



# Python API

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Python programmability supports Python APIs.

- [Using Python, on page 1](#)

## Using Python

### Cisco Python Module

Cisco provides a Python module that provides access to run EXEC and configuration commands. You can display the details of the Cisco Python module by entering the **help()** command. The **help()** command displays the properties of the Cisco CLI module.

The following example displays information about the Cisco Python module:

```
Device# guestshell run python

Python 2.7.5 (default, Jun 17 2014, 18:11:42)
[GCC 4.8.2 20140120 (Red Hat 4.8.2-16)] on linux2
Type "help", "copyright", "credits" or "license" for more information.
>>> >>> from cli import cli,clip,configure,configurep, execute, executep
>>> help(configure)
Help on function configure in module cli:

configure(configuration)
Apply a configuration (set of Cisco IOS CLI config-mode commands) to the device
and return a list of results.

configuration = '''interface gigabitEthernet 0/0
no shutdown'''

# push it through the Cisco IOS CLI.
try:
results = cli.configure(configuration)
print "Success!"
except CLIConfigurationError as e:
print "Failed configurations:"
for failure in e.failed:
print failure

Args:
configuration (str or iterable): Configuration commands, separated by newlines.
```

Returns:  
list(ConfigResult): A list of results, one for each line.

Raises:  
CLISyntaxError: If there is a syntax error in the configuration.

>>> **help(configurep)**

Help on function configurep in module cli:

configurep(configuration)  
Apply a configuration (set of Cisco IOS CLI config-mode commands) to the device and prints the result.

```
configuration = '''interface gigabitEthernet 0/0
no shutdown'''
```

```
# push it through the Cisco IOS CLI.
configurep(configuration)
```

Args:  
configuration (str or iterable): Configuration commands, separated by newlines.

>>> **help(execute)**

Help on function execute in module cli:

execute(command)  
Execute Cisco IOS CLI exec-mode command and return the result.

```
command_output = execute("show version")
```

Args:  
command (str): The exec-mode command to run.

Returns:  
str: The output of the command.

Raises:  
CLISyntaxError: If there is a syntax error in the command.

>>> **help(executep)**

Help on function executep in module cli:

executep(command)  
Execute Cisco IOS CLI exec-mode command and print the result.

```
executep("show version")
```

Args:  
command (str): The exec-mode command to run.

>>> **help(cli)**

Help on function cli in module cli:

cli(command)  
Execute Cisco IOS CLI command(s) and return the result.

A single command or a delimited batch of commands may be run. The delimiter is a space and a semicolon, " ;". Configuration commands must be in fully qualified form.

```
output = cli("show version")
output = cli("show version ; show ip interface brief")
```

```
output = cli("configure terminal ; interface gigabitEthernet 0/0 ; no shutdown")
```

Args:

command (str): The exec or config CLI command(s) to be run.

Returns:

string: CLI output for show commands and an empty string for configuration commands.

Raises:

errors.cli\_syntax\_error: if the command is not valid.

errors.cli\_exec\_error: if the execution of command is not successful.

```
>>> help(cli)
```

Help on function cli in module cli:

```
cli(command)
```

Execute Cisco IOS CLI command(s) and print the result.

A single command or a delimited batch of commands may be run. The delimiter is a space and a semicolon, " ;". Configuration commands must be in fully qualified form.

```
cli("show version")
```

```
cli("show version ; show ip interface brief")
```

```
cli("configure terminal ; interface gigabitEthernet 0/0 ; no shutdown")
```

Args:

command (str): The exec or config CLI command(s) to be run.

## Cisco Python Module to Execute IOS CLI Commands



**Note** Guest Shell must be enabled for Python to run. For more information, see the *Guest Shell* chapter.

The Python programming language uses six functions that can execute CLI commands. These functions are available from the Python CLI module. To use these functions, execute the **import cli** command.

Arguments for these functions are strings of CLI commands. To execute a CLI command through the Python interpreter, enter the CLI command as an argument string of one of the following six functions:

- **cli.cli(command)**—This function takes an IOS command as an argument, runs the command through the IOS parser, and returns the resulting text. If this command is malformed, a Python exception is raised. The following is sample output from the **cli.cli(command)** function:

```
>>> import cli
>>> cli.cli('configure terminal; interface loopback 10; ip address
10.10.10.10 255.255.255.255')
*Mar 13 18:39:48.518: %LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback10, changed
state to up
>>> cli.cli('show clock')
'\n*18:11:53.989 UTC Mon Mar 13 2017\n'
>>> output=cli.cli('show clock')
>>> print(output)
```

```
*18:12:04.705 UTC Mon Mar 13 2017
```

- **cli.clip(command)**—This function works exactly the same as the **cli.cli(command)** function, except that it prints the resulting text to *stdout* rather than returning it. The following is sample output from the **cli.clip(command)** function:

```
>>> cli
>>> cli.clip('configure terminal; interface loopback 11; ip address
10.11.11.11 255.255.255.255')
*Mar 13 18:42:35.954: %LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback11, changed
state to up
*Mar 13 18:42:35.954: %LINK-3-UPDOWN: Interface Loopback11, changed state to up
>>> cli.clip('show clock')
*18:13:35.313 UTC Mon Mar 13 2017
>>> output=cli.clip('show clock')
*18:19:26.824 UTC Mon Mar 13 2017
>>> print (output)
None
```

- **cli.execute(command)**—This function executes a single EXEC command and returns the output; however, does not print the resulting text. No semicolons or newlines are allowed as part of this command. Use a Python list with a for-loop to execute this function more than once. The following is sample output from the **cli.execute(command)**

function:

```
>>> cli.execute("show clock")
'15:11:20.816 UTC Thu Jun 8 2017'
>>>
>>> cli.execute('show clock'; 'show ip interface brief')
File "<stdin>", line 1
    cli.execute('show clock'; 'show ip interface brief')
    ^
SyntaxError: invalid syntax
>>>
```

- **cli.executep(command)**—This function executes a single command and prints the resulting text to *stdout* rather than returning it. The following is sample output from the **cli.executep(command)** function:

```
>>> cli.executep('show clock')
*18:46:28.796 UTC Mon Mar 13 2017
>>> output=cli.executep('show clock')
*18:46:36.399 UTC Mon Mar 13 2017
>>> print(output)
None
```

- **cli.configure(command)**—This function configures the device with the configuration available in commands. It returns a list of named tuples that contains the command and its result as shown below:

```
[Think: result = (bool(success), original_command, error_information)]
```

The command parameters can be in multiple lines and in the same format that is displayed in the output of the **show running-config** command. The following is sample output from the **cli.configure(command)** function:

```
>>>cli.configure(["interface GigabitEthernet1/0/7", "no shutdown",
"end"])
[ConfigResult(success=True, command='interface GigabitEthernet1/0/7',
line=1, output='', notes=None), ConfigResult(success=True, command='no shutdown',
line=2, output='', notes=None), ConfigResult(success=True, command='end',
line=3, output='', notes=None)]
```

- **cli.configurep(command)**—This function works exactly the same as the **cli.configure(command)** function, except that it prints the resulting text to *stdout* rather than returning it. The following is sample output from the **cli.configurep(command)** function:

```
>>> cli.configurep(["interface GigabitEthernet1/0/7", "no shutdown",
"end"])
Line 1 SUCCESS: interface GigabitEthernet1/0/7
Line 2 SUCCESS: no shut
Line 3 SUCCESS: end
```

