid IPv4 address.
ad_intvl	Advertisement interval (The number of centi-seconds between advertisements for VRRPv3); a multiple of 5 from 5-4095. Default value: 100 centi-seconds.
preempt	Enable the preemption of a lower priority master; one of yes (default) , no.

Element	Description
prio	The priority of the VR on the switch; an integer from 1-254. Default value: 100.
admin_state	Enable the VR (Str); one of up (default), down.
oper_state	The operation state of the VR (Str); one of master, backup, init.
track_if	The interface to track by this VR (Str). Default value: none. Note: If an interface is specified, it must exist.
accept_mode	Enables or disables the accept mode for this session (Str); one of yes (default), no.
switch_back_delay	The switch back delay interval; an integer from 1-500000, or 0 to disable (default).
v2_compt	Enables backward compatibility for VRRPv2 for the VR (Str); one of yes, no (default).

get_vrrp_accept_mode()

Determines whether a virtual router in Master state will accept packets.

Syntax

```
get_vrrp_accept_mode(vr_id, af_type, if_name)
```

where:

Variable	Description
<i>vr_id</i>	The VRRP session Virtual Router (VR) ID; an integer from 1-255.
<i>af_type</i>	The Address Family type (Int); 2 for AF_INET (IPv4) and 10 for AF_INET6 (IPv6).
<i>if_name</i>	The Ethernet interface name (Str). Note: The interface must exist.

Returns

The accept_mode for the session (Str); one of yes (default), no.

get_vrrp_advt_interval()

Get the IGMP snooping status for a VLAN

Syntax

```
get_vrrp_advt_interval(vr_id, af_type, if_name)
```


where:

Variable	Description
<i>vr_id</i>	The VRRP session Virtual Router (VR) ID; an integer from 1-255.
<i>af_type</i>	The Address Family type (Int); 2 for AF_INET (IPv4) and 10 for AF_INET6 (IPv6).
<i>if_name</i>	The Ethernet interface name (Str). Note: The interface must exist.

where:

Variable	Description
<i>vid</i>	The VLAN ID (Int).

Returns

The advertisement interval:

Element	Description
<i>ad_intvl</i>	Advertisement interval (The number of centi-seconds between advertisements for VRRPv3); a multiple of 5 from 5-4095. Default value: 100 centi-seconds.

get_vrrp_preempt_mode()

Get whether a higher priority virtual router can preempt a lower priority master.

Syntax

```
get_vrrp_preempt_mode(vr_id, af_type, if_name)
```

where:

Variable	Description
<i>vr_id</i>	The VRRP session Virtual Router (VR) ID; an integer from 1-255.
<i>af_type</i>	The Address Family type (Int); 2 for AF_INET (IPv4) and 10 for AF_INET6 (IPv6).
<i>if_name</i>	Ethernet interface name used for communication (Str). Note: The interface must exist.

Returns

Whether the preemption of a lower priority master is enabled:

Element	Description
preempt	Enable the preemption of a lower priority master; one of yes (default) , no.

get_vrrp_priority()

Get the priority to be used for the virtual router master election process.

Syntax

```
get_vrrp_priority(vr_id, af_type, if_name)
```

where:

Variable	Description
<i>vr_id</i>	The VRRP session Virtual Router (VR) ID; an integer from 1-255.
<i>af_type</i>	The Address Family type (Int); 2 for AF_INET (IPv4) and 10 for AF_INET6 (IPv6).
<i>if_name</i>	The Ethernet interface name (Str). Note: The interface must exist.

Returns

VRRP priority:

Element	Description
prio	The priority of the VR on the switch; an integer from 1-254. Default value: 100.

set_vrrp_accept_mode()

Set the accept mode for a VRRP session when VRPP V3 is enabled.

Syntax

```
set_vrrp_accept_mode(vr_id, af_type, if_name, accept_mode)
```

where:

Variable	Description
<i>vr_id</i>	The VRRP session Virtual Router (VR) ID; an integer from 1-255.
<i>af_type</i>	The Address Family type (Int); 2 for AF_INET (IPv4) and 10 for AF_INET6 (IPv6).
<i>if_name</i>	The Ethernet interface name (Str). Note: The interface must exist.
<i>accept_mode</i>	Whether to enable Accept mode for this VRRP session (Str); one of yes (default), no .

Returns

Boolean (True on success, otherwise False).

set_vrrp_advt_interval()

Set the advertisement interval of a virtual router.

Syntax

```
set_vrrp_advt_interval(vr_id, af_type, if_name, interval)
```

where:

Variable	Description
<i>vr_id</i>	The VRRP session Virtual Router (VR) ID; an integer from 1-255.
<i>af_type</i>	The Address Family type (Int); 2 for AF_INET (IPv4) and 10 for AF_INET6 (IPv6).
<i>if_name</i>	The Ethernet interface name (Str). Note: The interface must exist.
<i>interval</i>	Advertisement interval in centi-seconds (Int); a multiple of 5 from 5-4095. Default value: 100 centi-seconds.

Returns

Boolean (True on success, otherwise False).

set_vrrp_preempt_mode()

Enable or disable the preempt mode for a session.

Syntax

```
set_vrrp_preempt_mode(vr_id, af_type, if_name, preempt)
```

where:

Variable	Description
<i>vr_id</i>	The VRRP session Virtual Router (VR) ID; an integer from 1-255.
<i>af_type</i>	The Address Family type (Int); 2 for AF_INET (IPv4) and 10 for AF_INET6 (IPv6).
<i>if_name</i>	The Ethernet interface name (Str). Note: The interface must exist.
<i>preempt</i>	Enable the preemption of a lower priority master; one of yes (default) , no .

Returns

Boolean (True on success, otherwise False).

set_vrrp_priority()

Enable the configuration of the priority of the VRRP router for a session.

Syntax

```
set_vrrp_priority(vr_id, af_type, if_name, prio)
```

where:

Variable	Description
<i>vr_id</i>	The VRRP session Virtual Router (VR) ID; an integer from 1-255.
<i>af_type</i>	The Address Family type (Int); 2 for AF_INET (IPv4) and 10 for AF_INET6 (IPv6).
<i>if_name</i>	The Ethernet interface name (Str). Note: The interface must exist.
<i>prio</i>	The priority of the VR on the switch; an integer from 1-254. Default value: 100.

Returns

Boolean (True on success, otherwise False).

set_vrrp_switch_back_delay()

Get the IGMP snooping status for a VLAN

Syntax

```
set_vrrp_switch_back_delay(vr_id, af_type, if_name, switch_back_delay)
```

where:

Variable	Description
<i>vr_id</i>	The VRRP session Virtual Router (VR) ID; an integer from 1-255.
<i>af_type</i>	The Address Family type (Int); 2 for AF_INET (IPv4) and 10 for AF_INET6 (IPv6).
<i>if_name</i>	The Ethernet interface name (Str). Note: The interface must exist.
<i>switch_back_delay</i>	The switch back delay interval; an integer from 1-500000 or 0 to disable (default).

Returns

Boolean (True on success, otherwise False).

set_vrrp_oper_primary_ipaddr()

Set the primary IP address of the VRRP virtual router.

Syntax

```
set_vrrp_oper_primary_ipaddr(vr_id, af_type, if_name, ipaddr)
```

where:

Variable	Description
<i>vr_id</i>	The VRRP session Virtual Router (VR) ID; an integer from 1-255.
<i>af_type</i>	The Address Family type (Int); 2 for AF_INET (IPv4) and 10 for AF_INET6 (IPv6).
<i>if_name</i>	The Ethernet interface name (Str). Note: The interface must exist.
<i>ipaddr</i>	The primary IP address (Str).

Returns

Boolean (True on success, otherwise False).

set_vrrp_monitored_circuit()

Get the IGMP snooping status for a VLAN

Syntax

```
set_vrrp_monitored_circuit(vr_id, af_type, if_name, track_if)
```

where:

Variable	Description
<i>vr_id</i>	The VRRP session Virtual Router (VR) ID; an integer from 1-255.
<i>af_type</i>	The Address Family type (Int); 2 for AF_INET (IPv4) and 10 for AF_INET6 (IPv6).
<i>if_name</i>	The Ethernet interface name (Str). Note: The interface must exist.
<i>track_if</i>	The interface to track by this VR. Note: If an interface is specified, it must exist.

Returns

Boolean (True on success, otherwise False).

delete_vrrp_vr()

Delete a VRRP VR..

Syntax

```
delete_vrrp_vr(vr_id, af_type, if_name)
```

where:

Variable	Description
<i>vr_id</i>	The VRRP session Virtual Router (VR) ID; an integer from 1-255.
<i>af_type</i>	The Address Family type (Int); 2 for AF_INET (IPv4) and 10 for AF_INET6 (IPv6).
<i>if_name</i>	The Ethernet interface name (Str). Note: The interface must exist.

Returns

Boolean (True on success, otherwise False).

set_vrrp_vr()

Create a new VRRP session on the specified interface and allocate resources for the session.

Syntax

```
set_vrrp_vr(vr_id, if_name)
```

where:

Variable	Description
<i>vr_id</i>	The VRRP session Virtual Router (VR) ID; an integer from 1-255.
<i>if_name</i>	The Ethernet interface name (Str). Note: The interface must exist.

Returns

Boolean (True on success, otherwise False).

ARP Module

This module contains a class with functions that manage Address Resolution Protocol (ARP). To use this module, in the Python file or in the Python interpreter, enter:

```
import arpApi
```

class ARP

This class provides functions for managing ARP.

get_all_static_arp_entry()

Get all static ARP entries.

Syntax

```
get_all_static_arp_entry([<if_name>])
```

where:

Variable	Description
<i>if_name</i>	[Optional) The Ethernet interface name (Str). Default value: None. Note: If specified, the interface must exist.

Returns

The IP address, MAC address, and interface name for all or the specified ARP entry:

Element	Description
<i>if_name</i>	The Ethernet interface name (Str).
<i>ip_addr</i>	The IP address (Str).
<i>mac_addr</i>	The MAC address in xxxx.xxxx,xxxx format (Str).

get_one_static_arp_entry()

Get one static ARP entry for the specified interface.

Syntax

```
get_one_static_arp_entry(if_name, ip_addr)
```


where:

Variable	Description
<i>if_name</i>	The Ethernet interface name (Str). Note: The interface must exist.
<i>ip_addr</i>	The IP address (Str).

Returns

The static ARP entry, with the following parameters:

Element	Description
<i>if_name</i>	The Ethernet interface name (Str).
<i>ip_addr</i>	The IP address (Str).
<i>mac_addr</i>	The MAC address in xxxx.xxxx,xxxx format (Str).

set_ip_arp()

Create a static proxy ARP entry.

Syntax

```
set_ip_arp(ip_addr, mac_addr, if_name)
```

where

Variable	Description
<i>ip_addr</i>	The IP address (Str).
<i>mac_addr</i>	The MAC address in xxxx.xxxx,xxxx format (Str).
<i>if_name</i>	The Ethernet interface name (Str). Note: The interface must exist.

Returns

Boolean (True on success, otherwise False).

delete_ip_arp()

Delete an ARP entry.

Syntax

```
delete_ip_arp(ip_addr, if_name)
```

where

Variable	Description
<i>ip_addr</i>	The IP address (Str).
<i>if_name</i>	The Ethernet interface name (Str). Note: The interface must exist.

Returns

Boolean (True on success, otherwise False).

get_arp_sys_pro()

Get the global ARP properties of the system.

Syntax

```
get_arp_sys_pro()
```

Returns

The global ARP entry age out time:

Element	Description
<i>ageout_time</i>	The global ARP entry age out time, in seconds; an integer from 60-28800. Default value: 1500.

set_arp_sys_pro()

Set the global ARP properties of the system.

Syntax

```
set_arp_sys_pro(ageout_time)
```

where:

Variable	Description
<i>ageout_time</i>	The global ARP entry age out time, in seconds; an integer from 60-28800. Default value: 1500.

Returns

Boolean (True on success, otherwise False).

get_arp_sys_interfaces()

Get ARP properties for all interfaces or for the specified interface.

Syntax

```
get_arp_sys_interfaces([if_name])
```

where:

Variable	Description
<i>if_name</i>	(Optional) The Ethernet interface name (Str). Default value: None. Note: If specified, the interface must exist.

Returns

ARP properties for all interfaces or for the specified interface:

Element	Description
<i>if_name</i>	The Ethernet interface name (Str).
<i>ageout_time</i>	The global ARP entry age out time, in seconds; an integer from 60-28800. Default value: 1500.

set_arp_sys_pro_interface()

Set the ARP properties of the specified interface.

Syntax

```
set_arp_sys_pro_interface(if_name, ageout_time)
```

where:

Variable	Description
<i>if_name</i>	The Ethernet interface name (Str). Default value: None. Note: If specified, the interface must exist.
<i>ageout_time</i>	The global ARP entry age out time, in seconds; an integer from 60-28800. Default value: 1500.

Returns

Boolean (True on success, otherwise False).

VRF Module

The class and function in this module manage Virtual Routing and Forwarding (VRF). To use this module, in the Python file or in the Python interpreter, enter:

```
import vrfApi
```

class VRF

This class provides a function for managing VRF.

get_vrf_entry()

Get all VRF details.

Syntax

```
get_vrf_entry([vrf_name])
```

where:

Variable	Description
<i>vrf_name</i>	The name of the virtual router (Str). Default value: None. Note: The VR be either a management or default VR.

Returns

The following VRF details:

Element	Description
<i>vrf_name</i>	The name of the virtual router (Str).
<i>interfaces</i>	The interface (Str).

Platform Module

The classes in this module contain functions that get and provide port information. To use this module, in the Python file or in the Python interpreter, enter:

```
import platformApi
```

class PortInfo

The functions in this class provide a physical port's configuration.

get_interface()

Get the properties of one interface.

Syntax

```
get_interface([if_name])
```

where:

Variable	Description
<i>if_name</i>	(Optional) The Ethernet interface name (Str). Default value: None. Note: If specified, the interface must exist.

Returns

A dictionary containing lists of interface properties:

Element	Description
<i>duplex</i>	The communication method of the interface (Str); one of <i>auto</i> , <i>full</i> , <i>half</i> .
<i>if_name</i>	The interface name (Str).
<i>mtu</i>	The maximum transmission unit, in bytes; a positive integer from 64-9216. Default value: 1500.
<i>admin_state</i>	The admin status (Str); one of <i>up</i> , <i>down</i> .
<i>mac_addr</i>	The MAC address in <i>xxxx.xxxx,xxxx</i> format (Str).
<i>speed</i>	The communication speed of the interface (Str); one of: <ul style="list-style-type: none">● <i>auto</i> (auto negotiate)● <i>10</i> (10Mb/s)● <i>100</i> (100Mb/s)● <i>1000</i> (1Gb/s)● <i>10000</i> (10Gb/s)● <i>40000</i> (40Gb/s).

get_mac()

Get the MAC address of a physical port.

Syntax

```
get_mac(if_name)
```

where:

Variable	Description
<i>if_name</i>	The Ethernet interface name (Str). Note: The interface must exist.

Returns

The MAC address:

Element	Description
<i>mac_addr</i>	The MAC address in xxxx.xxxx,xxxx format (Str).

set_mac()

Set the MAC address of the specified interface.

Syntax

```
set_mac(if_name, mac_address)
```

where:

Variable	Description
<i>if_name</i>	The Ethernet interface name (Str). Note: The interface must exist.
<i>mac_addr</i>	The MAC address in xxxx.xxxx,xxxx format (Str).

Returns

Boolean (True on success, otherwise False).

is_enabled()

Check whether the port is enabled

Syntax

```
is_enabled(if_name)
```

where:

Variable	Description
<i>if_name</i>	The Ethernet interface name (Str). Note: The interface must exist.

Returns

Enabled status:

Element	Description
<i>is_enabled</i>	Port enabled status (Str); one of up, down

set_enabled()

Enable or disable the specified port.

Syntax

```
set_enabled(if_name, flag)
```

where:

Variable	Description
<i>if_name</i>	The Ethernet interface name (Str). Note: The interface must exist.
<i>flag</i>	Snooping status (Str); one of up, down.

Returns

The maximum transmission unit:

Element	Description
<i>mtu</i>	The maximum transmission unit; a positive integer from 64 - 9216. Default value: 1500.

set_mtu()

Set the Maximum Transmission Unit (MTU) for the port.

Syntax

```
set_mtu(if_name, mtu)
```

where:

Variable	Description
<i>if_name</i>	The Ethernet interface name (Str). Note: The interface must exist.
<i>mtu</i>	The maximum transmission unit; a positive integer from 64 - 9216. Default value: 1500.

Returns

Boolean (True on success, otherwise False).

get_port_speed()

Get the speed of the specified port.

Syntax

```
get_port_speed(if_name)
```

where:

Variable	Description
<i>if_name</i>	The Ethernet interface name (Str). Note: The interface must exist.

Returns

The port speed:

Element	Description
speed	The communication speed of the interface (Str); one of: <ul style="list-style-type: none">● auto (auto negotiate)● 10 (10Mb/s)● 100 (100Mb/s)● 1000 (1Gb/s)● 10000 (10Gb/s)● 40000 (40Gb/s).

set_port_speed()

Set the speed of the specified port.

Syntax

```
set_port_speed(if_name, speed)
```


where:

Variable	Description
<i>if_name</i>	The Ethernet interface name (Str). Note: The interface must exist.
<i>speed</i>	The communication speed of the interface (Str); one of: <ul style="list-style-type: none">● auto (auto negotiate)● 10 (10Mb/s)● 100 (100Mb/s)● 1000 (1Gb/s)● 10000 (10Gb/s)● 40000 (40Gb/s).

Returns

Boolean (True on success, otherwise False).

get_duplex()

Get the duplex for the port.

Syntax

`get_duplex(if_name)`

where:

Variable	Description
<i>if_name</i>	The Ethernet interface name (Str). Note: The interface must exist.

Returns

The duplex of the interface:

Element	Description
duplex	The communication method of the interface (Str); one of auto, full, half.

set_duplex()

Set the duplex for the port.

Syntax

`get_duplex(if_name, duplex)`

where:

Variable	Description
<i>if_name</i>	The Ethernet interface name (Str). Note: The interface must exist.
<i>duplex</i>	The communication method of the interface (Str); one of <code>auto</code> , <code>full</code> , <code>half</code> .

Returns

Boolean (`True` on success, otherwise `False`).

class PortStatistics

This class contains a function that gets port statistics.

get_stats()

Get the port statistics for the specified interface.

Syntax

```
get_stats(if_name)
```

where:

Variable	Description
<i>if_name</i>	The Ethernet interface name (Str). Note: The interface must exist.

Returns

The following packet statistics:

Element	Description
<code>good_pkts_sent</code>	Number of sent packets (Int).
<code>in_un_pkts</code>	Number of received unicast packets (Int).
<code>bad_crc</code>	Number of bad CRCs (Int).
<code>brdc_pkts_rcv</code>	Number of received broadcast packets (Int).
<code>mc_pkts_sent</code>	Number of sent multicast packets (Int).
<code>undersize_pkts</code>	Number of undersize packets (Int).
<code>mc_pkts_rcv</code>	Number of received multicast packets (Int).
<code>in_discards</code>	Number of discarded in packets (Int).
<code>good_octets_rcv</code>	Number of received octets (Int).

Element	Description
oversize_pkts	Number of oversize packets (Int).
brdc_pkts_sent	Number of sent broadcast packets (Int).
good_octets_sent	Number of sent octets (Int).
out_uc_pkts	Number of sent unicast packets (Int).
good_pkts_rcv	Number of received packets (Int).

Appendix A. Error Messages

Error messages thrown by the Lenovo Cloud NOS Python API fall into the following categories:

- Validation errors

If the argument for a function is not of a valid type, such as a string when an integer is expected or a string other than an expected string, an error will be thrown. For example, in the `vlanApi` module, when validating arguments for `vlanApi.VlanSystem().python_update_vlan_admin_state()`, if the value of `admin_state` is not `up` or `down`, the Python interpreter will throw the following error message:

```
Error: Invalid admin state. Valid options (up, down)
```

- Operating system errors

If the internal module or server functionality encounters an error, it will throw an operating system error. For example, if you call the LLDP module function `lldpApi.LldpStats().python_lldp_get_interface(ifname)` with an interface name that does not exist, the following error is thrown:

```
Error: Interface name not valid
```

Appendix B. Getting help and technical assistance

If you need help, service, or technical assistance or just want more information about Lenovo products, you will find a wide variety of sources available from Lenovo to assist you.

Use this information to obtain additional information about Lenovo and Lenovo products, and determine what to do if you experience a problem with your Lenovo system or optional device.

Note: This section includes references to IBM web sites and information about obtaining service. IBM is Lenovo's preferred service provider for the System x, Flex System, and NeXtScale System products.

Before you call, make sure that you have taken these steps to try to solve the problem yourself.

If you believe that you require warranty service for your Lenovo product, the service technicians will be able to assist you more efficiently if you prepare before you call.

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system and any optional devices are turned on.
- Check for updated software, firmware, and operating-system device drivers for your Lenovo product. The Lenovo Warranty terms and conditions state that you, the owner of the Lenovo product, are responsible for maintaining and updating all software and firmware for the product (unless it is covered by an additional maintenance contract). Your service technician will request that you upgrade your software and firmware if the problem has a documented solution within a software upgrade.
- If you have installed new hardware or software in your environment, check the [IBM ServerProven website](#) to make sure that the hardware and software is supported by your product.
- Go to the [IBM Support portal](#) to check for information to help you solve the problem.
- Gather the following information to provide to the service technician. This data will help the service technician quickly provide a solution to your problem and ensure that you receive the level of service for which you might have contracted.
 - Hardware and Software Maintenance agreement contract numbers, if applicable
 - Machine type number (if applicable—Lenovo 4-digit machine identifier)
 - Model number
 - Serial number
 - Current system UEFI and firmware levels
 - Other pertinent information such as error messages and logs

- Start the process of determining a solution to your problem by making the pertinent information available to the service technicians. The IBM service technicians can start working on your solution as soon as you have completed and submitted an Electronic Service Request.

You can solve many problems without outside assistance by following the troubleshooting procedures that Lenovo provides in the online help or in the Lenovo product documentation. The Lenovo product documentation also describes the diagnostic tests that you can perform. The documentation for most systems, operating systems, and programs contains troubleshooting procedures and explanations of error messages and error codes. If you suspect a software problem, see the documentation for the operating system or program.

Appendix C. Notices

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Important Notes

Processor speed indicates the internal clock speed of the microprocessor; other factors also affect application performance.

CD or DVD drive speed is the variable read rate. Actual speeds vary and are often less than the possible maximum.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for 1 024 bytes, MB stands for 1 048 576 bytes, and GB stands for 1 073 741 824 bytes.

When referring to hard disk drive capacity or communications volume, MB stands for 1 000 000 bytes, and GB stands for 1 000 000 000 bytes. Total user-accessible capacity can vary depending on operating environments.

Maximum internal hard disk drive capacities assume the replacement of any standard hard disk drives and population of all hard-disk-drive bays with the largest currently supported drives that are available from Lenovo.

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Each solid-state memory cell has an intrinsic, finite number of write cycles that the cell can incur. Therefore, a solid-state device has a maximum number of write cycles that it can be subjected to, expressed as total bytes written (TBW). A device that has exceeded this limit might fail to respond to system-generated commands or might be incapable of being written to. Lenovo is not responsible for replacement of a device that has exceeded its maximum guaranteed number of program/erase cycles, as documented in the Official Published Specifications for the device.

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Some software might differ from its retail version (if available) and might not include user manuals or all program functionality.

Recycling Information

Lenovo encourages owners of information technology (IT) equipment to responsibly recycle their equipment when it is no longer needed. Lenovo offers a variety of programs and services to assist equipment owners in recycling their IT products. For information on recycling Lenovo products, go to:

<http://www.lenovo.com/recycling>

Particulate Contamination

Attention: Airborne particulates (including metal flakes or particles) and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the device that is described in this document.

Risks that are posed by the presence of excessive particulate levels or concentrations of harmful gases include damage that might cause the device to malfunction or cease functioning altogether. This specification sets forth limits for particulates and gases that are intended to avoid such damage. The limits must not be viewed or used as definitive limits, because numerous other factors, such as temperature or moisture content of the air, can influence the impact of particulates or environmental corrosives and gaseous contaminant transfer. In the absence of specific limits that are set forth in this document, you must implement practices that maintain particulate and gas levels that are consistent with the protection of human health and safety. If Lenovo determines that the levels of particulates or gases in your environment have caused damage to the device, Lenovo may condition provision of repair or replacement of devices or parts on implementation of appropriate remedial measures to mitigate such environmental contamination. Implementation of such remedial measures is a customer responsibility..

Contaminant	Limits
Particulate	<ul style="list-style-type: none">• The room air must be continuously filtered with 40% atmospheric dust spot efficiency (MERV 9) according to ASHRAE Standard 52.2¹.• Air that enters a data center must be filtered to 99.97% efficiency or greater, using high-efficiency particulate air (HEPA) filters that meet MIL-STD-282.• The deliquescent relative humidity of the particulate contamination must be more than 60%².• The room must be free of conductive contamination such as zinc whiskers.
Gaseous	<ul style="list-style-type: none">• Copper: Class G1 as per ANSI/ISA 71.04-1985³• Silver: Corrosion rate of less than 300 Å in 30 days

¹ ASHRAE 52.2-2008 - *Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size*. Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.

² The deliquescent relative humidity of particulate contamination is the relative humidity at which the dust absorbs enough water to become wet and promote ionic conduction.

³ ANSI/ISA-71.04-1985. *Environmental conditions for process measurement and control systems: Airborne contaminants*. Instrument Society of America, Research Triangle Park, North Carolina, U.S.A.

Telecommunication Regulatory Statement

This product may not be certified in your country for connection by any means whatsoever to interfaces of public telecommunications networks. Further certification may be required by law prior to making any such connection. Contact a Lenovo representative or reseller for any questions.

Electronic Emission Notices

When you attach a monitor to the equipment, you must use the designated monitor cable and any interference suppression devices that are supplied with the monitor.

Federal Communications Commission (FCC) Statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used to meet FCC emission limits. Lenovo is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

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Industry Canada Class A Emission Compliance Statement

This Class A digital apparatus complies with Canadian ICES-003.

Avis de Conformité à la Réglementation d'Industrie Canada

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Australia and New Zealand Class A Statement

Attention: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

European Union - Compliance to the Electromagnetic Compatibility Directive

This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC (until April 19, 2016) and EU Council Directive 2014/30/EU (from April 20, 2016) on the approximation of the laws of the Member States relating to electromagnetic compatibility. Lenovo cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the installation of option cards from other manufacturers.

This product has been tested and found to comply with the limits for Class A equipment according to European Standards harmonized in the Directives in compliance. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment.

Lenovo, Einsteinova 21, 851 01 Bratislava, Slovakia



Warning: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Germany Class A Statement

Deutschsprachiger EU Hinweis:

Hinweis für Geräte der Klasse A EU-Richtlinie zur Elektromagnetischen Verträglichkeit

Dieses Produkt entspricht den Schutzanforderungen der EU-Richtlinie 2014/30/EU (früher 2004/108/EC) zur Angleichung der Rechtsvorschriften über die elektromagnetische Verträglichkeit in den EU-Mitgliedsstaaten und hält die Grenzwerte der Klasse A der Norm gemäß Richtlinie.

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Deutschland:

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Dieses Produkt entspricht dem „Gesetz über die elektromagnetische Verträglichkeit von Betriebsmitteln“ EMVG (früher „Gesetz über die elektromagnetische Verträglichkeit von Geräten“). Dies ist die Umsetzung der EU-Richtlinie 2014/30/EU (früher 2004/108/EC) in der Bundesrepublik Deutschland.

Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Betriebsmitteln, EMVG vom 20. Juli 2007 (früher Gesetz über die elektromagnetische Verträglichkeit von Geräten), bzw. der EMV EU Richtlinie 2014/30/EU (früher 2004/108/EC), für Geräte der Klasse A.

Dieses Gerät ist berechtigt, in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen. Verantwortlich für die Konformitätserklärung nach Paragraf 5 des EMVG ist die Lenovo (Deutschland) GmbH, Meitnerstr. 9, D-70563 Stuttgart.

Informationen in Hinsicht EMVG Paragraf 4 Abs. (1) 4:

Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse A.

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VCCI-A

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Japan Electronics and Information Technology Industries Association (JEITA) Statement

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Japan Electronics and Information Technology Industries Association (JEITA)
Confirmed Harmonics Guidelines (products less than or equal to 20 A per phase)

高調波ガイドライン準用品

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People's Republic of China Class A electronic emission statement

中华人民共和国“A类”警告声明

声明

此为A级产品，在生活环境中，该产品可能会造成无线电干扰。在这种情况下，
可能需要用户对其干扰采取切实可行的措施。

Taiwan Class A compliance statement

警告使用者：
這是甲類的資訊產品，在
居住的環境中使用時，可
能會造成射頻干擾，在這
種情況下，使用者會被要
求採取某些適當的對策。

