

Chapter 1: Setting Up Our Python Environment

WHICH VERSION OF PYTHON DOES YOUR DEVICE SUPPORT?

	CAT 3650	CAT 3850	ISR 4K	Nexus 3K/9K	Nexus 5K/6K	Nexus 7K
Python 2.7	IOS-XE 16.5.1	IOS-XE 16.5.1	IOS-XE 16.5.1	N3K NX-OS 6.0 N9K NX-OS 7.0	N5K NX-OS 5.2 N6K NX-OS 6.0	NX-OS 6.1
Python 3.x	N/A	N/A	IOS-XE 16.5.1			

The screenshot shows a Python console window titled "Python Console - DevNet" with a "Django Console" tab. The code being executed is as follows:

```
>>> #python 2. multiple strings
... print ("welcome", "to", "Enterprise", "Automation")
...
('welcome', 'to', 'Enterprise', 'Automation')
>>>
>>>
>>> from __future__ import print_function
... print ("welcome", "to", "Enterprise", "Automation")
...
+ welcome to Enterprise Automation
>>>
```

Two callout boxes provide explanations:

- The first callout box points to the first `print` statement and says: "Python interpret it as a tuple".
- The second callout box points to the second `print` statement and says: "Python interpret it as a multi strings after Importing __future__".

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Looking for **latest release of python 2.x**

Python releases by version number:

Release version	Release date	Click for more
Python 2.7.15		Download Release Notes
Python 3.6.5		Download Release Notes
Python 3.4.8		Download Release Notes

Download latest release for python 3.x

Python 2.7.15

Release Date: 2018-05-01

Python 2.7.15 is a bugfix release in the Python 2.7 series.

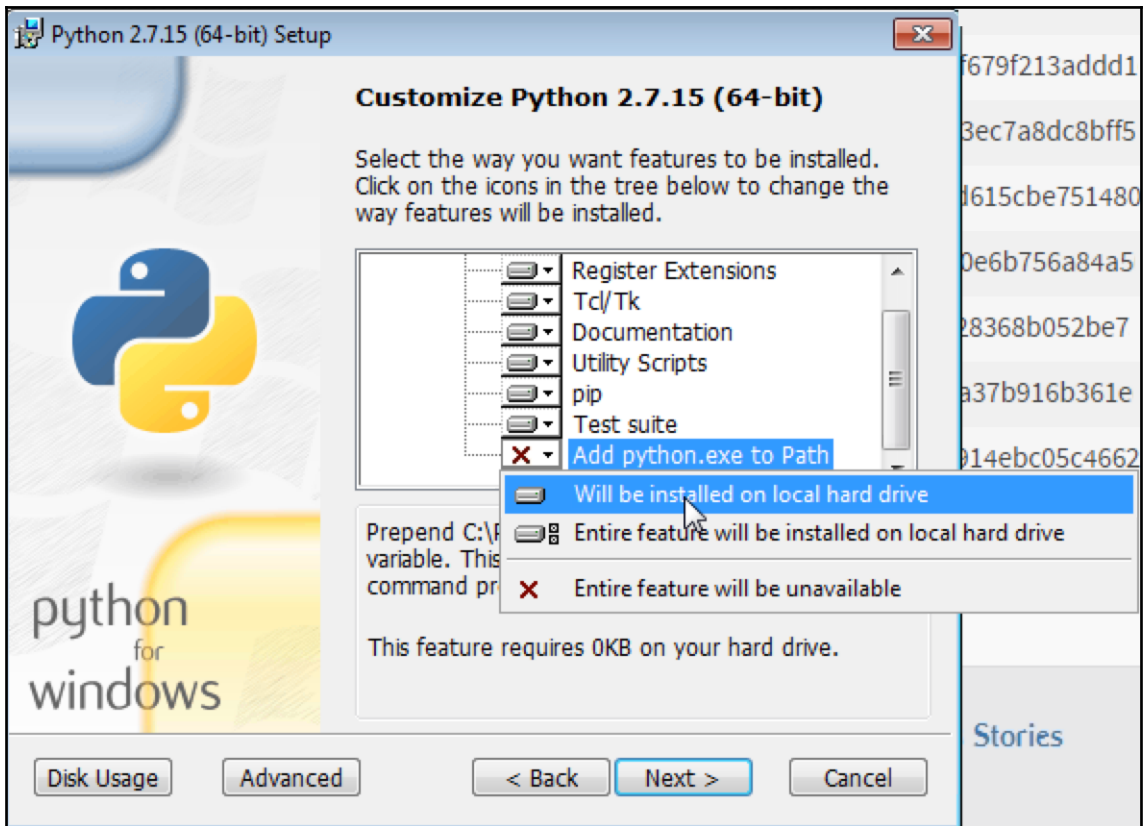
Note:
 Attention macOS users: as of 2.7.15, all python.org macOS installers ship with a builtin copy of OpenSSL. Additionally, there is a new additional installer variant for macOS 10.9+ that includes a built-in version of Tcl/Tk 8.6. See the installer README for more information.

Files

Version	Operating System	Description	MD5	File Size	GPG
Gzipped source tarball	Source release		40219a1f6923fedabde63342	17496336	SIG
XZ compressed source tarball	Source release		a80ae3cc478460b922242f43a1b4094d	12642436	SIG
macOS 64-bit/32-bit installer	Mac OS X	for Mac OS X 10.6 and later	9ac8c85150147f679f213addd1e7d96e	25193631	SIG
macOS 64-bit installer	Mac OS X	for OS X 10.9 and later	223b71346316c3ec7a8dc8bff5476d84	23768240	SIG
Windows debug information files	Windows		4c61ef61d4c51d615cbe751480be01f8	25079974	SIG
Windows debug information files for 64-bit binaries	Windows		680bf74bad3700e6b756a84a56720949	25858214	SIG
Windows help file	Windows		297315472777f28368b052be734ba2ee	6252777	SIG
Windows x86-64 MSI installer	Windows	for AMD64/EM64T/x64	0ffa4a86522f9a37b916b361eebc552	20246528	SIG
Windows x86 MSI installer	Windows		023e49c9fba54914ebc05c4662a93ffe	19304448	SIG

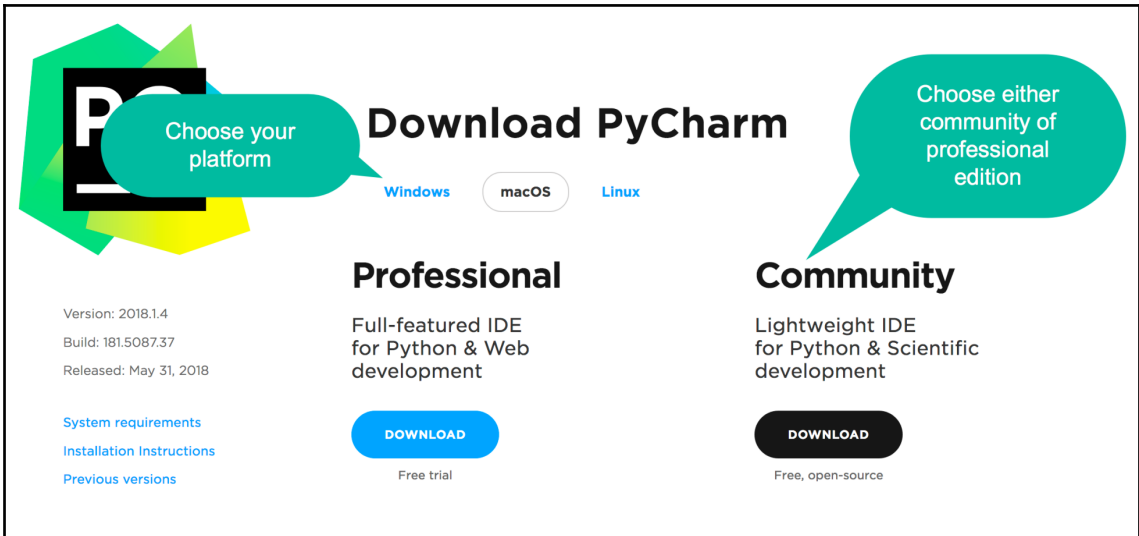
I choose the 2.7.15

All supported platforms will be listed here



```
system32\cmd.exe - python
Python 2.7.15 (tags/v2.7.15:ca079a3ea3, Apr 30 2018, 16:30:26) [MSC v.1500 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> _
```

Python version



Choose your platform

Download PyCharm

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Choose either community of professional edition

Professional

Full-featured IDE for Python & Web development

[DOWNLOAD](#)

Free trial

Community

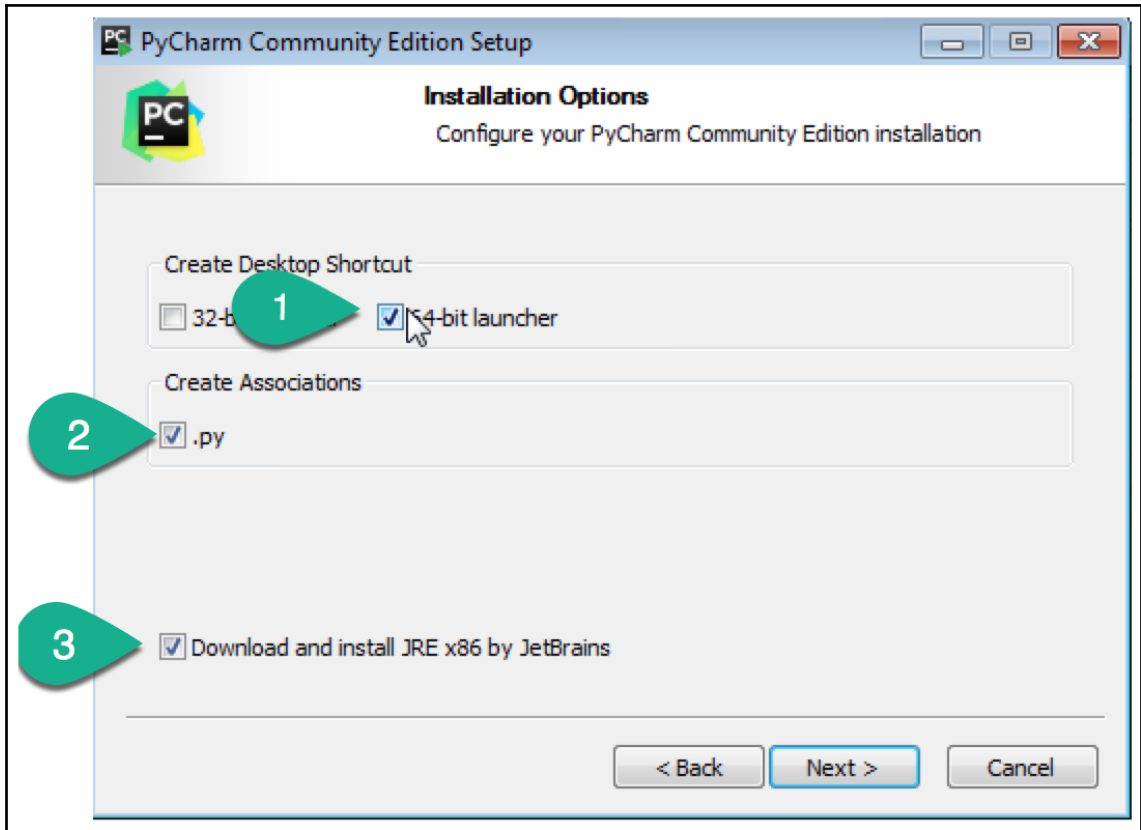
Lightweight IDE for Python & Scientific development

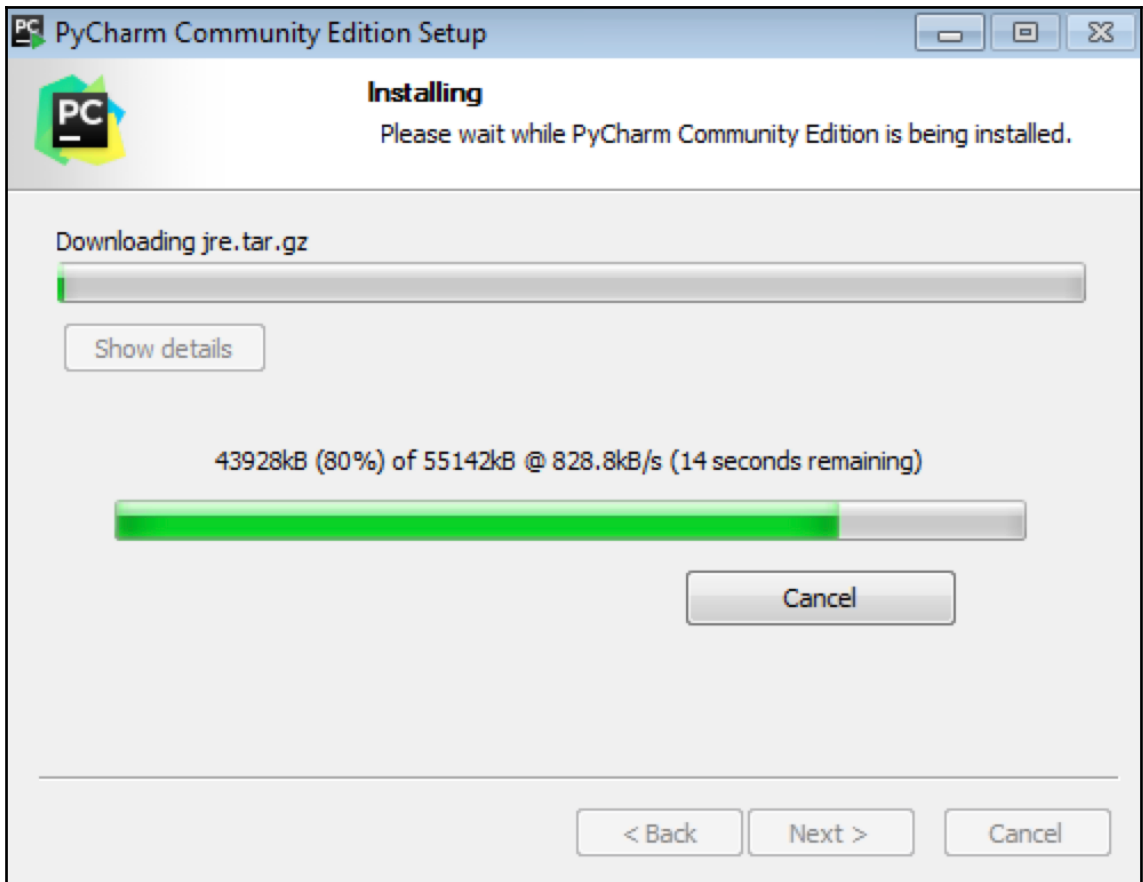
[DOWNLOAD](#)

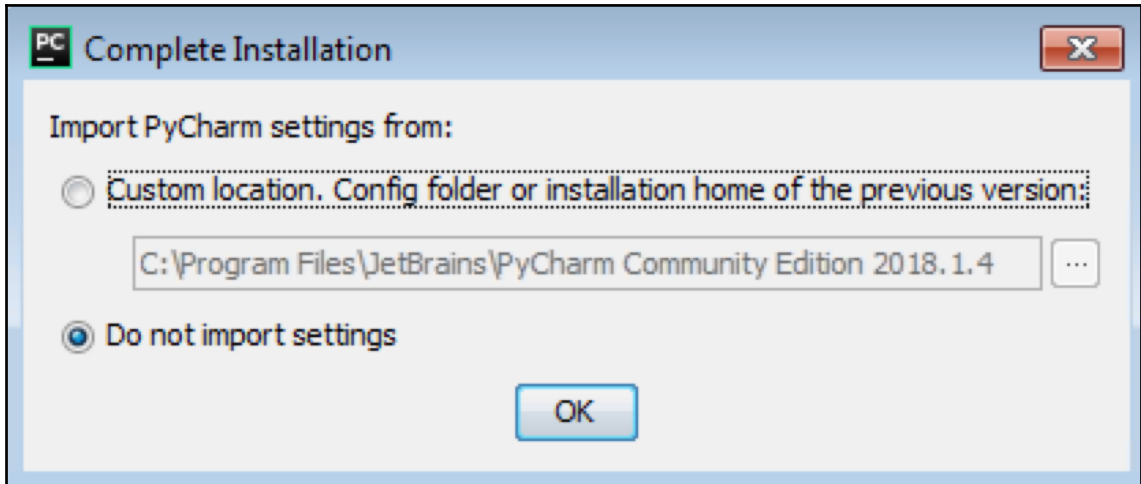
Free, open-source

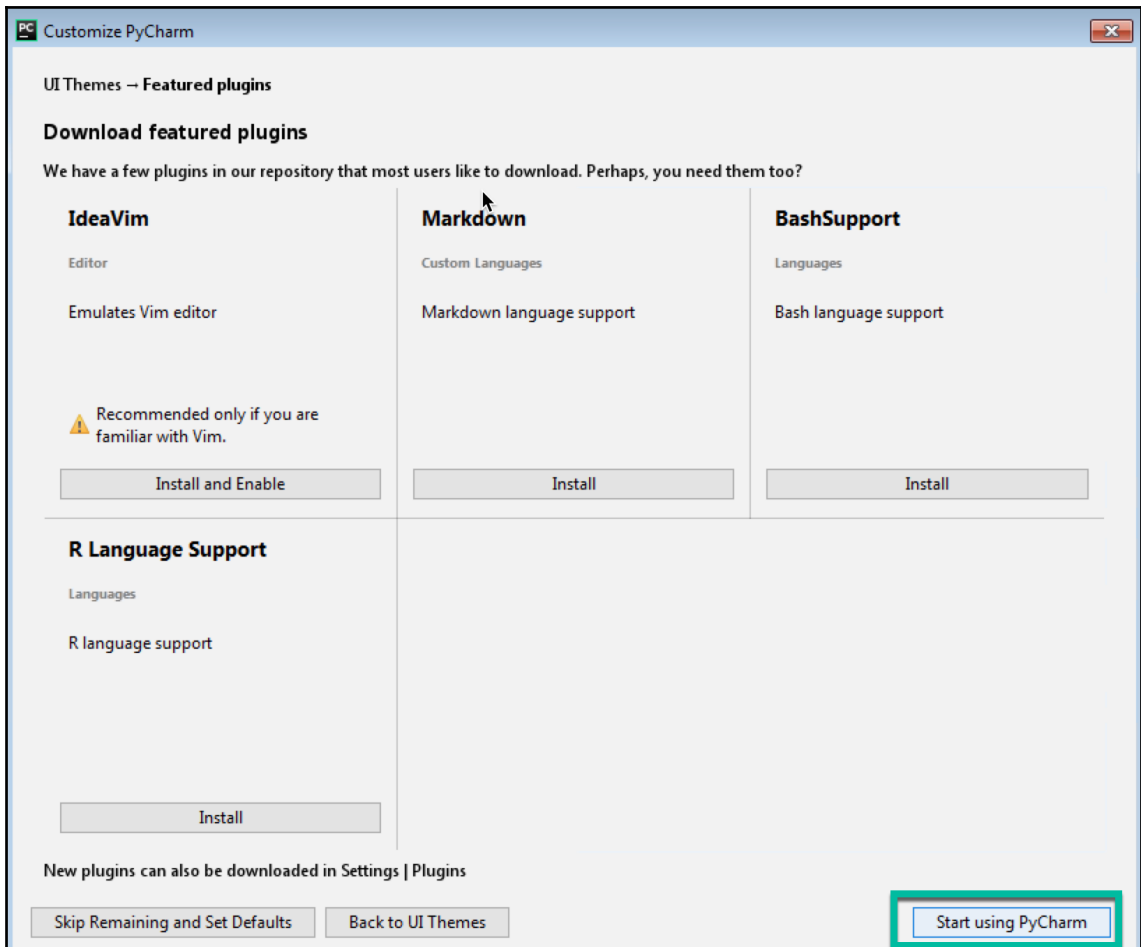
Version: 2018.1.4
Build: 181.5087.37
Released: May 31, 2018

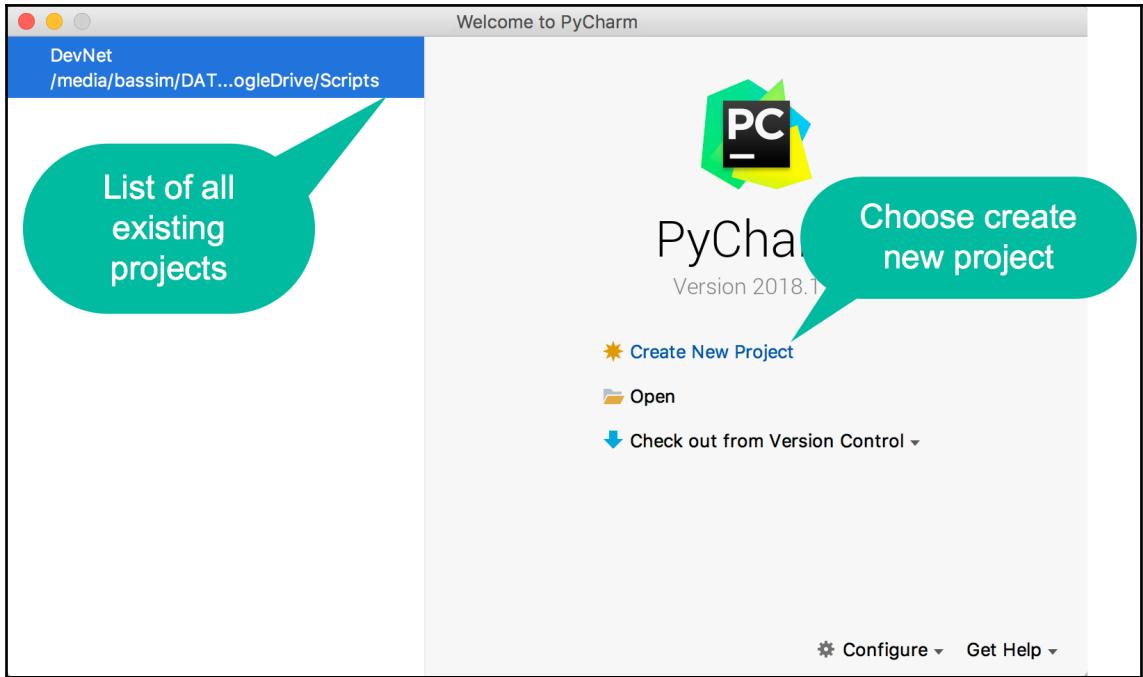
[System requirements](#)
[Installation Instructions](#)
[Previous versions](#)

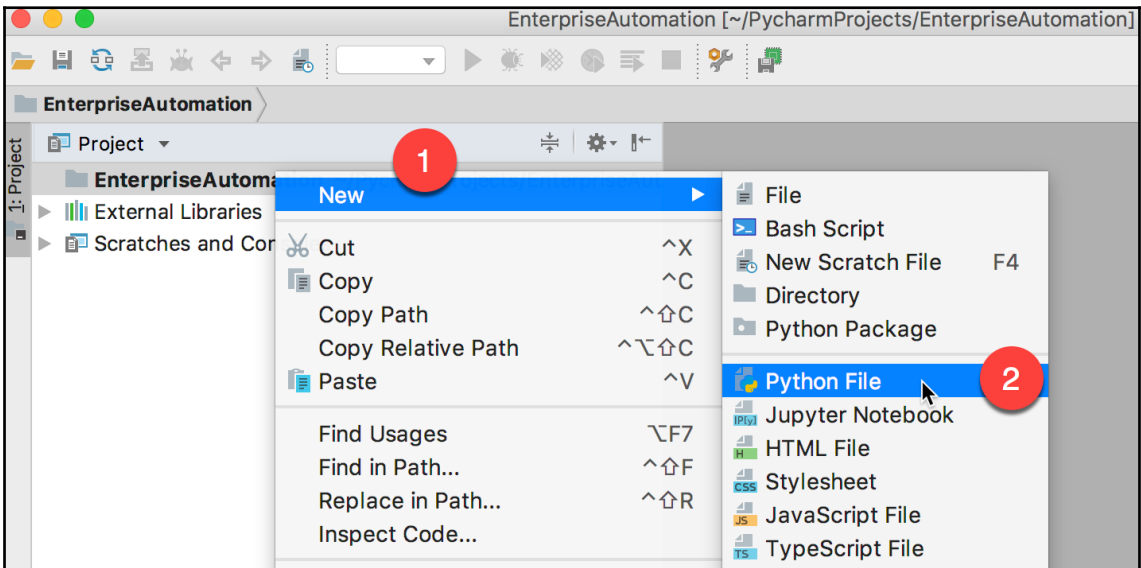
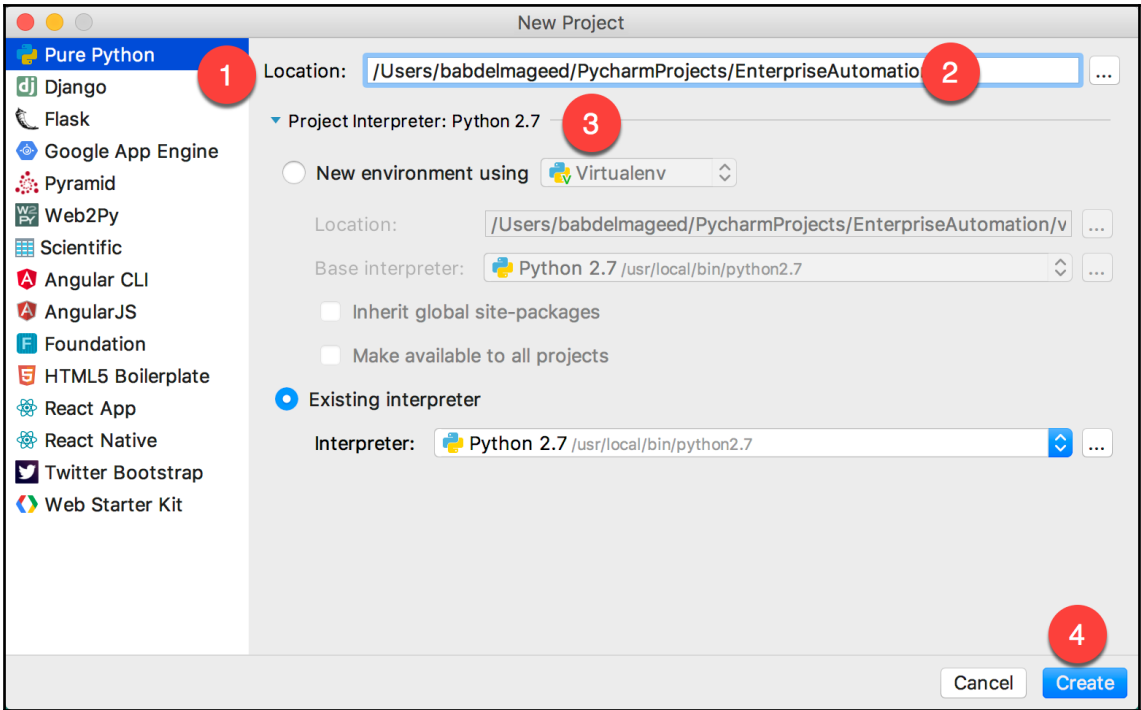












```
1 from __future__ import print_function
```

```
1 from __future__ import print_function  
2  
3 print("Welcome to Enterprise Automation")
```

Run/Debug Configurations

Name: Run

Script path: /Users/babdeltageed/PycharmProjects/EnterpriseAutomation/Hello_World.py

Parameters:

Environment

Environment variables: PYTHONUNBUFFERED=1

Python interpreter: Python 2.7

Interpreter options:

Working directory: /Users/babdeltageed/PycharmProjects/EnterpriseAutomation

Add content roots to PYTHONPATH

Add source roots to PYTHONPATH

Emulate terminal in output console

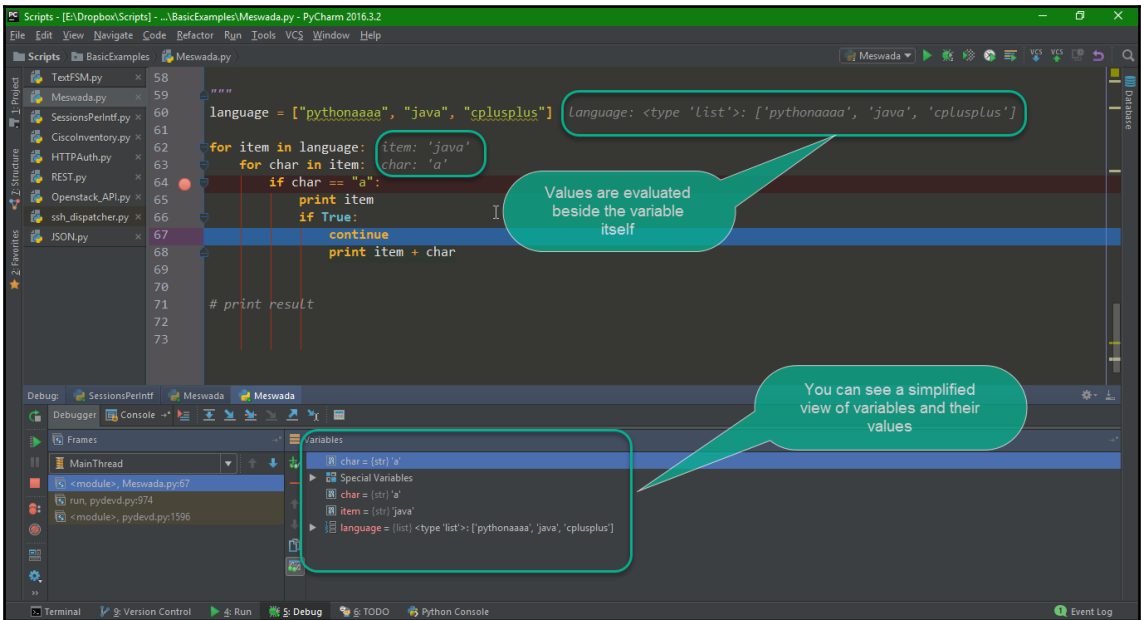
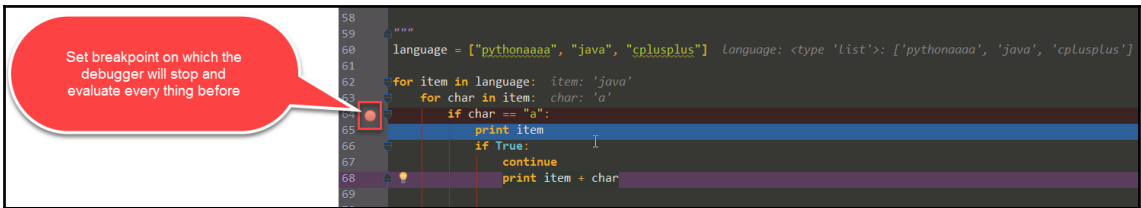
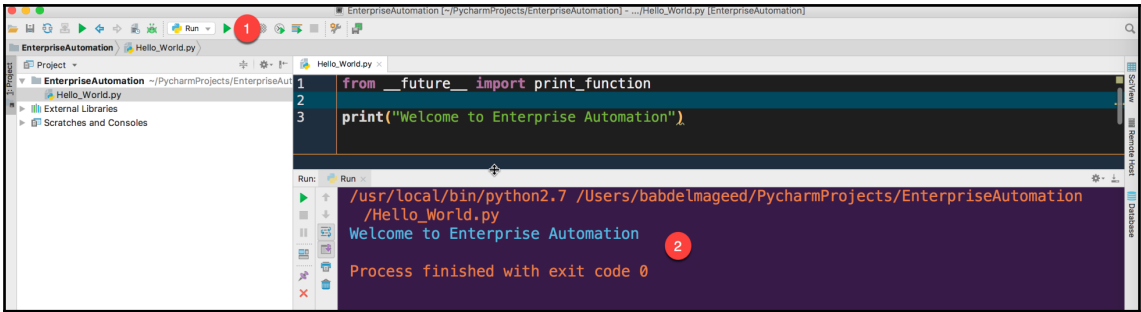
Run with Python console

Before launch: Activate tool window

There are no tasks to run before launch

Show this page Activate tool window

Cancel Apply OK



Scripts
Person Inspection

```
77 for host in hosts: host: 'y'  
78 print (1+2)  
return_name(host)
```

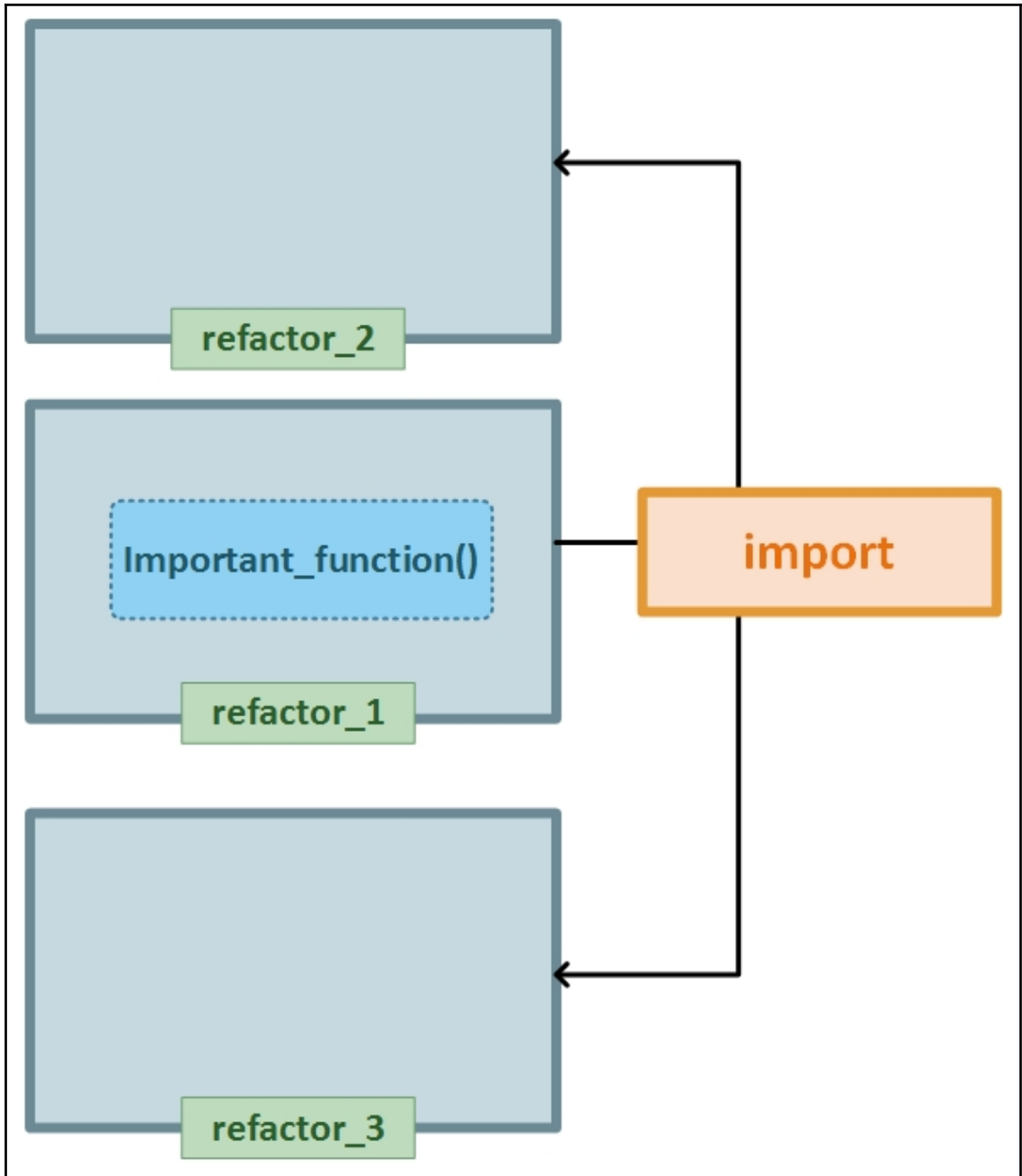
Test_Area.py:79

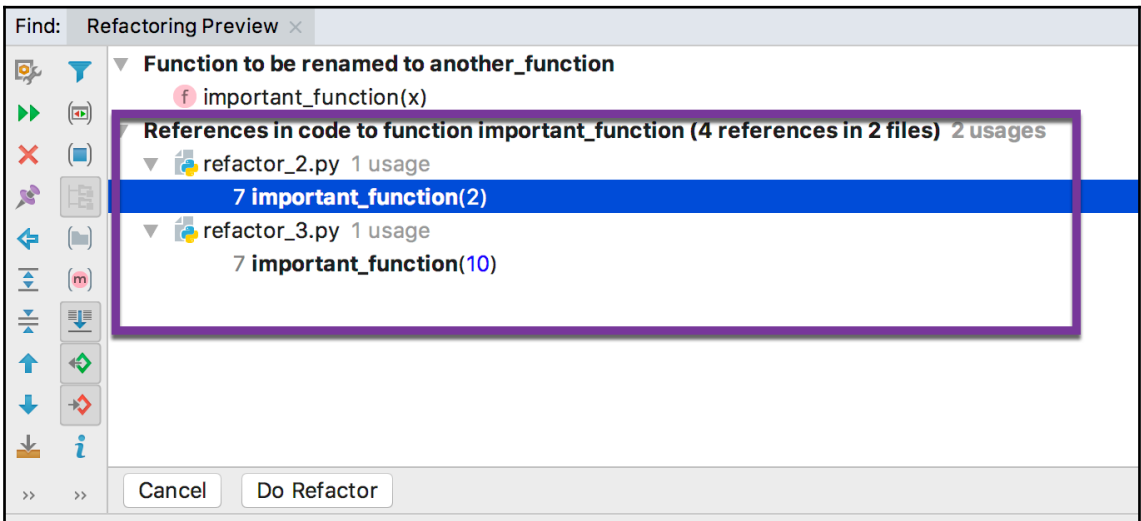
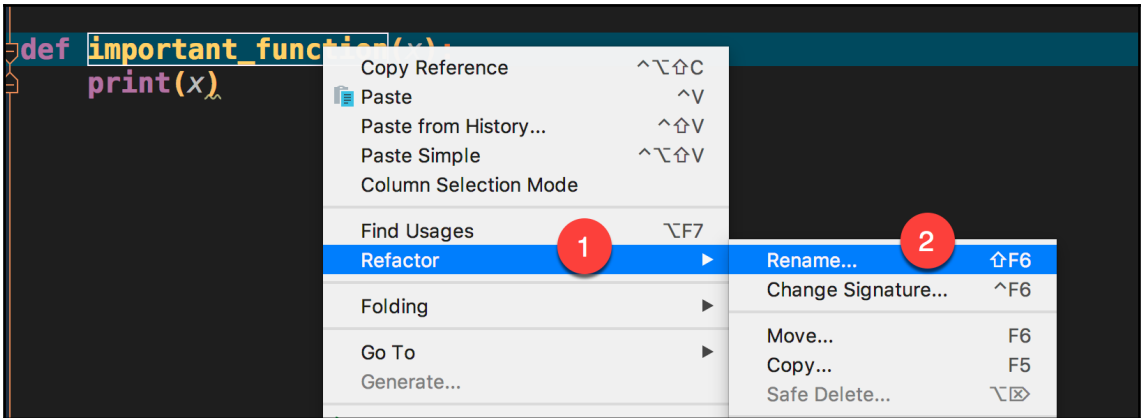
- Enabled
- Suspend All Thread
- Condition:
- Log message to console
- Evaluate and log:
- Remove once hit

[More \(Ctrl+Shift+F8\)](#)

set a condition that once reached, program will exit

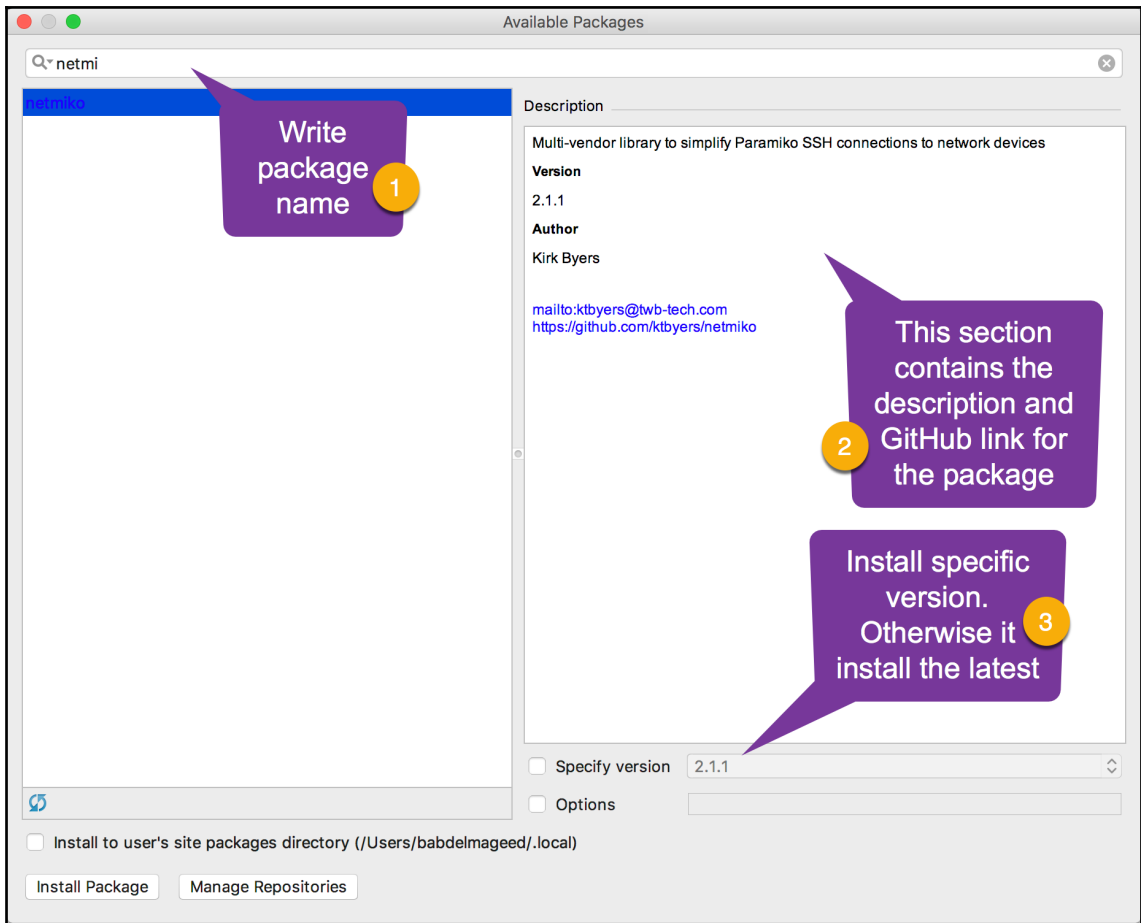
Generate a log message once





The screenshot shows the 'Project Interpreter' preferences window in PyCharm. The window title is 'Project: EnterpriseAutomation > Project Interpreter'. Below the title, it says 'Project Interpreter: Python 2.7 [usr/local/bin/python2.7]'. The main area is a table of installed packages. The table has columns for 'Package', 'Version', and 'Latest'. The packages listed include Django, PyNaCl, PyYAML, appscript, asn1crypto, bcrypt, cffi, cryptography, enum34, fabric, idna, invoke, ipaddress, netaddr, netmiko, paramiko, pip, prettytable, pyasn1, pycparser, pyserial, pytz, scp, selenium, setuptools, six, textfsm, wheel, and wsgiref. Callouts with numbers 1 through 6 point to various elements: 1 points to the window title, 2 points to the Python version, 3 points to the package list, 4 points to the 'Latest' column, 5 points to the '+ - ▲' buttons at the bottom, and 6 points to the '+' button.

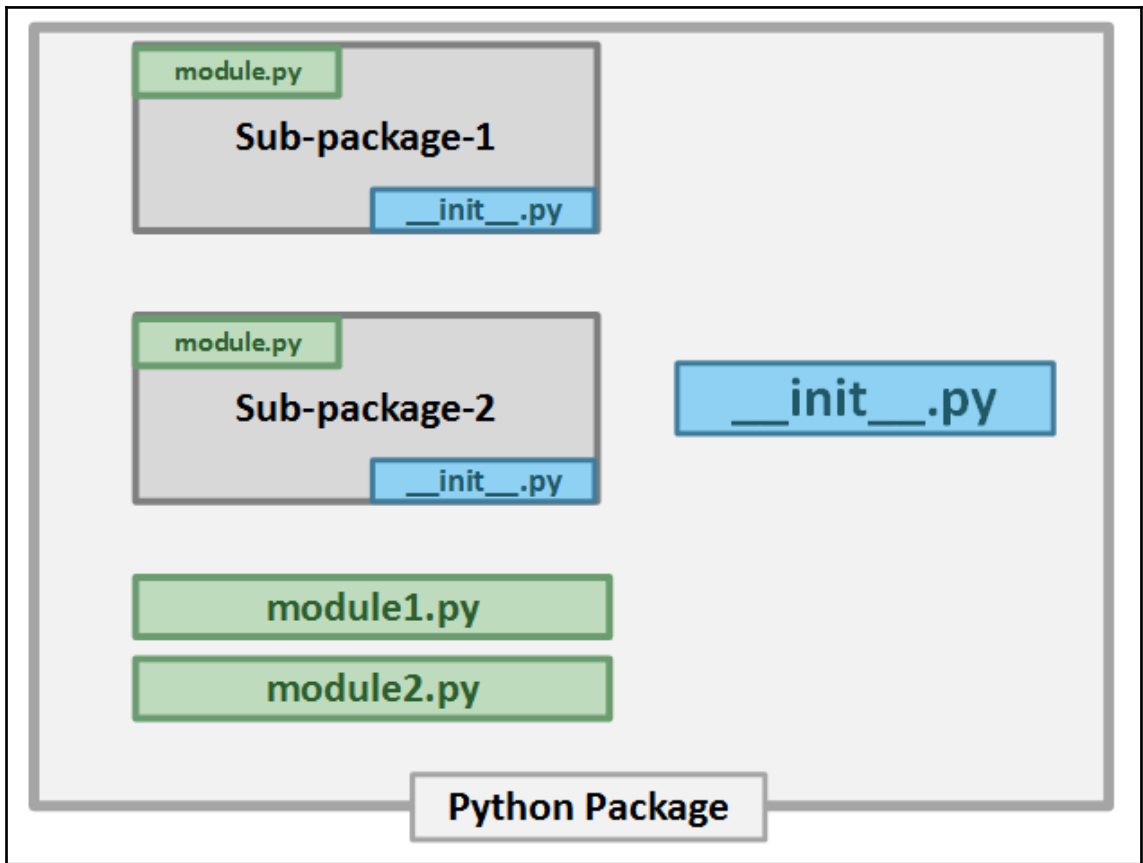
Package	Version	Latest
Django	1.11.1	2.1a1
PyNaCl	1.2	1.2.1
PyYAML	3.1	3.12
appscript	1.0	1.0.1
asn1crypto	0.24.0	0.24.0
bcrypt	3.1.4	3.1.4
cffi	1.11.5	1.11.5
cryptography	2.2.2	2.2.2
enum34	1.1.6	1.1.6
fabric	2.1.3	2.1.3
idna	2.6	2.7
invoke	1.0.0	1.0.0
ipaddress	1.0.22	1.0.22
netaddr	0.7.19	0.7.19
netmiko	2.1.1	2.1.1
paramiko	2.4.1	2.4.1
pip	10.0.1	10.0.1
prettytable	0.7.2	7
pyasn1	0.4.2	0.4.3
pycparser	2.18	2.18
pyserial	3.4	3.4
pytz	2018.4	2018.4
scp	0.11.0	0.11.0
selenium	3.12.0	3.12.0
setuptools	39.1.0	39.2.0
six	1.11.0	1.11.0
textfsm	0.4.1	0.4.1
wheel	0.31.0	0.31.1
wsgiref	0.1.2	0.1.2




Chapter 2: Common Libraries Used in Automation

```
from netmiko.  
_textfsm /usr/local/lib/python2.7/site-packages/netmiko  
a10 /usr/local/lib/python2.7/site-packages/netmiko  
accedian /usr/local/lib/python2.7/site-packages/netmiko  
alcatel /usr/local/lib/python2.7/site-packages/netmiko  
arista /usr/local/lib/python2.7/site-packages/netmiko  
aruba /usr/local/lib/python2.7/site-packages/netmiko  
avaya /usr/local/lib/python2.7/site-packages/netmiko  
base_connection /usr/local/lib/python2.7/site-packages/netmiko  
brocade /usr/local/lib/python2.7/site-packages/netmiko  
calix /usr/local/lib/python2.7/site-packages/netmiko  
checkpoint /usr/local/lib/python2.7/site-packages/netmiko  
ciena /usr/local/lib/python2.7/site-packages/netmiko  
cisco /usr/local/lib/python2.7/site-packages/netmiko  
cisco_base_connection /usr/local/lib/python2.7/site-packages/netmi...  
coriant /usr/local/lib/python2.7/site-packages/netmiko  
dell /usr/local/lib/python2.7/site-packages/netmiko  
eltex /usr/local/lib/python2.7/site-packages/netmiko  
enterasys /usr/local/lib/python2.7/site-packages/netmiko  
extreme /usr/local/lib/python2.7/site-packages/netmiko  
f5 /usr/local/lib/python2.7/site-packages/netmiko
```

```
bassim:~$ python  
Python 2.7.15rc1 (default, Apr 15 2018, 21:51:34)  
[GCC 7.3.0] on linux2  
Type "help", "copyright", "credits" or "license" for more information.  
>>> import sys  
>>> sys.path  
['', '/usr/lib/python2.7', '/usr/lib/python2.7/plat-x86_64-linux-gnu', '/usr/lib/python2.7/lib-tk', '/usr/lib/python2.7/  
lib-old', '/usr/lib/python2.7/lib-dynload', '/home/bassim/.local/lib/python2.7/site-packages', '/usr/local/lib/python2.7/  
/dist-packages', '/usr/local/lib/python2.7/dist-packages/pycontrail-2.20b64-py2.7.egg', '/usr/lib/python2.7/dist-package  
s']  
>>>
```











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
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Dismiss 

Multi-vendor library to simplify Paramiko SSH connections to network devices

 1,645 commits  3 branches  28 releases  73 contributors  MIT

Branch: **develop**  [New pull request](#) [Find file](#) [Clone or download](#) 

 **ktbyers** Merge pull request #809 from brunopeter/develop  Latest commit 2fbaf5 9 hours ago

 docs	Test of documentation	2 years ago
 examples	Merge pull request #809 from brunopeter/develop	9 hours ago
 netmiko	Minor extreme fix	9 hours ago
 tests	Merge pull request #824 from nmisaki/develop	10 hours ago
 .gitignore	TOX integration	2 years ago
 .travis.yml	rebase	4 months ago
 COMMON_ISSUES.md	Add additional comment to documentation	10 months ago
 LICENSE	Updating copyright year	2 years ago


```
from __future__ import unicode_literals
import logging

# Logging configuration
log = logging.getLogger(__name__) # noqa
log.addHandler(logging.NullHandler()) # noqa

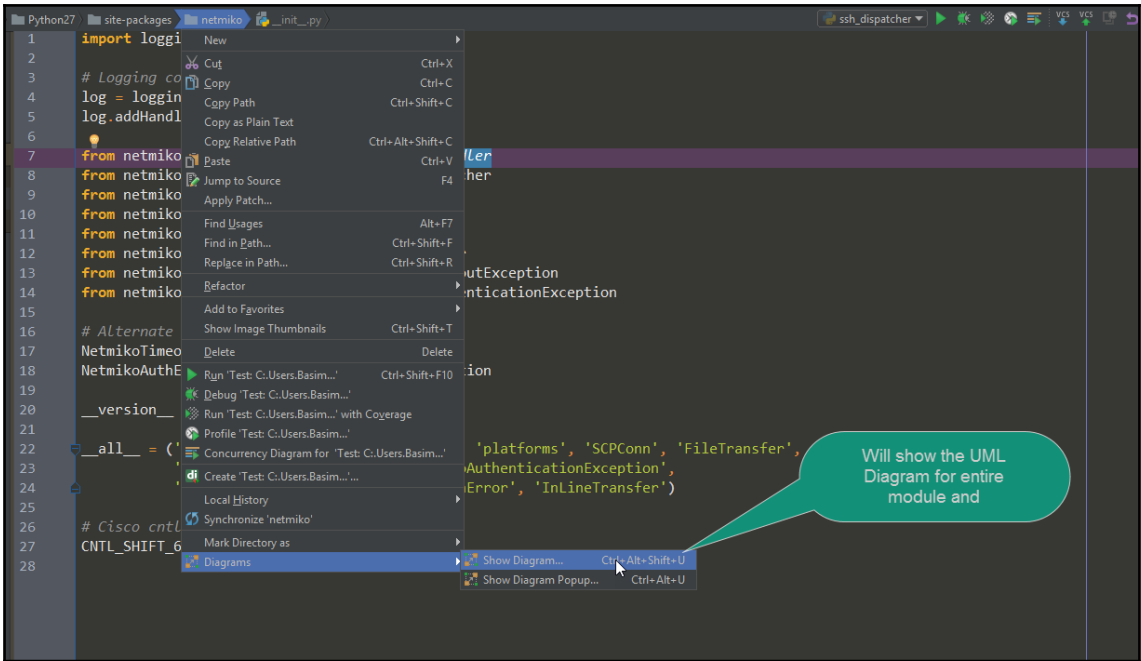
from netmiko.ssh_dispatcher import ConnectHandler
from netmiko.ssh_dispatcher import ssh_dispatcher
from netmiko.ssh_dispatcher import redispatch
from netmiko.ssh_dispatcher import platforms
from netmiko.ssh_dispatcher import FileTransfer
from netmiko.scp_handler import SCPConn
from netmiko.cisco.cisco_ios import InLineTransfer
from netmiko.ssh_exception import NetMikoTimeoutException
from netmiko.ssh_exception import NetMikoAuthenticationException
from netmiko.ssh_autodetect import SSHDetect
from netmiko.base_connection import BaseConnection
from netmiko.scp_functions import file_transfer

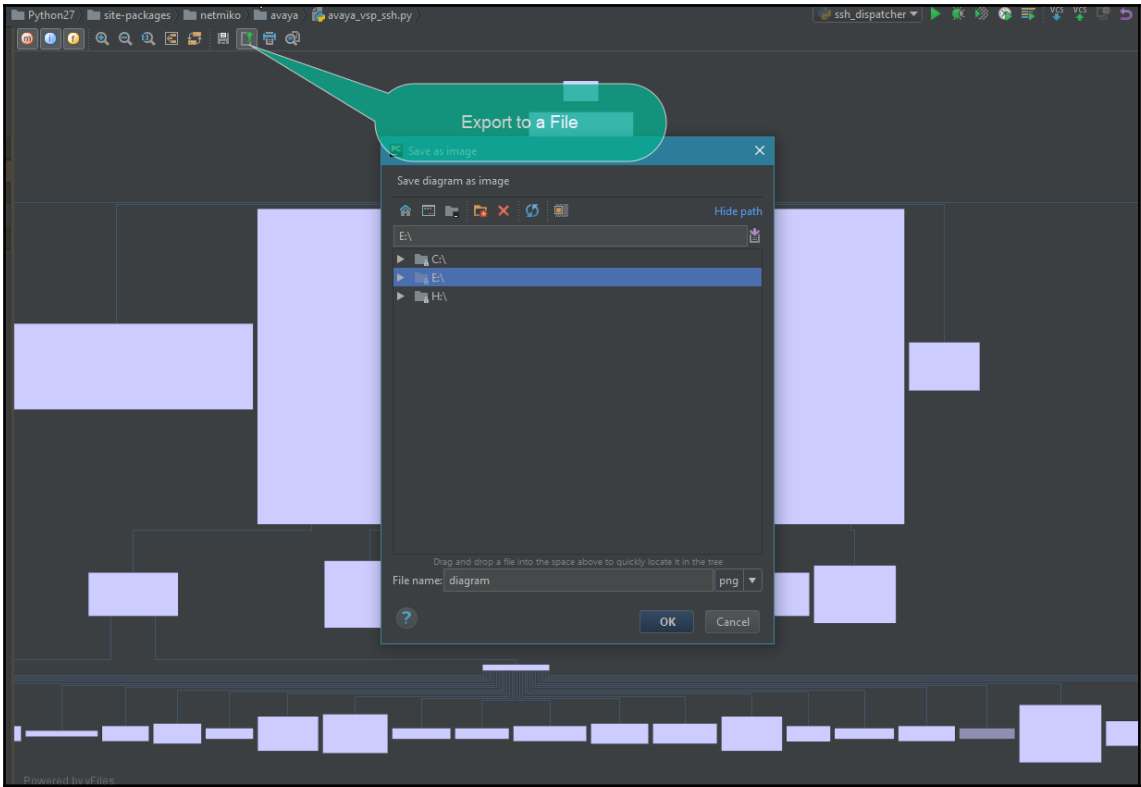
# Alternate naming
NetmikoTimeoutError = NetMikoTimeoutException
NetmikoAuthError = NetMikoAuthenticationException
Netmiko = ConnectHandler

__version__ = '2.1.1'
__all__ = ('ConnectHandler', 'ssh_dispatcher', 'platforms', 'SCPConn', 'FileTransfer',
           'NetMikoTimeoutException', 'NetMikoAuthenticationException',
           'NetmikoTimeoutError', 'NetmikoAuthError', 'InLineTransfer', 'redispatch',
           'SSHDetect', 'BaseConnection', 'Netmiko', 'file_transfer')

# Cisco cntl-shift-six sequence
CNTL_SHIFT_6 = chr(30)
```

init.py file of the netmiko module





The image shows a PyCharm IDE window with a Python file named `base_connection.py` open. The code defines a `BaseConnection` class. A class hierarchy diagram is overlaid on the code, showing the inheritance structure. The diagram includes the following elements:

- Python File Name:** A yellow box pointing to the file path in the IDE.
- module(package) name:** A yellow box pointing to the `netmiko` package in the hierarchy.
- Class Name:** A red box pointing to the `BaseConnection` class in the code and the diagram.
- Inheritance:** A green callout bubble points to the `BaseConnection` class in the diagram with the text: "this class inheriting from netmiko.base_connection_BaseConnection".

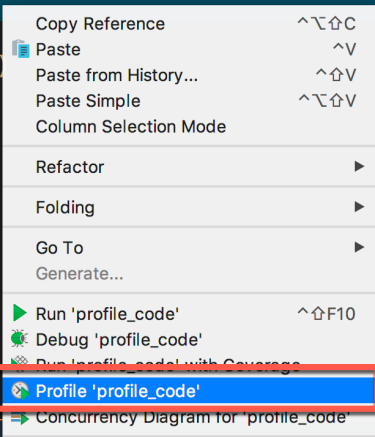
```
graph TD
    object --> BaseConnection
    BaseConnection --> TelnetConnection
    BaseConnection --> F5LtmSSH
    BaseConnection --> CiscoWlcSSH
    BaseConnection --> ExtremeSSH
    BaseConnection --> BrocadeFastironSSH
    BaseConnection --> HPProcureSSH
```

```
10 from __future__ import print_function
11 from __future__ import unicode_literals
12
13 import paramiko
14 import telnetlib
15 import time
16 import socket
17 import re
18 import io
19 from os import path
20
21 from netmiko.netmiko_globals
22 from netmiko.ssh_exception import NetmikoTimeoutException
23 from netmiko.utilities import ipaddress
24 from netmiko import log
25
26
27 class BaseConnection(object):
28     """
29     Defines vendor independent connection methods
30     Otherwise method left as None
31
32     """
33     def __init__(self, ip='10.10.10.10',
34                 device_type='cisco_ios',
35                 key_file=None,
36                 alt_host_key=None):
```

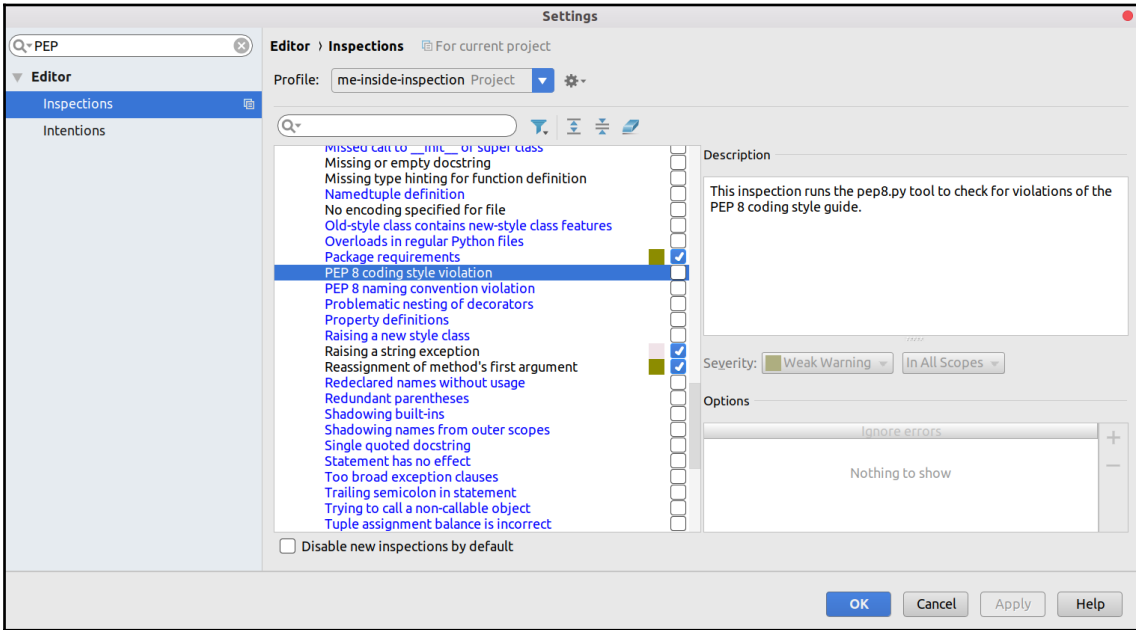
```
from netmiko import ConnectHandler

device = {"device_type": "cisco_ios_telnet",
          "ip": "10.10.10.10",
          "username": "admin",
          "password": "admin"}

net_connect = ConnectHandler(**device)
output = net_connect.send_command("show arp")
print output
```



Chapter 3: Setting Up the Network Lab Environment

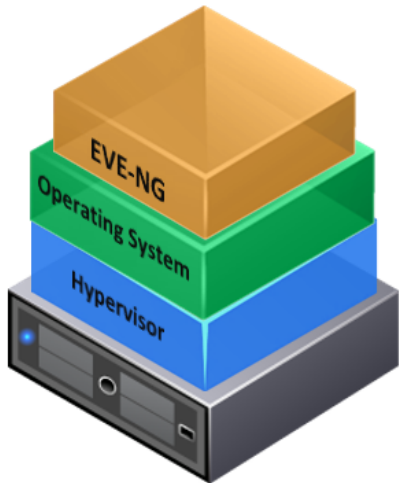


JAVA

```
public class Main {
    public static void main(String[] args) {
        System.out.println("hello world");
    }
}
```

PYTHON

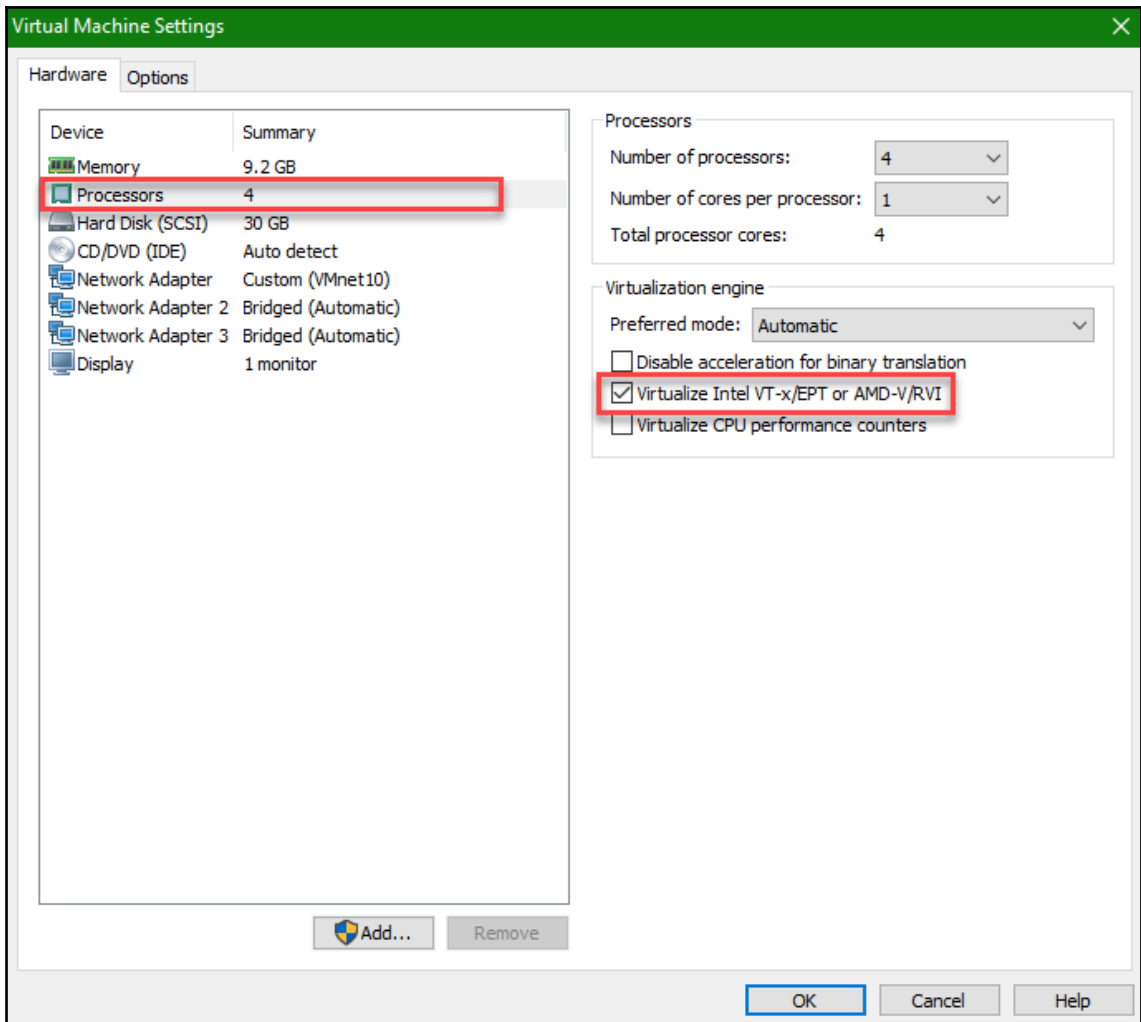
```
print('hello world')
```

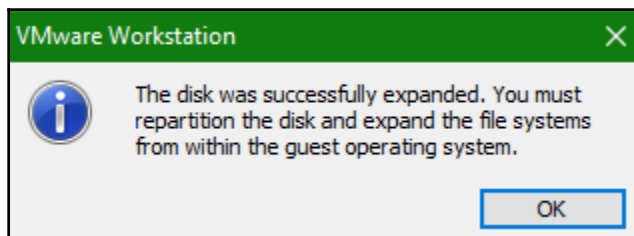
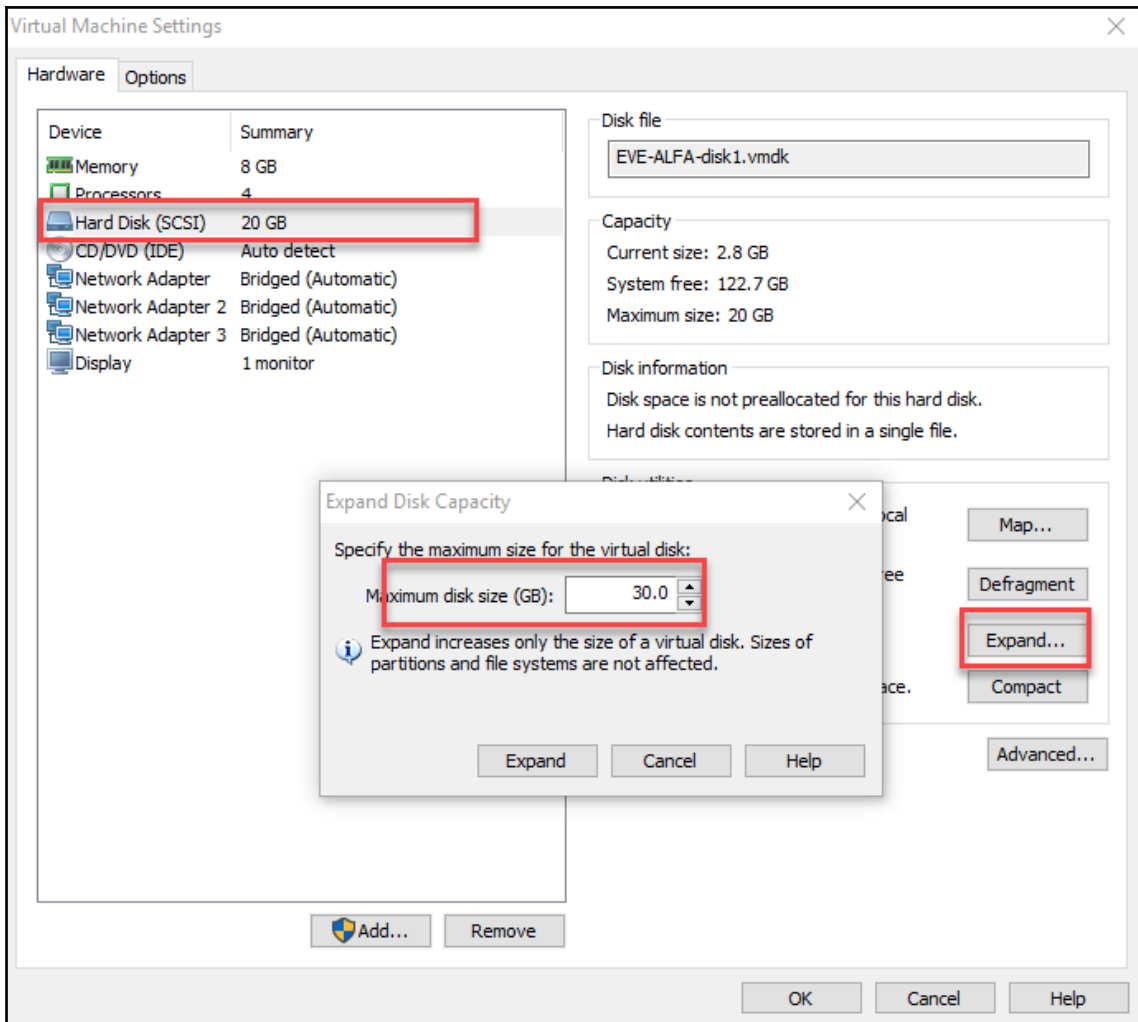


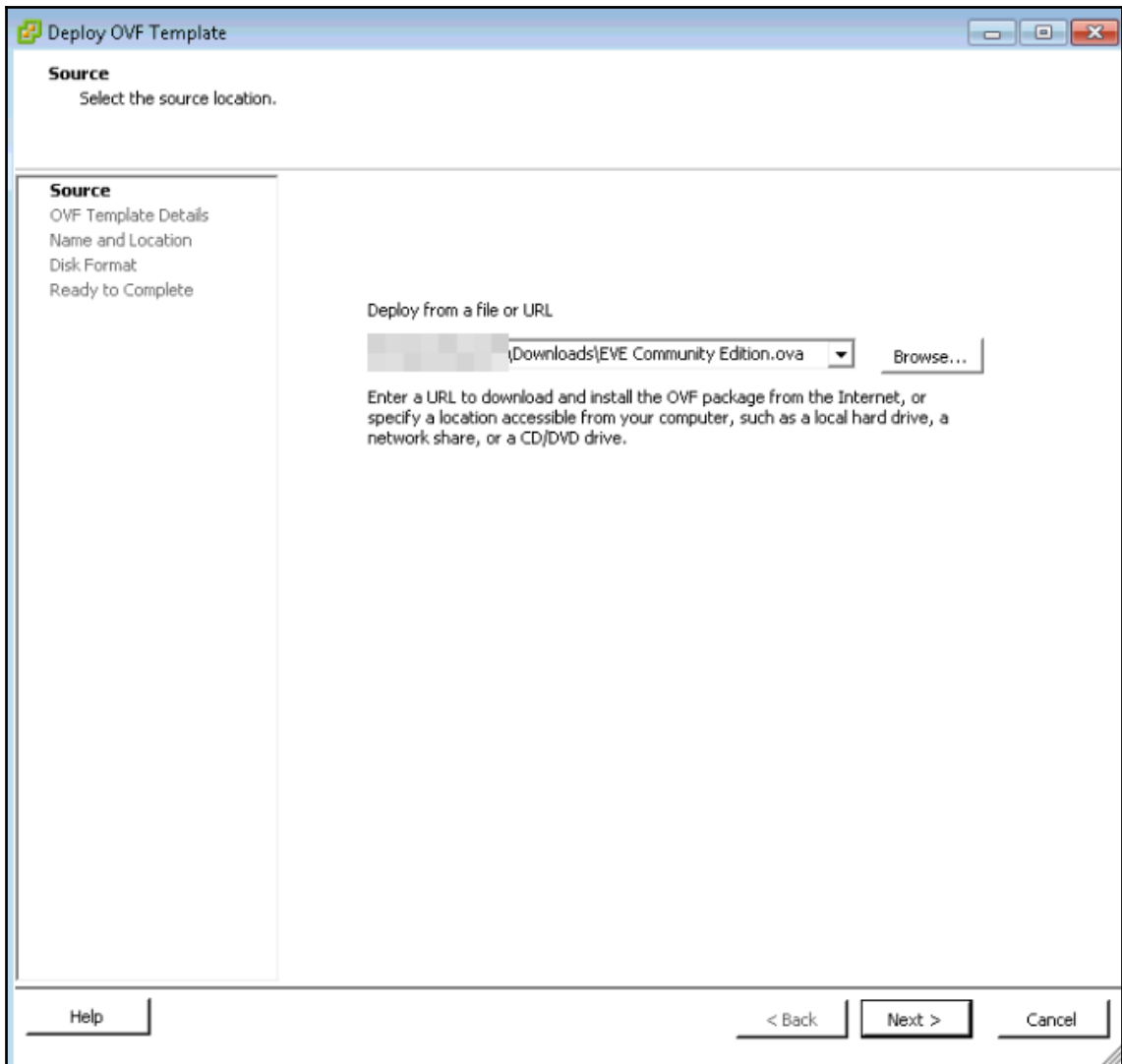
Hypervisor Installation

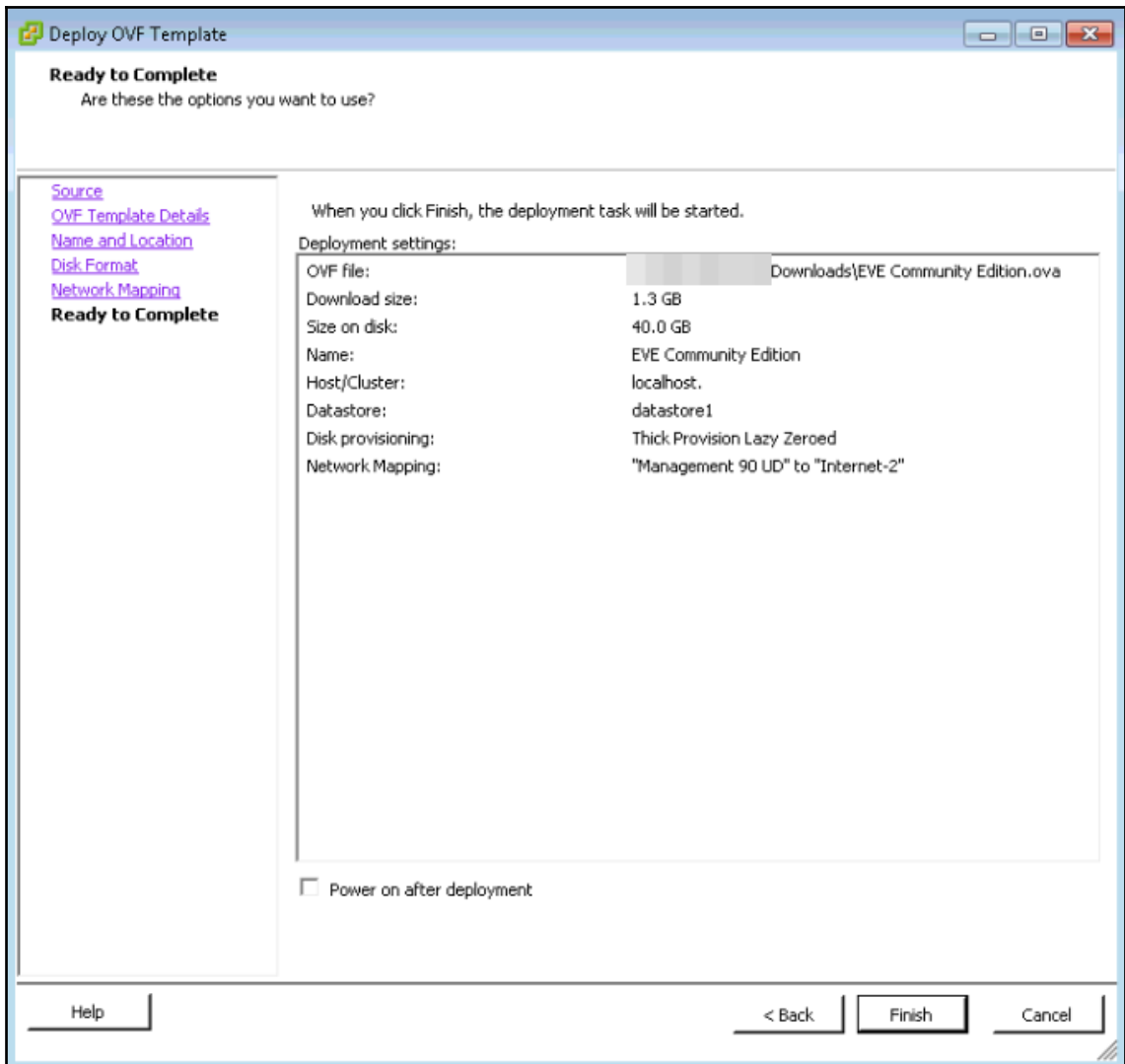


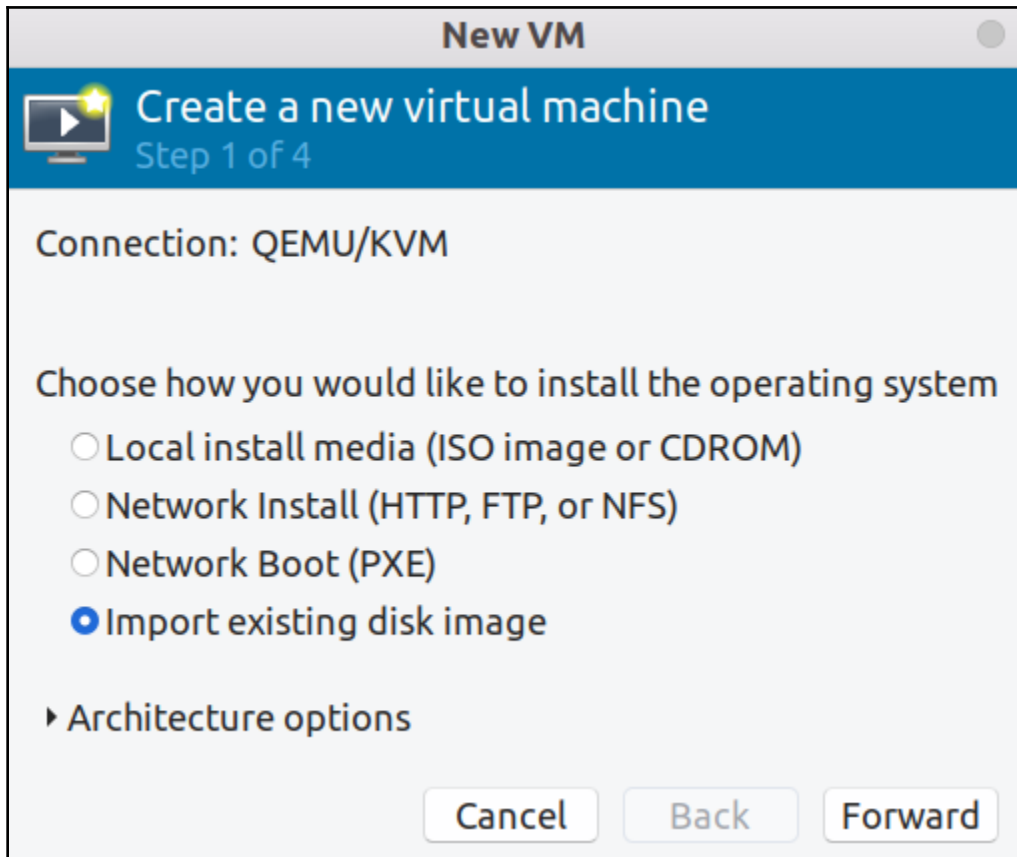
Bare Metal Installation












New VM

 **Create a new virtual machine**
Step 2 of 4

Provide the existing storage path:

Choose an operating system type and version

OS type: ▼

Version: ▼

Root Password

Type the Root Password:

< OK >

Hostname

Type the short hostname for the system:

< OK >

DNS domain name
Type the DNS domain name for the
system:

Automation-Workshop

< OK >

Use DHCP/Static IP Address
Use DHCP or Static IP Address for
the network adapter on Management
Network?

dhcp
 static

< OK >

Management Network IP Address
Type the IP address for the
Management Network:

< OK >



Emulated Virtual Environment
Next Generation

2.0.3-86

Sign in to start your session

admin

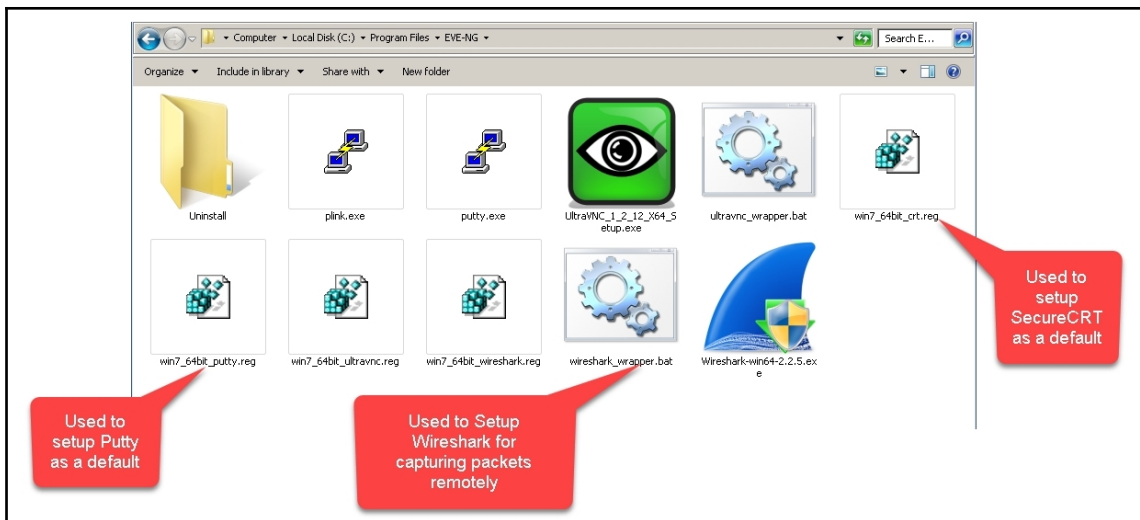
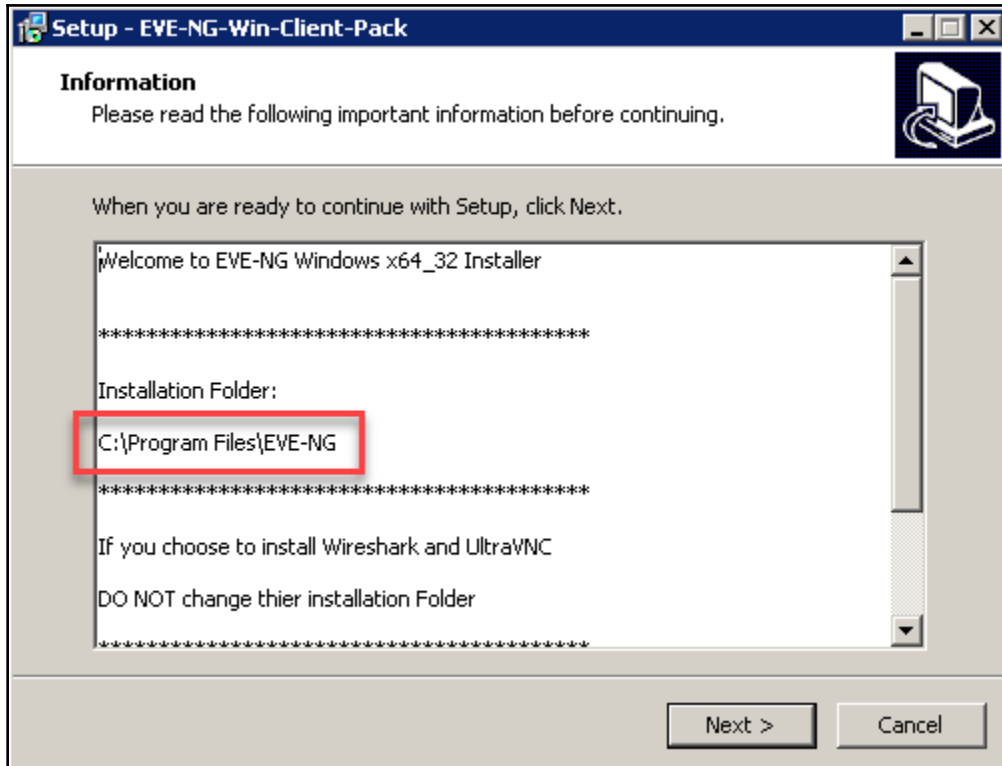


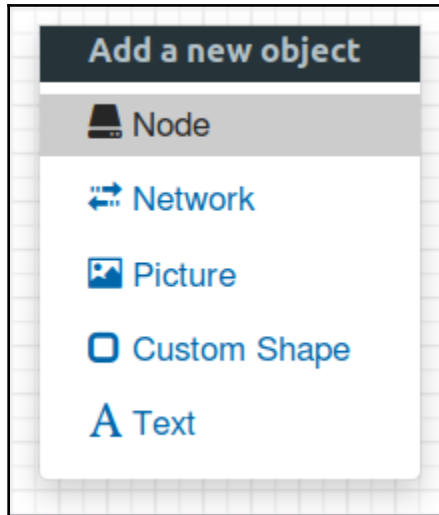
...



Native console

Sign In





ADD A NEW NODE

Template

Nothing selected

- Cisco FirePower 6
- Cisco vIOS
- Cisco vIOS L2
- Cisco vNAM
- Cisco vWLC
- Cisco vWAAS
- Cisco Prime Infra
- Cisco Email Security Appliance (ESA)
- Cisco Web Security Appliance (WSA)
- Cisco XRv
- Cisco XRv 9000
- Citrix Netscaler
- Dell SonicWall
- Cumulus VX
- ExtremeXOS
- F5 BIG-IP LTM VE
- Fortinet FortiGate

This emulate Cisco router

This will emulate Cisco switch

ADD A NEW NODE ✕

Template

Cisco vIOS L2

Number of nodes to add

4



Image

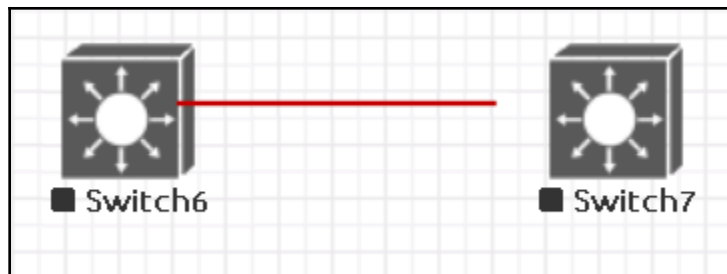
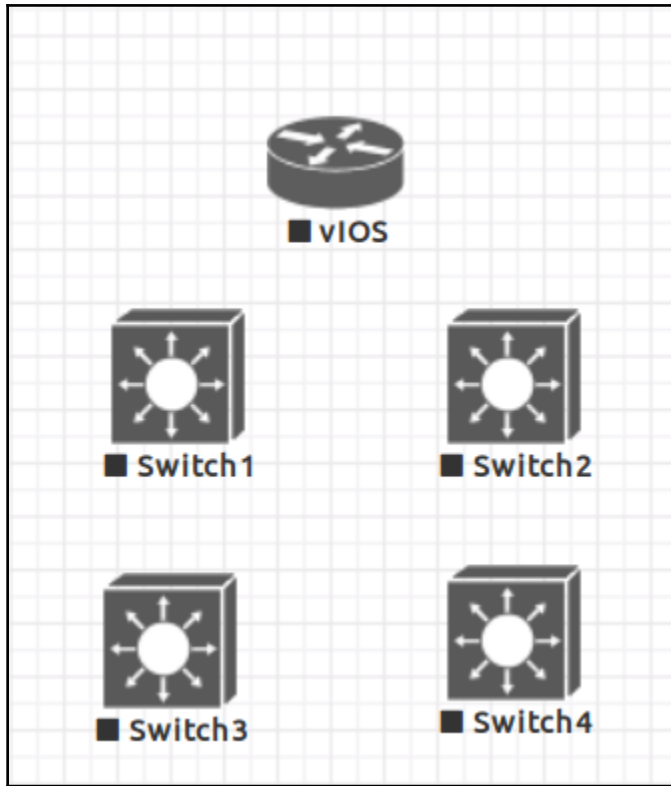
viosl2-15

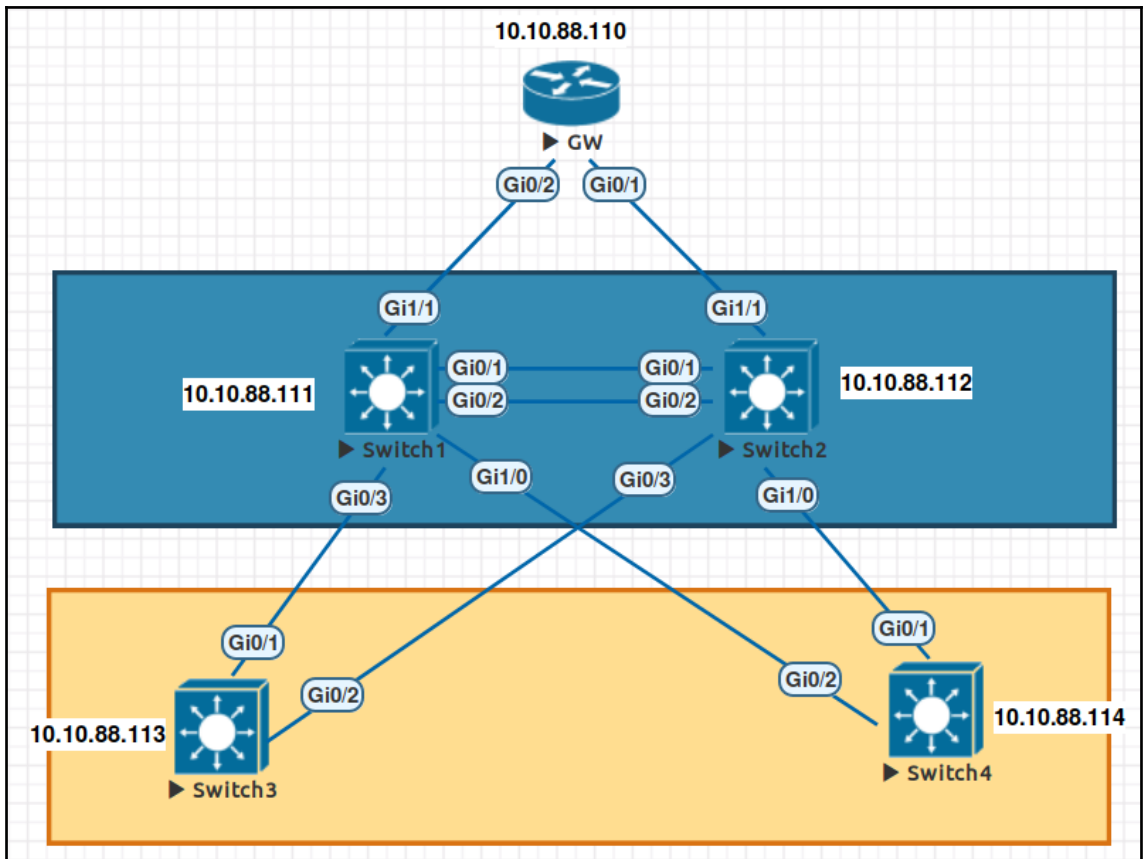
Name/prefix

Switch

Icon

 Switch L3.png





Chapter 4: Using Python to Manage Network Devices

```
bassim@me-inside:~$ pip install paramiko
Collecting paramiko
  Using cached paramiko-2.4.0-py2.py3-none-any.whl
Collecting cryptography>=1.5 (from paramiko)
  Using cached cryptography-2.1.4-cp27-cp27mu-manylinux1_x86_64.whl
Collecting pynacl>=1.0.1 (from paramiko)
  Using cached PyNaCl-1.2.1-cp27-cp27mu-manylinux1_x86_64.whl
Collecting pyasn1>=0.1.7 (from paramiko)
  Using cached pyasn1-0.4.2-py2.py3-none-any.whl
Collecting bcrypt>=3.1.3 (from paramiko)
  Using cached bcrypt-3.1.4-cp27-cp27mu-manylinux1_x86_64.whl
Collecting cffi>=1.7; platform_python_implementation != "PyPy" (from cryptography>=1.5->paramiko)
  Downloading cffi-1.11.4-cp27-cp27mu-manylinux1_x86_64.whl (406kB)
    100% |#####| 409kB 1.2MB/s
Collecting enum34; python_version < "3" (from cryptography>=1.5->paramiko)
  Using cached enum34-1.1.6-py2-none-any.whl
Collecting idna>=2.1 (from cryptography>=1.5->paramiko)
  Using cached idna-2.6-py2.py3-none-any.whl
Collecting asn1crypto>=0.21.0 (from cryptography>=1.5->paramiko)
  Using cached asn1crypto-0.24.0-py2.py3-none-any.whl
Collecting six>=1.4.1 (from cryptography>=1.5->paramiko)
  Using cached six-1.11.0-py2.py3-none-any.whl
Collecting ipaddress; python_version < "3" (from cryptography>=1.5->paramiko)
Collecting pycparser (from cffi>=1.7; platform_python_implementation != "PyPy"->cryptography>=1.5->paramiko)
Installing collected packages: pycparser, cffi, enum34, idna, asn1crypto, six, ipaddress, cryptography, pynacl, pyasn1, bcrypt, paramiko
```

```
bassim@me-inside:~$ python
Python 2.7.14 (default, Sep 23 2017, 22:06:14)
[GCC 7.2.0] on linux2
Type "help", "copyright", "credits" or "license" for more information.
>>> import paramiko
>>> █
```

```
Python Console - DevNet
Django Console
* IOSv is strictly limited to use for evaluation, demonstration and IOS *
* education. IOSv is provided as-is and is not supported by Cisco's *
* Technical Advisory Center. Any use or disclosure, in whole or in part, *
* of the IOSv Software or Documentation to any third party for any *
* purposes is expressly prohibited except as otherwise authorized by *
* Cisco in writing. *
*****
SW2>enable
Password:
SW2#terminal length 0
SW2#show ip int b
Interface IP-Address OK? Method Status Protocol
GigabitEthernet0/1 unassigned YES unset up up
GigabitEthernet0/2 unassigned YES unset up up
GigabitEthernet0/3 unassigned YES unset up up
GigabitEthernet0/0 10.10.88.112 YES NVRAM up up
GigabitEthernet1/0 unassigned YES unset up up
GigabitEthernet1/1 unassigned YES unset up up
GigabitEthernet1/2 unassigned YES unset up up
GigabitEthernet1/3 unassigned YES unset up up
GigabitEthernet2/0 unassigned YES unset up up
GigabitEthernet2/1 unassigned YES unset up up
GigabitEthernet2/2 unassigned YES unset up up
GigabitEthernet2/3 unassigned YES unset up up
GigabitEthernet3/0 unassigned YES unset up up
GigabitEthernet3/1 unassigned YES unset up up
GigabitEthernet3/2 unassigned YES unset up up
GigabitEthernet3/3 unassigned YES unset up up
SW2#show arp
Protocol Address Age (min) Hardware Addr Type Interface
Internet 10.10.88.1 10 5254.008e.88b2 ARPA GigabitEthernet0/0
Internet 10.10.88.112 - 5000.0002.0000 ARPA GigabitEthernet0/0
>>>
```

Regularly tested

Arista vEOS

Cisco ASA

Cisco IOS

Cisco IOS-XE

Cisco IOS-XR

Cisco NX-OS

Cisco SG300

HP Comware7

HP ProCurve

Juniper Junos

Linux

Limited testing

Alcatel AOS6/AOS8

Avaya ERS

Avaya VSP

Brocade VDX

Brocade MLX/NetIron

Calix B6

Cisco WLC

Dell-Force10

Dell PowerConnect

Huawei

Mellanox

NetApp cDOT

Palo Alto PAN-OS

Pluribus

Ruckus ICX/FastIron

Ubiquiti EdgeSwitch

Vyatta VyOS

Experimental

A10

Accedian

Aruba

Ciena SAOS

Cisco Telepresence

Check Point GAIa

Coriant

Eltex

Enterasys

Extreme EXOS

Extreme Wing

F5 LTM

Fortinet

MRV Communications OptiSwitch

Nokia/Alcatel SR-OS

QuantaMesh

```

bassim@me-inside:~$ pip install netmiko
Collecting netmiko
  Downloading netmiko-2.0.1.tar.gz (68kB)
    100% |#####| 71kB 450kB/s
Collecting paramiko>=2.0.0 (from netmiko)
  Using cached paramiko-2.4.0-py2.py3-none-any.whl
Collecting scp>=0.10.0 (from netmiko)
  Using cached scp-0.10.2-py2.py3-none-any.whl
Collecting pyyaml (from netmiko)
Collecting pyserial (from netmiko)
  Using cached pyserial-3.4-py2.py3-none-any.whl
Collecting textfsm (from netmiko)
  Downloading textfsm-0.3.2.tar.gz
Collecting cryptography>=1.5 (from paramiko>=2.0.0->netmiko)
  Using cached cryptography-2.1.4-cp27-cp27mu-manylinux1_x86_64.whl
Collecting pynacl>=1.0.1 (from paramiko>=2.0.0->netmiko)
  Using cached PyNaCl-1.2.1-cp27-cp27mu-manylinux1_x86_64.whl
Collecting pyasn1>=0.1.7 (from paramiko>=2.0.0->netmiko)
  Using cached pyasn1-0.4.2-py2.py3-none-any.whl
Collecting bcrypt>=3.1.3 (from paramiko>=2.0.0->netmiko)
  Using cached bcrypt-3.1.4-cp27-cp27mu-manylinux1_x86_64.whl
Collecting cffi>=1.7; platform_python_implementation != "PyPy" (from cryptography>=1.5->paramiko>=2.0.0->netmiko)
  Using cached cffi-1.11.4-cp27-cp27mu-manylinux1_x86_64.whl
Collecting enum34; python_version < "3" (from cryptography>=1.5->paramiko>=2.0.0->netmiko)
  Using cached enum34-1.1.6-py2-none-any.whl
Collecting idna>=2.1 (from cryptography>=1.5->paramiko>=2.0.0->netmiko)

```

Python Console - DevNet

Django Console

Interface	IP-Address	OK?	Method	Status	Protocol
GigabitEthernet0/0	10.10.88.110	YES	NVRAM	up	up
GigabitEthernet0/1	unassigned	YES	NVRAM	administratively down	down
GigabitEthernet0/2	unassigned	YES	NVRAM	administratively down	down
GigabitEthernet0/3	unassigned	YES	NVRAM	administratively down	down
GigabitEthernet0/4	unassigned	YES	NVRAM	administratively down	down
GigabitEthernet0/5	unassigned	YES	NVRAM	administratively down	down

>>>


```
Python Console - DevNet
Django Console
show ip int b
Interface      IP-Address      OK? Method Status      Protocol
GigabitEthernet0/0  10.10.88.110   YES NVRAM    up          up
GigabitEthernet0/1  unassigned     YES NVRAM    administratively down down
GigabitEthernet0/2  unassigned     YES NVRAM    administratively down down
GigabitEthernet0/3  unassigned     YES NVRAM    administratively down down
GigabitEthernet0/4  unassigned     YES NVRAM    administratively down down
GigabitEthernet0/5  unassigned     YES NVRAM    administratively down down
R1#
>>>
```

```
interface GigabitEthernet0/1
  switchport trunk allowed vlan 1,2
  switchport trunk encapsulation dot1q
  switchport mode trunk
  media-type rj45
  negotiation auto
!
interface GigabitEthernet0/2
  switchport trunk allowed vlan 1,2
  switchport trunk encapsulation dot1q
  switchport mode trunk
  media-type rj45
  negotiation auto
!
```

```

1  __author__ = "Bassim Aly"
2  __EMAIL__ = "basim.aly@gmail.com"
3
4  import telnetlib
5  username = "admin"
6  password = "access123"
7  enable_password = "access123"
8  cnx = telnetlib.Telnet(host="10.10.88.110")
9  cnx.read_until("Username:")
10 cnx.write(username + "\n")
11 cnx.read_until("Password:")
12 cnx.write(password + "\n")
13 cnx.read_until(">")
14 cnx.write("en" + "\n")
15 cnx.read_until("Password:")
16 cnx.write(enable_password + "\n")
17 cnx.read_until("#")
18 cnx.write("show ip int b" + "\n")
19 output = cnx.read_until("#")
20 print output

```

Run - DevNet

```

Run telnetlib_1
/usr/bin/python2.7 /media/bassim/DATA/GoogleDrive/Packt/EnterpriseAutomationProject
/Chapter5_Using_Python_to_manage_network_devices/telnetlib_1.py
show ip int b
Interface             IP-Address      OK? Method Status          Protocol
GigabitEthernet0/0    10.10.88.110   YES NVRAM    up              up
GigabitEthernet0/1    unassigned     YES NVRAM    administratively down down
GigabitEthernet0/2    unassigned     YES NVRAM    administratively down down
GigabitEthernet0/3    unassigned     YES NVRAM    administratively down down
GigabitEthernet0/4    unassigned     YES NVRAM    administratively down down
GigabitEthernet0/5    unassigned     YES NVRAM    administratively down down
R1#
Process finished with exit code 0

```

```
Run - DevNet
Run telnetlib_1
/usr/bin/python2.7 /media/bassim/DATA/GoogleDrive/Packt/EnterpriseAutomationProject/Chapter5_Using_Python_to_manage_network_devices/telnetlib_1.py

Interface      IP-Address      OK? Method Status      Protocol
GigabitEthernet0/0  10.10.88.110   YES NVRAM   up          up
GigabitEthernet0/1  unassigned     YES NVRAM   administratively down down
GigabitEthernet0/2  unassigned     YES NVRAM   administratively down down
GigabitEthernet0/3  unassigned     YES NVRAM   administratively down down
GigabitEthernet0/4  unassigned     YES NVRAM   administratively down down
GigabitEthernet0/5  unassigned     YES NVRAM   administratively down down

Process finished with exit code 0
```

```
bassim@me-inside:~$ /usr/bin/python2.7 /media/bassim/DATA/GoogleDrive/Packt/EnterpriseAutomationProject/Chapter5_Using_Python_to_manage_network_devices/telnetlib_push_vlans.py
Please Enter your username:admin
Please Enter your Password:
Please Enter your Enable Password:

##### Working on Device 10.10.88.111 #####

***** Adding VLAN 300*****
***** Adding VLAN 301*****
***** Adding VLAN 302*****
***** Adding VLAN 303*****
***** Adding VLAN 304*****
***** Adding VLAN 305*****
***** Adding VLAN 306*****
***** Adding VLAN 307*****
***** Adding VLAN 308*****
```

```
SW1#show vlan
```

VLAN Name	Status	Ports
1 default	active	Gi0/1, Gi0/2, Gi0/3, Gi1/0 Gi1/1, Gi1/2, Gi1/3, Gi2/0 Gi2/1, Gi2/2, Gi2/3, Gi3/0 Gi3/1, Gi3/2, Gi3/3
300 VLAN0300	active	
301 VLAN0301	active	
302 VLAN0302	active	
303 VLAN0303	active	
304 VLAN0304	active	
305 VLAN0305	active	
306 VLAN0306	active	
307 VLAN0307	active	
308 VLAN0308	active	
309 VLAN0309	active	
310 VLAN0310	active	
311 VLAN0311	active	
312 VLAN0312	active	
313 VLAN0313	active	
314 VLAN0314	active	
315 VLAN0315	active	
316 VLAN0316	active	
317 VLAN0317	active	

```
Python Console - DevNet
Django Console
Please Enter the IP Address: >? 10.10.88.1
IP Address is Private
IP Address is unicast
Please Enter the IP Network: >? 8.8.8.8/24
Network IP Address is 8.8.8.0 and Netowrk Mask is 255.255.255.0
The Broadcast is 8.8.8.255
IP Version is 4
Information known about this network is {'IPv4': [{'date': '1992-12',
'designation': 'Level 3 Communications, Inc.',
'prefix': '8/8',
'status': 'Legacy',
'whois': 'whois.arin.net'}]}
The IPv6 representation is ::ffff:8.8.8.8/120
The Network size is 256
Generating a list of ip addresses inside the subnet
8.8.8.0
8.8.8.1
8.8.8.2
8.8.8.3
8.8.8.4
8.8.8.5
8.8.8.6
8.8.8.7
8.8.8.8
8.8.8.9
8.8.8.10
8.8.8.11
8.8.8.12
~ ~ ~ ~ ~
>>>
```

1	10.10.88.110,admin,access123,access123,cisco
2	10.10.88.111,admin,access123,access123,Cisco
3	10.10.88.112,admin,access123,access123,Cisco
4	10.10.88.113,admin,access123,access123,Cisco
5	10.10.88.114,admin,access123,access123,Cisco

```
Run UC1_BackupDeviceConfig
/usr/bin/python2.7 /media/bassim/DATA/GoogleDrive/Packt/EnterpriseAutomationProject
/Chapter5_Using_Python_to_manage_network_devices/UC1_BackupDeviceConfig.py
2018-02-08 20:37:11.690865 Connecting to device 10.10.88.110
2018-02-08 20:37:23.363711 Saving config from device 10.10.88.110
=====
2018-02-08 20:37:23.364040 Connecting to device 10.10.88.111
2018-02-08 20:37:37.711011 Saving config from device 10.10.88.111
=====
2018-02-08 20:37:37.711355 Connecting to device 10.10.88.112
2018-02-08 20:37:51.856718 Saving config from device 10.10.88.112
=====
2018-02-08 20:37:51.866718 Connecting to device 10.10.88.113
2018-02-08 20:38:06.578131 Saving config from device 10.10.88.113
=====
2018-02-08 20:38:06.578548 Connecting to device 10.10.88.114
2018-02-08 20:38:21.228174 Saving config from device 10.10.88.114
=====
Process finished with exit code 0
```

```
bassim@me-inside:portal$ ls dev*
dev_10.10.88.110_.cfg dev_10.10.88.112_.cfg dev_10.10.88.114_.cfg
dev_10.10.88.111_.cfg dev_10.10.88.113_.cfg
bassim@me-inside:portal$
bassim@me-inside:portal$ more dev_10.10.88.110_.cfg
Building configuration...

Current configuration : 3994 bytes
!
version 15.6
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname R1
!
boot-start-marker
boot-end-marker
!
!
enable password access123
!
aaa new-model
!
!
aaa authentication login default local
```

```

Run - DevNet
UC2_CreateYourTerminal
#:health
show ip int b
Interface IP-Address OK? Method Status Protocol
GigabitEthernet0/0 10.10.88.110 YES NVRAM up up
GigabitEthernet0/1 unassigned YES NVRAM administratively down down
GigabitEthernet0/2 unassigned YES NVRAM administratively down down
GigabitEthernet0/3 unassigned YES NVRAM administratively down down
GigabitEthernet0/4 unassigned YES NVRAM administratively down down
GigabitEthernet0/5 unassigned YES NVRAM administratively down down
R1#
=====
show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2
i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
ia - IS-IS inter area, * - candidate default, U - per-user static route
o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
a - application route
+ - replicated route, % - next hop override, p - overrides from Pfr

Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 10.10.88.0/24 is directly connected, GigabitEthernet0/0
L 10.10.88.110/32 is directly connected, GigabitEthernet0/0
R1#
=====
show clock
*20:55:47.739 UTC Thu Feb 8 2018
R1#
=====
show banner motd
R1#

```

```

Run - DevNet
UC2_CreateYourTerminal
/usr/bin/python2.7 /media/bassim/DATA/GoogleDrive/Packt/EnterpriseAutomationProject
/Chapter5_Using_Python_to_manage_network_devices/UC2_CreateYourTerminal.py
#:discover
show arp
Protocol Address Age (min) Hardware Addr Type Interface
Internet 10.10.88.1 0 5254.000e.88b2 ARPA GigabitEthernet0/0
Internet 10.10.88.110 - 5000.0005.0000 ARPA GigabitEthernet0/0
R1#
=====
show version | i uptime
R1 uptime is 30 minutes
R1#
=====
show inventory
NAME: "IOSv", DESCR: "IOSv chassis, Hw Serial#"
=====
: 9ZS9SCN2K7NI00EF02FYZ, Hw Revision: 1.0"
PID: IOSv , VID: 1.0, SN: 9ZS9SCN2K7NI00EF02FYZ
R1#
=====
#

```

UC3_devices.xlsx - LibreOffice Calc

File Edit View Insert Format Styles Sheet Data Tools Window Help

Calibri 11

	A	B	C	D	E	F
1	<u>hostname</u>	<u>ip</u>	<u>username</u>	<u>password</u>	<u>secret</u>	<u>vendor</u>
2	R1	10.10.88.110	admin	access123	access123	cisco_ios
3	SW1	10.10.88.111	admin	access123	access123	cisco_ios
4	SW2	10.10.88.112	admin	access123	access123	cisco_ios
5	SW3	10.10.88.113	admin	access123	access123	cisco_ios
6	SW4	10.10.88.114	admin	access123	access123	cisco_ios

UC3_devices.xlsx - LibreOffice Calc

File Edit View Insert Format Styles Sheet Data Tools Window Help

Calibri 11

sheet.row(0)[0] sheet.row(0)[1]



















	A	B	C	D	E	F
1	<u>hostname</u>	<u>ip</u>	<u>username</u>	<u>password</u>	<u>secret</u>	<u>vendor</u>
2	R1	10.10.88.110	admin	access123	access123	cisco_ios
3	SW1	10.10.88.111	admin	access123	access123	cisco_ios
4	SW2	10.10.88.112	admin	access123	access123	cisco_ios
5	SW3	10.10.88.113	admin	access123	access123	cisco_ios
6	SW4	10.10.88.114	admin	access123	access123	cisco_ios
7						
8						
9						
10						
11						
12						
13						
14						

sheet.row(6)[0]

Sheet

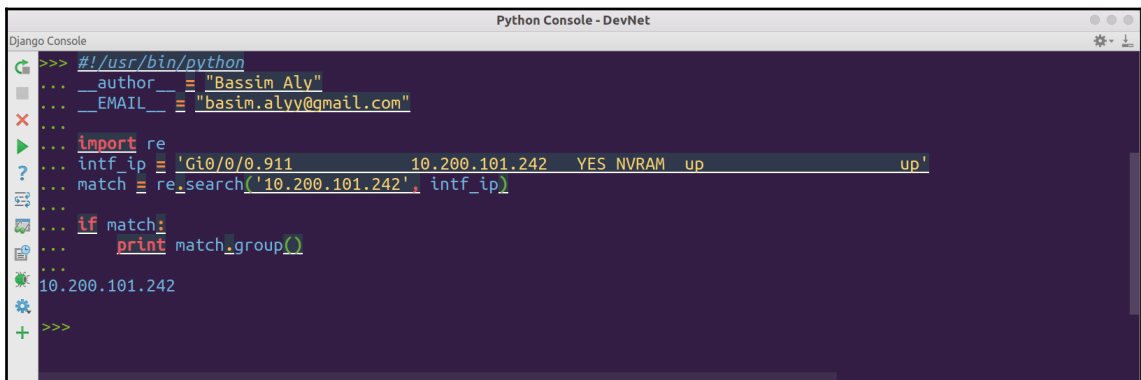
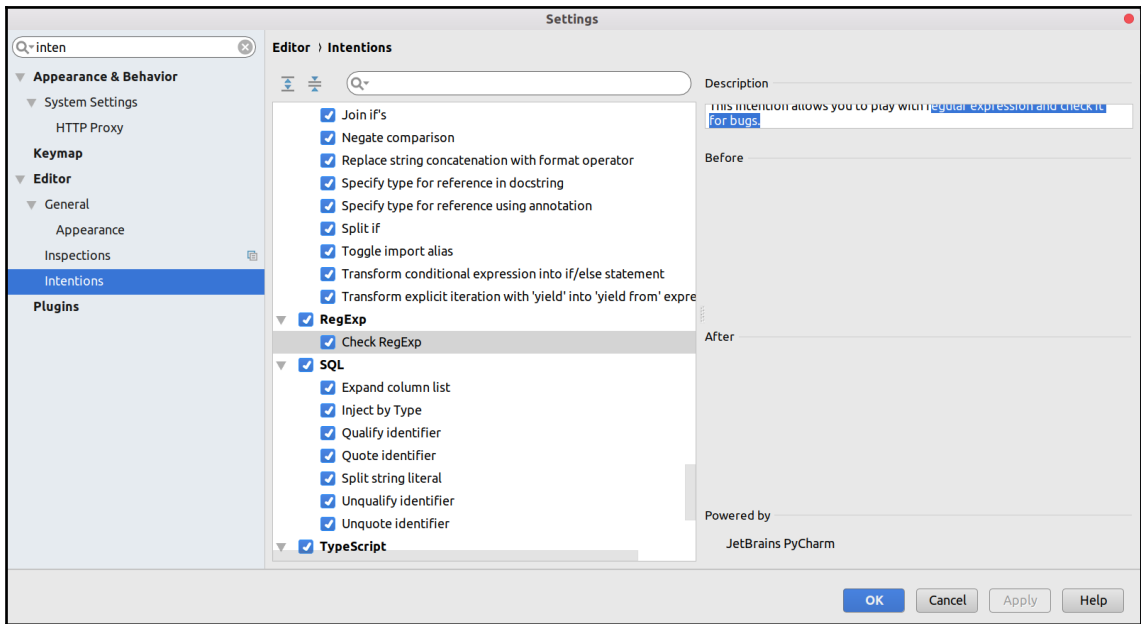
Workbook

91

Branch: master ▾		pynet / presentations / dfwcug / examples /		Create new file	Upload files	Find file	History
	ktbyers	Minor update		Latest commit 3100bd5 on Apr 17			
..							
	case10_ssh_proxy	DFCWUG presentation update		3 months ago			
	case11_logging	More Netmiko examples for presentations		3 months ago			
	case12_telnet	More Netmiko examples for presentations		3 months ago			
	case13_term_server	More Netmiko examples for presentations		3 months ago			
	case14_secure_copy	More Netmiko examples for presentations		3 months ago			
	case15_netmiko_tools	Presentation updates		3 months ago			
	case16_concurrency	More content for presentation		3 months ago			
	case17_jinja2	More content for presentation		3 months ago			
	case1_simple_conn	Updating presentation		3 months ago			
	case2_using_dict	Updating presentation		3 months ago			
	case3_multiple_devices	Updating presentation		3 months ago			
	case4_show_commands	DFCWUG presentation update		3 months ago			
	case5_prompting	Minor update		2 months ago			
	case6_config_change	DFCWUG presentation update		3 months ago			
	case7_commit	DFCWUG presentation update		3 months ago			
	case8_autodetect	DFCWUG presentation update		3 months ago			
	case9_ssh_keys	DFCWUG presentation update		3 months ago			

Chapter 5: Extracting Useful Data from Network Devices

expression	matches...
abc	abc (that exact character sequence, but anywhere in the string)
^abc	abc at the <i>beginning</i> of the string
abc\$	abc at the <i>end</i> of the string
a b	either of a and b
^abc abc\$	the string abc at the beginning or at the end of the string
ab{2,4}c	an a followed by two, three or four b's followed by a c
ab{2,}c	an a followed by at least two b's followed by a c
ab*c	an a followed by any number (zero or more) of b's followed by a c
ab+c	an a followed by one or more b's followed by a c
ab?c	an a followed by an optional b followed by a c; that is, either abc or ac
a.c	an a followed by any single character (not newline) followed by a c
a\.c	a.c exactly
[abc]	any one of a, b and c
[Aa]bc	either of Abc and abc
[abc]+	any (nonempty) string of a's, b's and c's (such as a, abba, acbabcaaaa)
[^abc]+	any (nonempty) string which does <i>not</i> contain any of a, b and c (such as defg)
\d\d	any two decimal digits, such as 42; same as \d{2}
\w+	a "word": a nonempty sequence of alphanumeric characters and low lines (underscores), such as foo and 12bar8 and foo_1
100\s*mk	the strings 100 and mk optionally separated by any amount of white space (spaces, tabs, newlines)
abc\b	abc when followed by a word boundary (e.g. in abc! but not in abcd)
perl\B	perl when <i>not</i> followed by a word boundary (e.g. in perlert but not in perl stuff)



```

Python Console - DevNet
Django Console
10.200.101.242
>>> import re
... intf_ip = '''Gi0/0/0.705          10.103.17.5    YES NVRAM  up      up
... Gi0/0/0.900          86.121.75.31  YES NVRAM  up      up
... Gi0/0/0.911          10.200.101.242 YES NVRAM  up      up
... Gi0/0/0.7000         unassigned    YES unset  up      up'''
... match = re.search("\d+\.\d+\.\d+\.\d+", intf_ip)
...
... if match:
...     print match_group()
...
10.103.17.5
>>>

```

```

Python Console - DevNet
Django Console
... log_msg = 'Dec 20 12:11:47.417: %LINK-3-UPDOWN: Interface GigabitEthernet0/0/4, changed st
... match = re.search("(\\w+\\s\\d+\\s\\S+):\\s(\\S+):\\sInterface(\\S+),\\schanged state to (\\S+)". log
... if match:
...     print match_groups()
...
>>> import re
... log_msg = 'Dec 20 12:11:47.417: %LINK-3-UPDOWN: Interface GigabitEthernet0/0/4, changed st
... match = re.search("(\\w+\\s\\d+\\s\\S+):\\s(\\S+): Interface (\\S+), changed state to (\\S+)". log_
... if match:
...     print match_groups()
...
('Dec 20 12:11:47.417', '%LINK-3-UPDOWN', 'GigabitEthernet0/0/4', 'down')
>>>

```

```

# Example 4: Named group
import re
log_msg = 'Dec 20 12:11:47.417: %LINK-3-UPDOWN: Interface GigabitEthernet0/0/4, changed state to down'
match = re.search("(?P<TIMESTAMP>\\w+\\s\\d+\\s\\S+):\\s(?P<EVENT>\\S+): Interface (?P<INTE>\\S+), changed state to (?P<STATE>\\S+)",
log_msg)
if match:
    print match.groups()

```

```
Python Console - DevNet
Django Console
"""
... for line in show_ip_int_br_full.split("\n"):
...     match = re.search(r"(?P<interface>\w+\d+\/\d+\/\d+)\s+(?P<ip>\d+\.\d+\.\d+)", line)
...     if match:
...         intf_ip = match.groupdict()
...         if intf_ip["ip"].startswith("57"):
...             print "Subnet is configured on " + intf_ip["interface"] + " and ip is " + intf_ip["ip"]
...
Subnet is configured on GigabitEthernet0/1/1 and ip is 57.234.66.28
Subnet is configured on GigabitEthernet0/2/1 and ip is 57.20.20.1
>>>
```

```
Python Console - DevNet
Django Console
GigabitEthernet0/2/0      10.30.40.1      YES manual down      down
GigabitEthernet0/2/1      57.20.20.1      YES manual down      down
"""
... #intf_ip = re.findall(r"(\w+\d+\/\d+\/\d+)\s+(57.\d+.\d+.\d+)", show_ip_int_br_full)
...
... intf_ip = re.findall(r"(?P<interface>\w+\d+\/\d+\/\d+)\s+(?P<ip>57.\d+.\d+.\d+)", show_ip_int_br_full)
... pprint(intf_ip)
...
[('GigabitEthernet0/1/1', '57.234.66.28'),
 ('GigabitEthernet0/2/1', '57.20.20.1')]
>>>
```

```
mpenning@tsunami: /home/mpenning/ccp/ciscoconfparse/sphinx-doc
!
interface Null0
  no ip unreachable
!
interface Port-channel1 ← Parent Line
  description SWITCH01.PUB.DAL02 VLAN trunk
  switchport
  switchport trunk encapsulation dot1q
  switchport trunk allowed vlan 106,107,111,114,118,120,123-125,127,133,140,221
  switchport trunk allowed vlan add 299-599
  switchport mode trunk
  no ip address
!
interface Port-channel2
  description SWITCH02.PUB.DAL02 VLAN trunk
  switchport
  switchport trunk encapsulation dot1q
  switchport trunk allowed vlan 106,117,118,121,122,126,128-131,134-136,222,223
  switchport trunk allowed vlan add 299,600-799,2031-2033
  switchport mode trunk
  no ip address
!
```

```
bassim@me-inside:~$ pip install ciscoconfparse
Collecting ciscoconfparse
  Downloading ciscoconfparse-1.3.1-py2-none-any.whl (85kB)
    100% |#####| 92kB 183kB/s
Collecting colorama (from ciscoconfparse)
  Using cached colorama-0.3.9-py2.py3-none-any.whl
Collecting ipaddr>=2.1.11 (from ciscoconfparse)
  Downloading ipaddr-2.2.0.tar.gz
Collecting dnspython (from ciscoconfparse)
  Downloading dnspython-1.15.0-py2.py3-none-any.whl (177kB)
    100% |#####| 184kB 263kB/s
Building wheels for collected packages: ipaddr
  Running setup.py bdist_wheel for ipaddr ... done
  Stored in directory: /home/bassim/.cache/pip/wheels/3a/75/ef/8677a26e72d7fee90f46b1cb9d8cfd
c0ffe9c738dfd22a54e5
Successfully built ipaddr
Installing collected packages: colorama, ipaddr, dnspython, ciscoconfparse
Successfully installed ciscoconfparse-1.3.1 colorama-0.3.9 dnspython-1.15.0 ipaddr-2.2.0
bassim@me-inside:~$
```

```

from ciscoconfparse import CiscoConfParse
from pprint import pprint

# Find All shutdown interfaces.

orig_config = CiscoConfParse("media/bassim/DATA/GoogleDrive/Packt/EnterpriseAutomationProject
/Chapter5_Extract_useful_data_from_network_devices/Cisco_Config.txt")

shutdown_intfs = orig_config.find_parents_w_child(parentspec=r"^interface", childspec='shutdown')
pprint(shutdown_intfs)

```

```

Python Console - DevNet
Django Console
>>> from pprint import pprint
>>> # Find All shutdown interfaces.
>>> orig_config = CiscoConfParse("/media/bassim/DATA/GoogleDrive/Packt/EnterpriseAutomationProject/Chapter5_Extract_useful_data_from_network_devices/Cisco_Config.txt")
>>> shutdown_intfs = orig_config.find_parents_w_child(parentspec=r"^interface", childspec='shutdown')
>>> pprint(shutdown_intfs)
['interface GigabitEthernet3', 'interface GigabitEthernet4']
>>>

```

```

# EX2: Does this configuration has a router

from ciscoconfparse import CiscoConfParse
from pprint import pprint
orig_config = CiscoConfParse("/media/bassim/DATA/GoogleDrive/Packt/EnterpriseAutomationProject
/Chapter5_Extract_useful_data_from_network_devices/Cisco_Config.txt" )

check_router = orig_config.has_line_with(r"^router")
pprint(check_router)

```

```

Python Console - DevNet
Django Console
>>> # EX2: Does this configuration has a router
>>> from ciscoconfparse import CiscoConfParse
>>> from pprint import pprint
>>> orig_config = CiscoConfParse("/media/bassim/DATA/GoogleDrive/Packt/EnterpriseAutomationProject/Chapter5_Extract_useful_data_from_network_devices/Cisco_Config.txt")
>>> check_router = orig_config.has_line_with(r"^router")
>>> pprint(check_router)
True
>>>

```

```
#EX3: Does OSPF enabled? if yes then find advertised networks

from ciscoconfparse import CiscoConfParse
from pprint import pprint
orig_config = CiscoConfParse("/media/bassim/DATA/GoogleDrive/Packt/EnterpriseAutomationProject
/Chapter5_Extract_useful_data_from_network_devices/Cisco_Config.txt")

if orig_config.has_line_with(r"^router ospf"):
    ospf_config = orig_config.find_all_children(r"^router ospf")
    networks = []
    for line in ospf_config:
        if 'network' in line:
            networks.append(line.split(" ")[2])

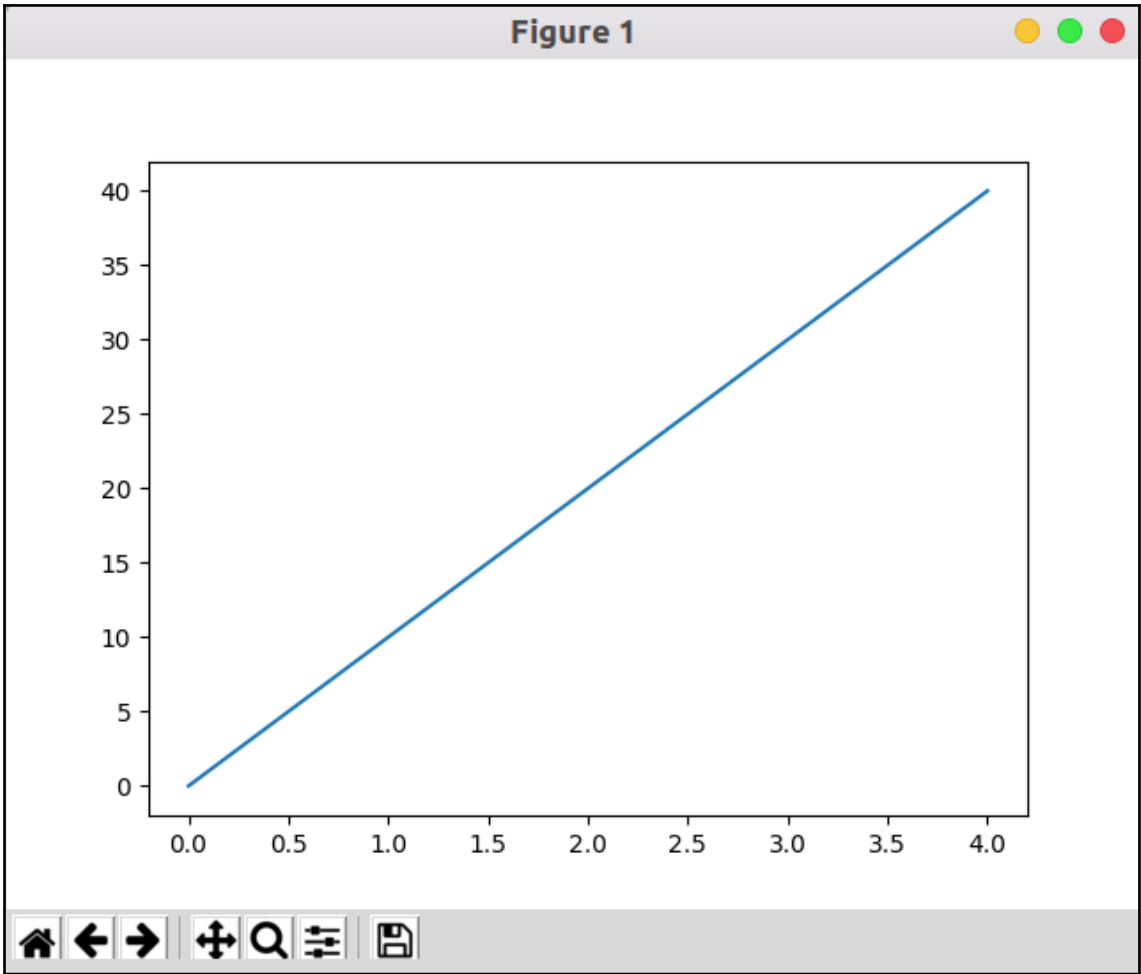
print networks
```

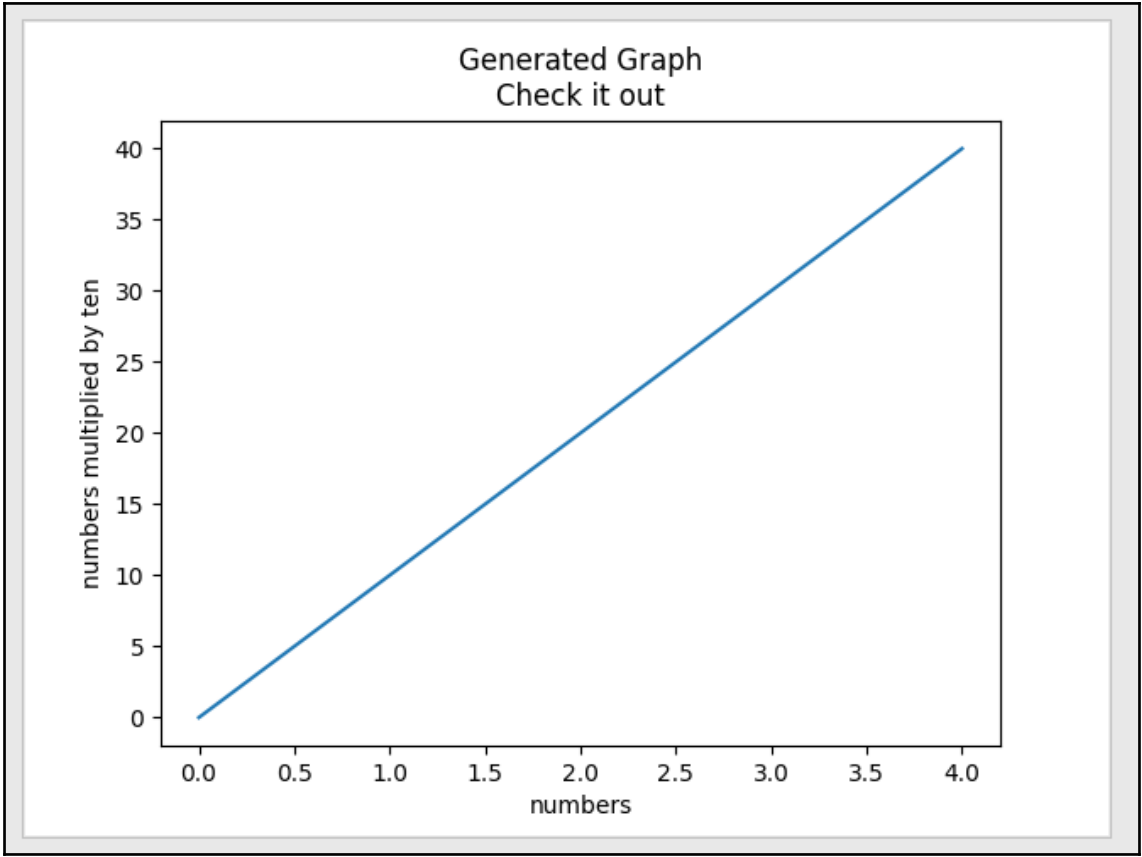
```
Python Console - DevNet
Django Console
... if orig_config.has_line_with(r"^router ospf"):
...     ospf_config = orig_config.find_all_children(r"^router ospf")
...     networks = []
...     for line in ospf_config:
...         if 'network' in line:
...             networks.append(line.split(" ")[2])
...
...     print networks
...
['10.10.10.1', '172.16.35.1', '192.168.35.0']
>>>
```

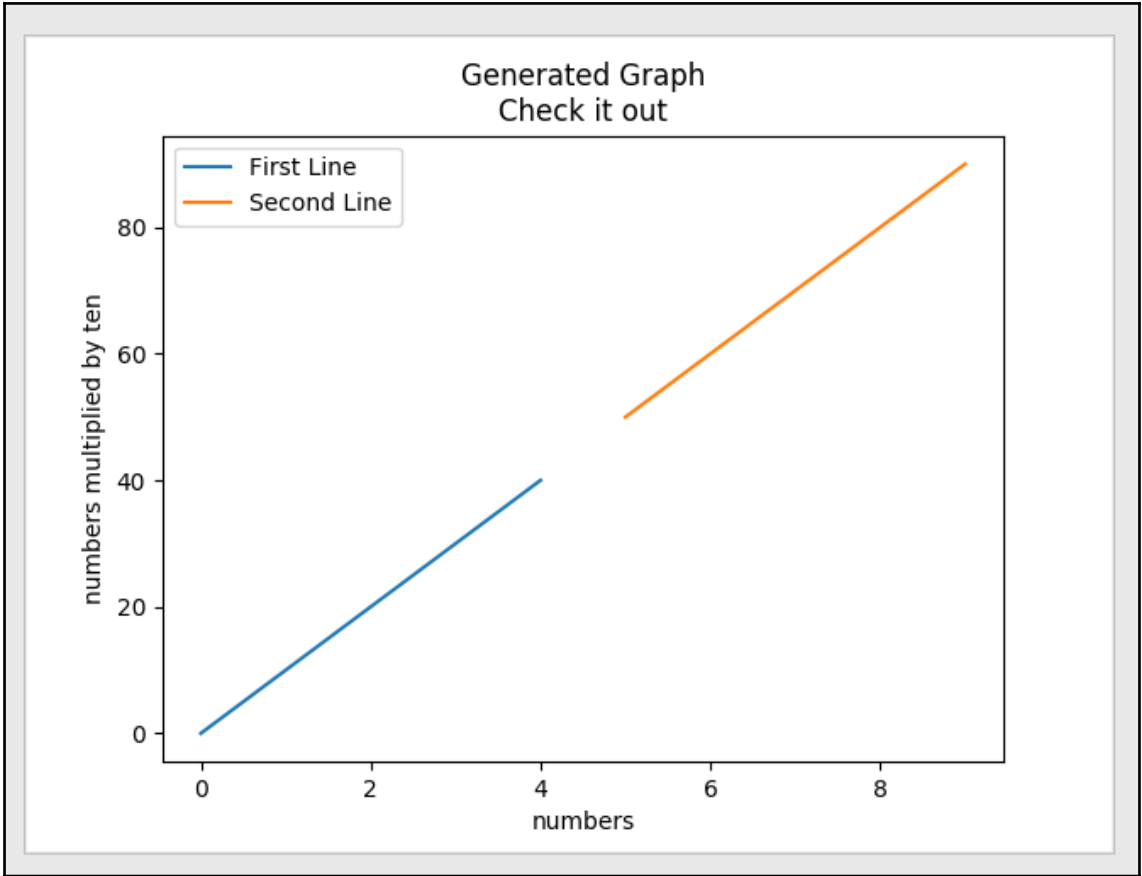


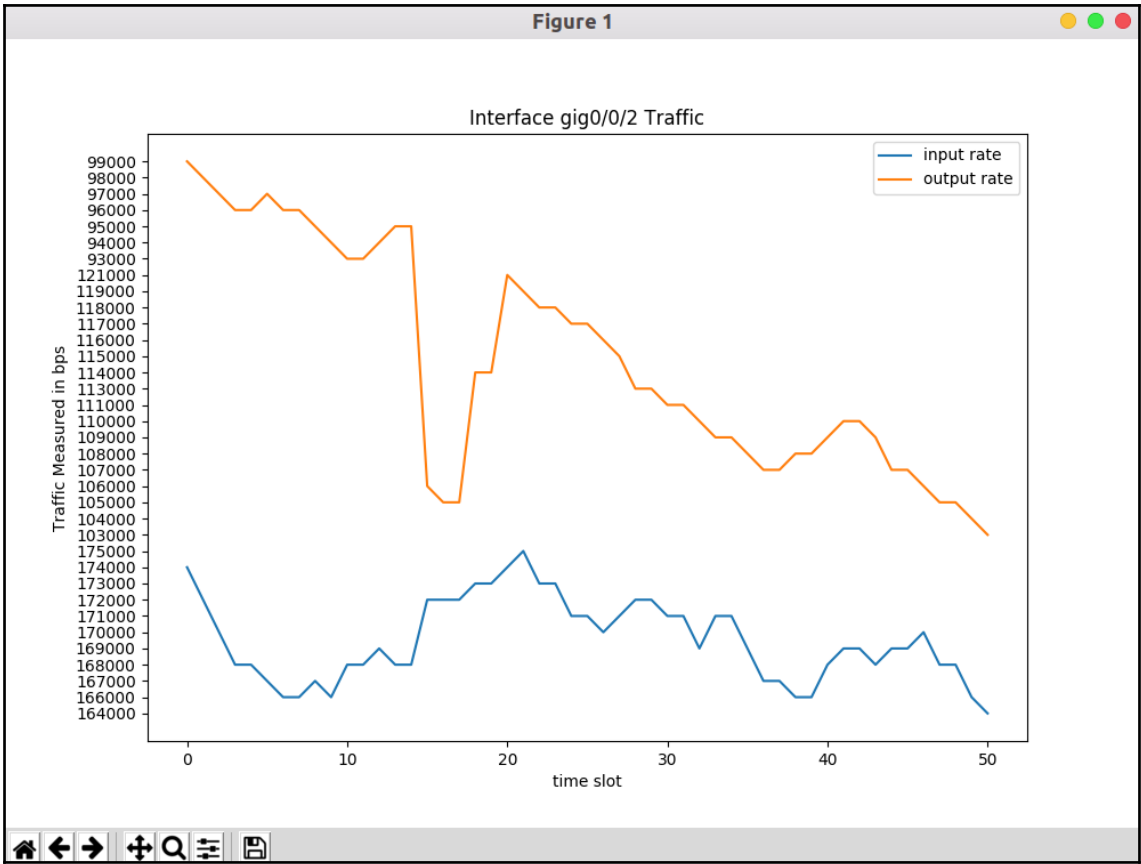
```
bassim@me-inside:~$ pip install matplotlib
Collecting matplotlib
  Downloading matplotlib-2.1.2-cp27-cp27mu-manylinux1_x86_64.whl (15.0MB)
    100% |#####| 15.0MB 79kB/s
Collecting cycler>=0.10 (from matplotlib)
  Downloading cycler-0.10.0-py2.py3-none-any.whl
Collecting numpy>=1.7.1 (from matplotlib)
  Downloading numpy-1.14.1-cp27-cp27mu-manylinux1_x86_64.whl (12.1MB)
    100% |#####| 12.1MB 122kB/s
Collecting backports.functools-lru-cache (from matplotlib)
  Downloading backports.functools_lru_cache-1.5-py2.py3-none-any.whl
Collecting subprocess32 (from matplotlib)
  Downloading subprocess32-3.2.7.tar.gz (54kB)
    100% |#####| 61kB 248kB/s
Collecting pytz (from matplotlib)
  Downloading pytz-2018.3-py2.py3-none-any.whl (509kB)
    100% |#####| 512kB 467kB/s
Collecting six>=1.10 (from matplotlib)
  Using cached six-1.11.0-py2.py3-none-any.whl
Collecting python-dateutil>=2.1 (from matplotlib)
  Using cached python_dateutil-2.6.1-py2.py3-none-any.whl
Collecting pyparsing!=2.0.4,!=2.1.2,!=2.1.6,>=2.0.1 (from matplotlib)
  Downloading pyparsing-2.2.0-py2.py3-none-any.whl (56kB)
    100% |#####| 61kB 234kB/s
Building wheels for collected packages: subprocess32
  Running setup.py bdist_wheel for subprocess32 ... done
  Stored in directory: /home/bassim/.cache/pip/wheels/7d/4c/a4/ce9ceb463dae01f4b95e670abd9afc
```

```
bassim@me-inside:~$
bassim@me-inside:~$ python
Python 2.7.14 (default, Sep 23 2017, 22:06:14)
[GCC 7.2.0] on linux2
Type "help", "copyright", "credits" or "license" for more information.
>>> import matplotlib
>>>
```

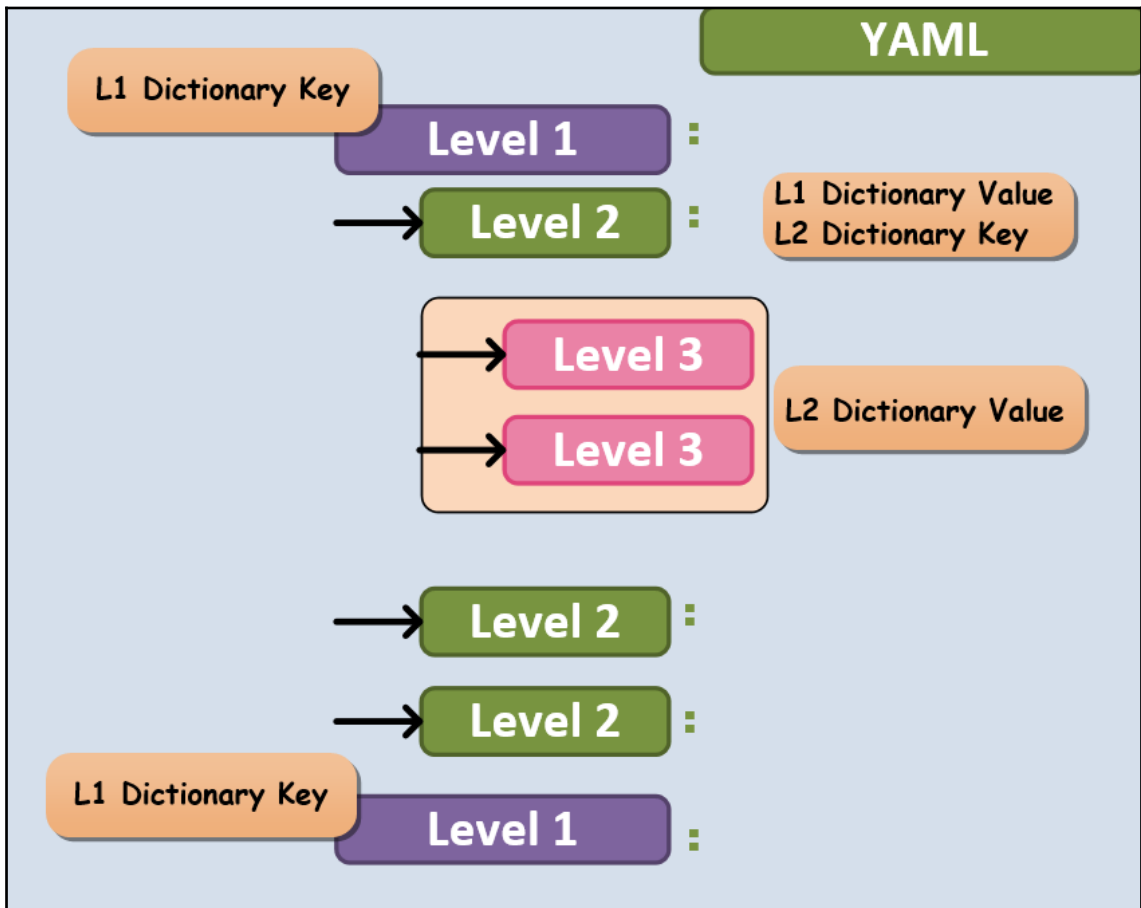








Chapter 6: Configuration Generator with Python and Jinja2



```
1  ---
2  my_datacenter:
3  GW:
4      eve_port: 32773
5      device_template: vIOSL3_Template
6      hostname: R1
7      mgmt_intf: gig0/0
8      mgmt_ip: 10.10.88.110
9      mgmt_subnet: 255.255.255.0
10     enabled_ports:
11         - gig0/0
12         - gig0/1
13         - gig0/2
14
15
16     switch1:
17         eve_port: 32769
18         device_template: vIOSL2_Template
19         hostname: SW1
20         mgmt_intf: gig0/0
21         mgmt_ip: 10.10.88.111
22         mgmt_subnet: 255.255.255.0
23
24     switch2:
25         eve_port: 32770
26         device_template: vIOSL2_Template
27         hostname: SW2
28         mgmt_intf: gig0/0
29         mgmt_ip: 10.10.88.112
30         mgmt_subnet: 255.255.255.0
31
```

```
1  #!/usr/bin/python
2  __author__ = "Bassim Aly"
3  __EMAIL__ = "basim.alyy@gmail.com"
4
5  import yaml
6  from pprint import pprint
7
8
9  with open(r'/media/bassim/DATA/GoogleDrive/Packt/EnterpriseAutomationProject
10 /Chapter6_Configuration_generator_with_python_and_jinja2/yaml_example.yml', 'r') as yaml_file:
11     yaml_data = yaml.load(yaml_file) # This is to read the file content
12
13     pprint(yaml_data)
14
```

```
Python Console - DevNet
Django Console
...
... pprint(yaml_data)
...
{ 'my_datacenter': { 'GW': { 'device_template': 'vIOSL3_Template',
                           'enabled_ports': ['gig0/0', 'gig0/1', 'gig0/2'],
                           'eve_port': 32773,
                           'hostname': 'R1',
                           'mgmt_intf': 'gig0/0',
                           'mgmt_ip': '10.10.88.110',
                           'mgmt_subnet': '255.255.255.0'},
                    'switch1': { 'device_template': 'vIOSL2_Template',
                                  'eve_port': 32769,
                                  'hostname': 'SW1',
                                  'mgmt_intf': 'gig0/0',
                                  'mgmt_ip': '10.10.88.111',
                                  'mgmt_subnet': '255.255.255.0'},
                    'switch2': { 'device_template': 'vIOSL2_Template',
                                  'eve_port': 32770,
                                  'hostname': 'SW2',
                                  'mgmt_intf': 'gig0/0',
                                  'mgmt_ip': '10.10.88.112',
                                  'mgmt_subnet': '255.255.255.0'}}}
>>>
```

Annotations in the image:

- Top-Level Key: points to 'my_datacenter'
- First Level keys and Top-level values: points to 'GW', 'switch1', and 'switch2'


```
302 - name: "unarchive xRV"
303   unarchive:
304     src: /root/xrv-k9-6.1.2.tar.gz
305     dest: /opt/unetlab/addons/qemu/
306     remote_src: no
307     tags: upload_file
308     ignore_errors: yes
309
310 - name: "unarchive vIOS"
311   unarchive:
312     src: /root/vios.tar.gz
313     dest: /opt/unetlab/addons/qemu/
314     remote_src: no
315     tags: upload_file
316     ignore_errors: yes
317
318 - name: "unarchive centos server"
319   unarchive:
320     src: /root/linux-centos-server-1707.tar.gz
321     dest: /opt/unetlab/addons/qemu/
322     remote_src: no
323     tags: upload_file
324     ignore_errors: yes
325
326 - name: "unarchive Linux vRIN server"
```

Vertical Lines Guide

Number of white spaces inserted when click on TAB

x 167, Line 305, Column 1

Spaces: 2 Ansible

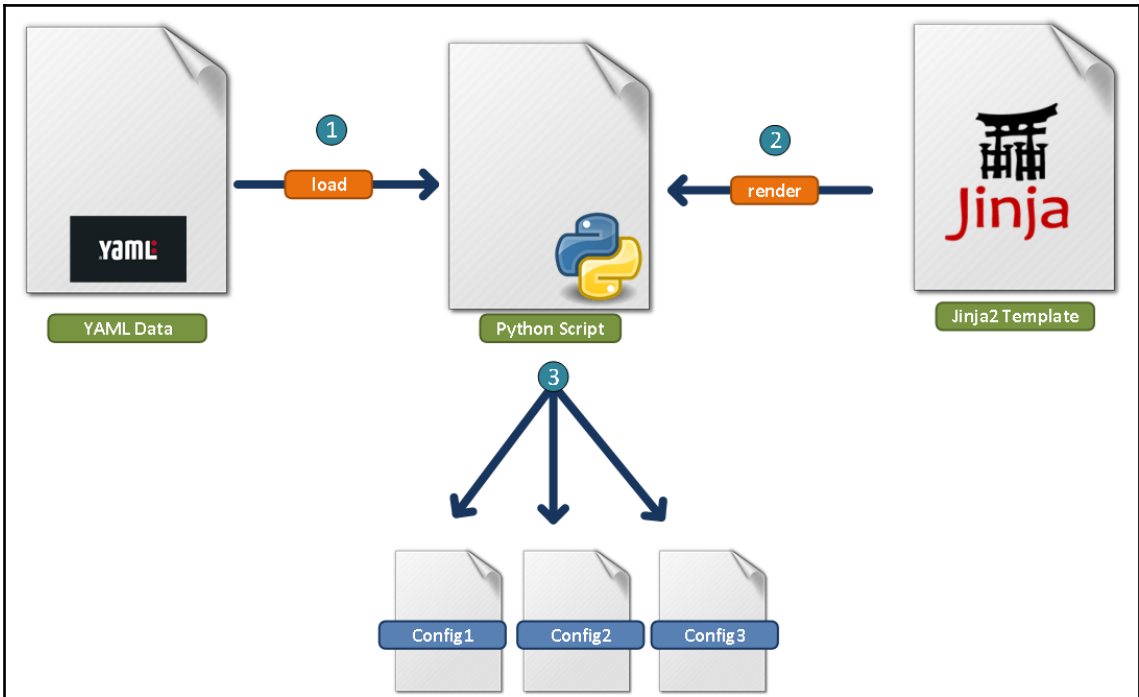
```
Python Console - DevNet
Django Console
... int {{mqmt intf}}
... no switchport
... no shut
... ip address {{mqmt ip}} {{mqmt subnet}}
... '''
...
... sw1 = {'hostname': 'switch1', 'mqmt intf': 'gig0/0', 'mqmt ip': '10.10.88.111', 'mqmt subnet': '255.255.255.0'}
... print(template_render(sw1))

hostname switch1

aaa new-model
aaa session-id unique
aaa authentication login default local
+ aaa authorization exec default local none
vtp mode transparent
vlan 10,20,30,40,50,60,70,80,90,100,200

int gig0/0
no switchport
no shut
ip address 10.10.88.111 255.255.255.0

>>>
```



```
Python Console - DevNet
Django Console
... print "=" * 30
...
rendering now device GW
hostname R1
int gig0/0
  no shutdown
  ip add 10.10.88.110 255.255.255.0
lldp run
ip domain-name EnterpriseAutomation.net
ip ssh version 2
ip scp server enable
crypto key generate rsa general-keys modulus 1024

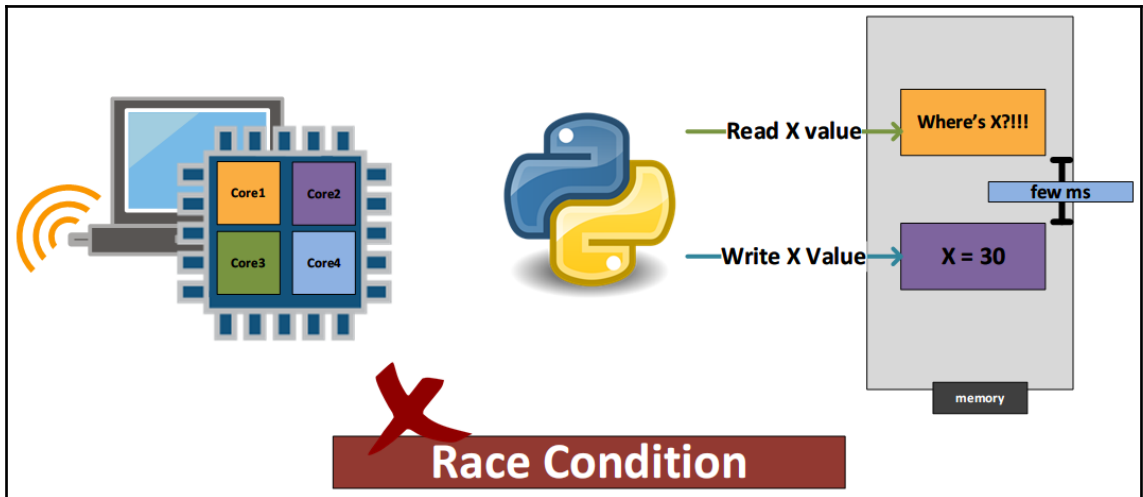
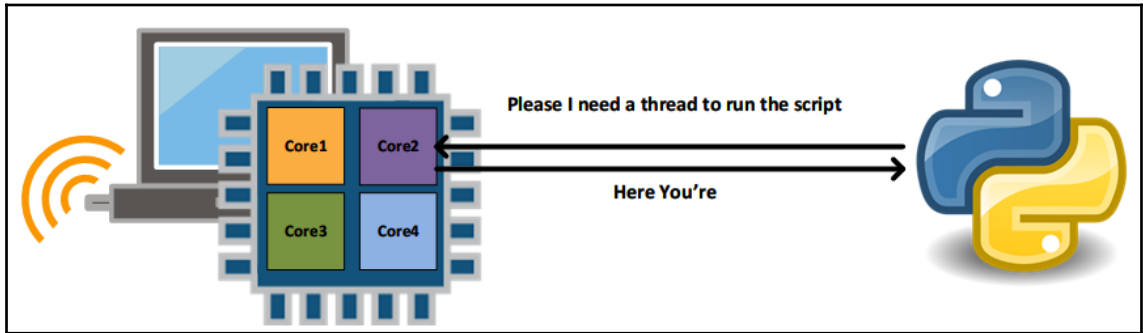
snmp-server community public RW
snmp-server trap link ietf
snmp-server enable traps snmp linkdown linkup
snmp-server enable traps syslog
snmp-server manager

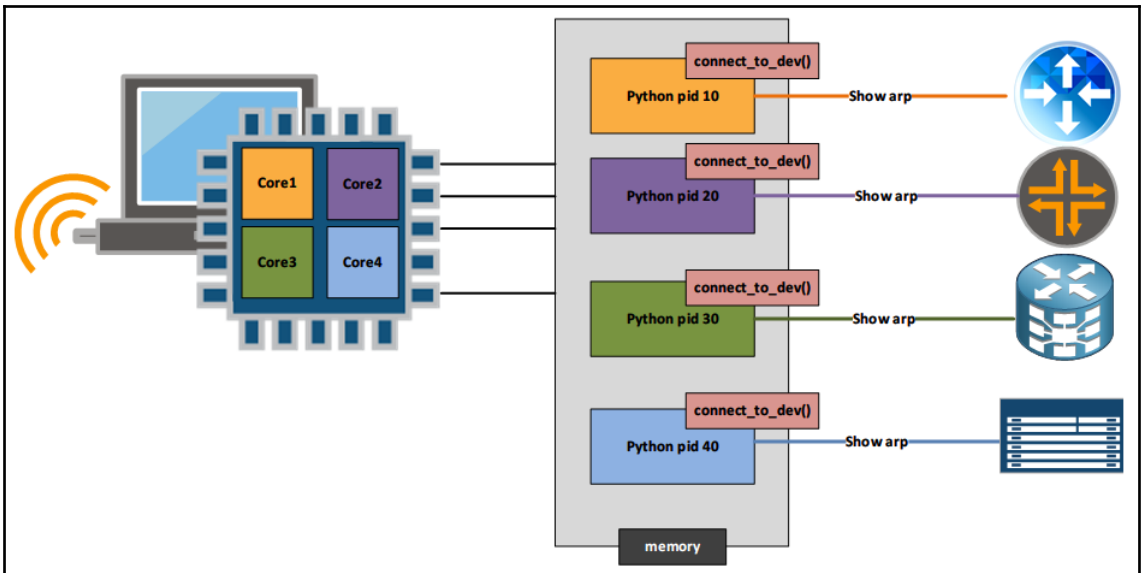
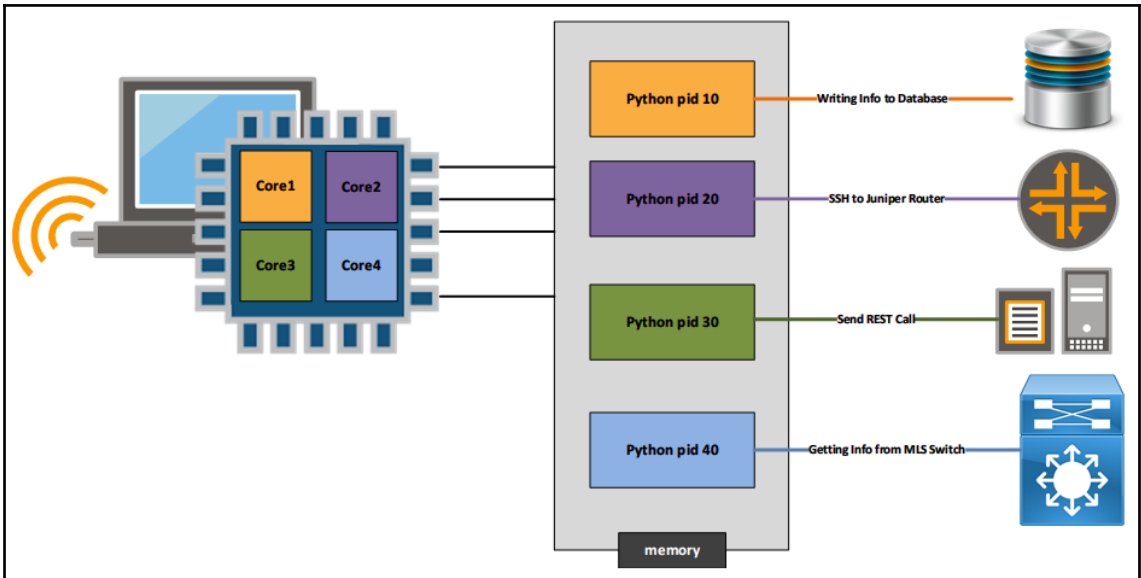
logging history debugging
>>>
```

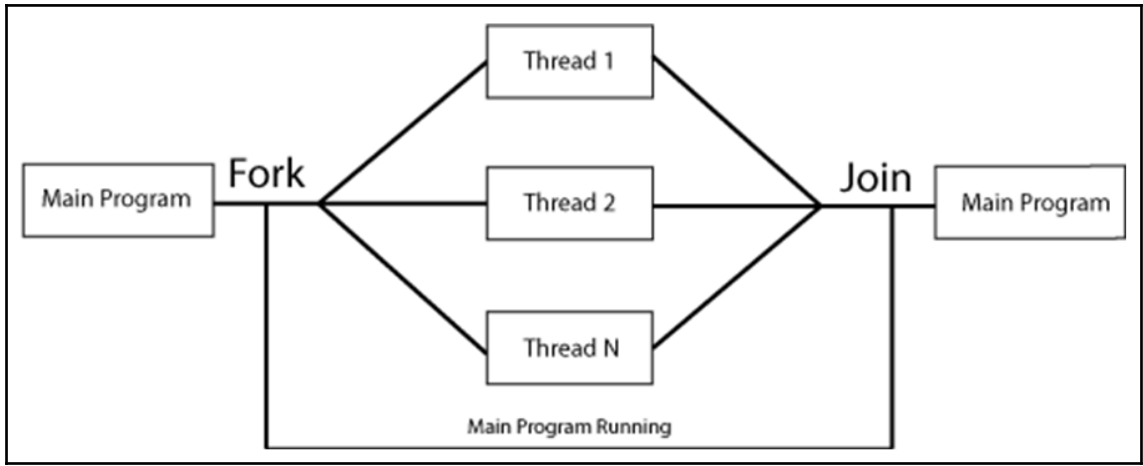
```
Python Console - DevNet
Django Console
=====
rendering now device switch2
hostname SW2
aaa new-model
aaa session-id unique
aaa authentication login default local
aaa authorization exec default local none
vtp mode transparent
vlan 10,20,30,40,50,60,70,80,90,100,200
int gig0/0
  no switchport
  no shut
  ip address 10.10.88.112 255.255.255.0

snmp-server community public RW
snmp-server trap link ietf
snmp-server enable traps snmp linkdown linkup
snmp-server enable traps syslog
snmp-server manager
```

Chapter 7: Parallel Execution of Python Script



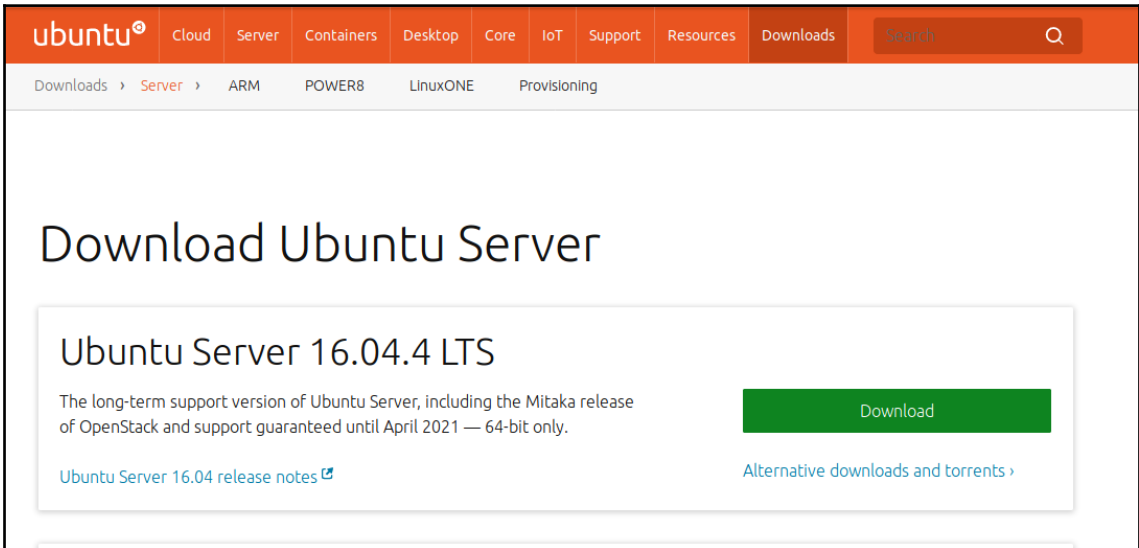




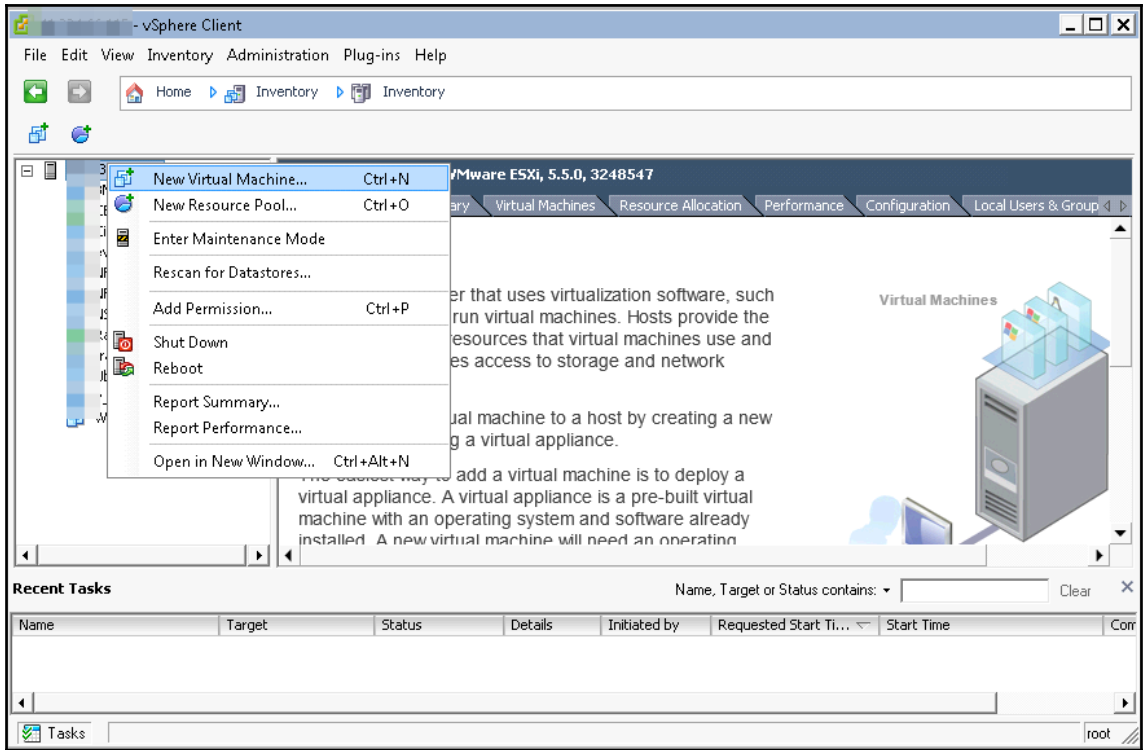
Chapter 8: Preparing a Lab Environment

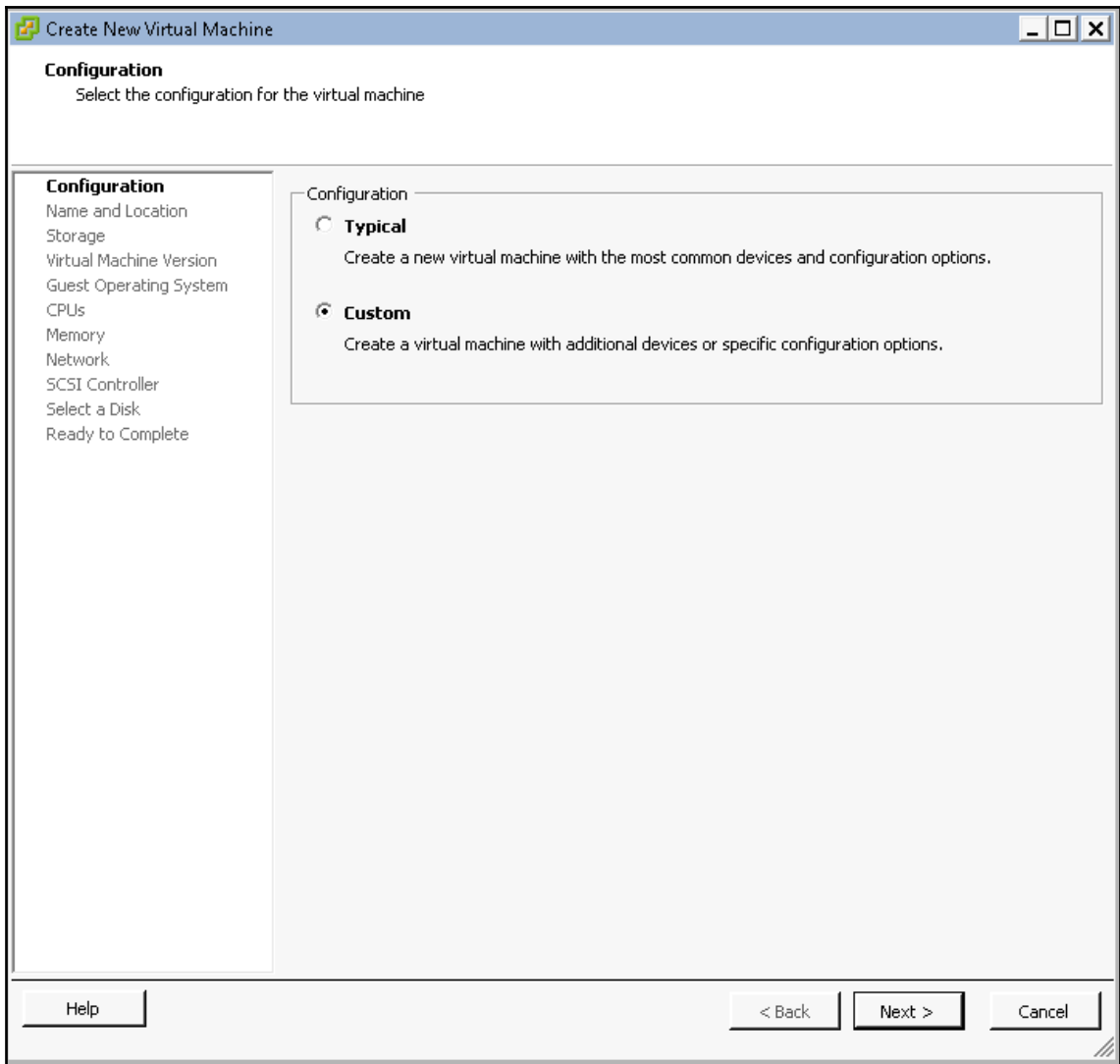


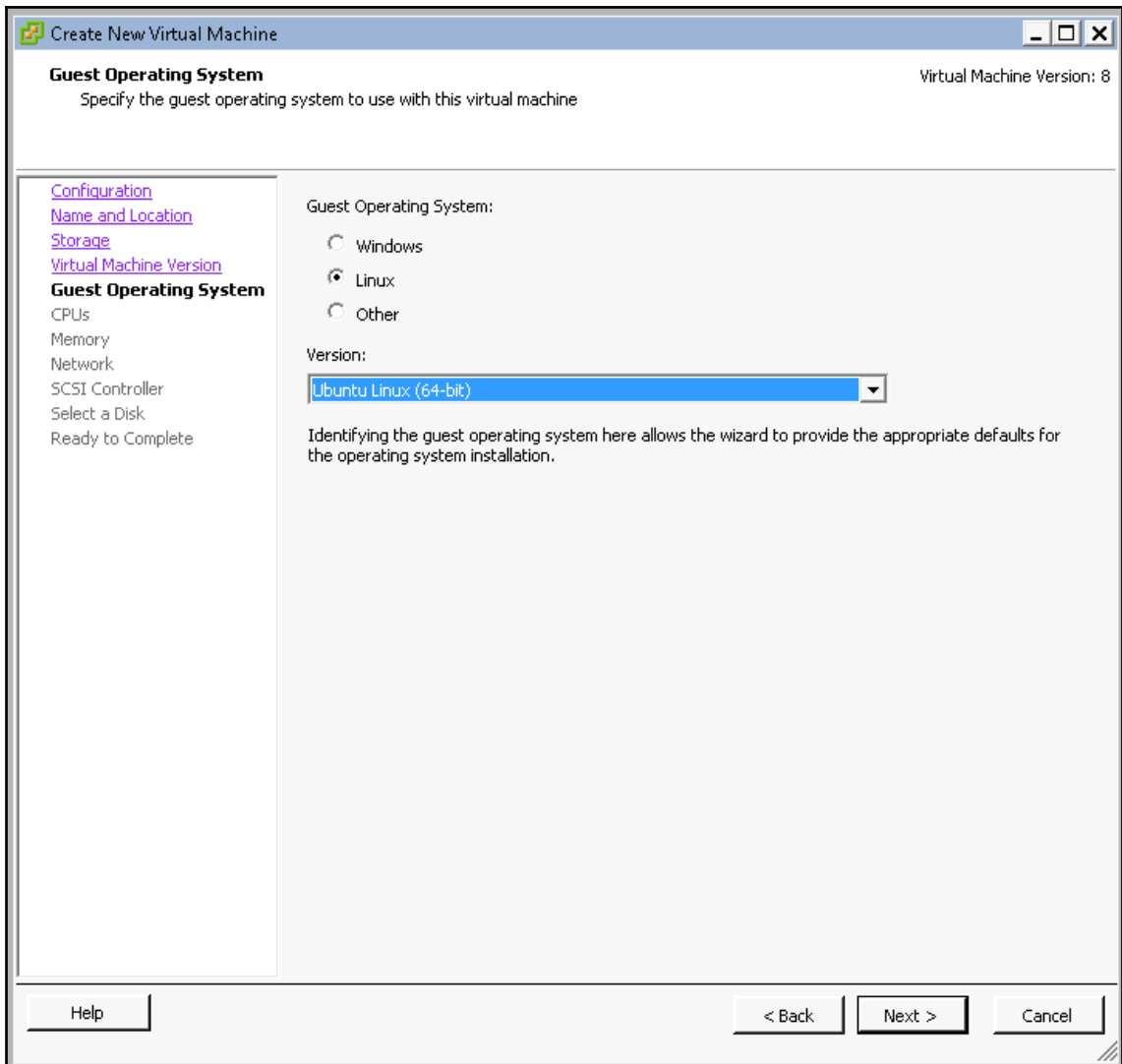
The screenshot shows the top section of the CentOS Project website. At the top is the CentOS logo and a navigation menu with links for GET CENTOS, ABOUT, COMMUNITY, DOCUMENTATION, and HELP. Below this is a large blue header with the text "The CentOS Project". Underneath, there are three paragraphs of text describing the project as a community-driven free software effort, offering a consistent manageable platform, and expanding availability across vendors like Amazon and Google. At the bottom of this section is a prominent orange button that says "Get CentOS Now".

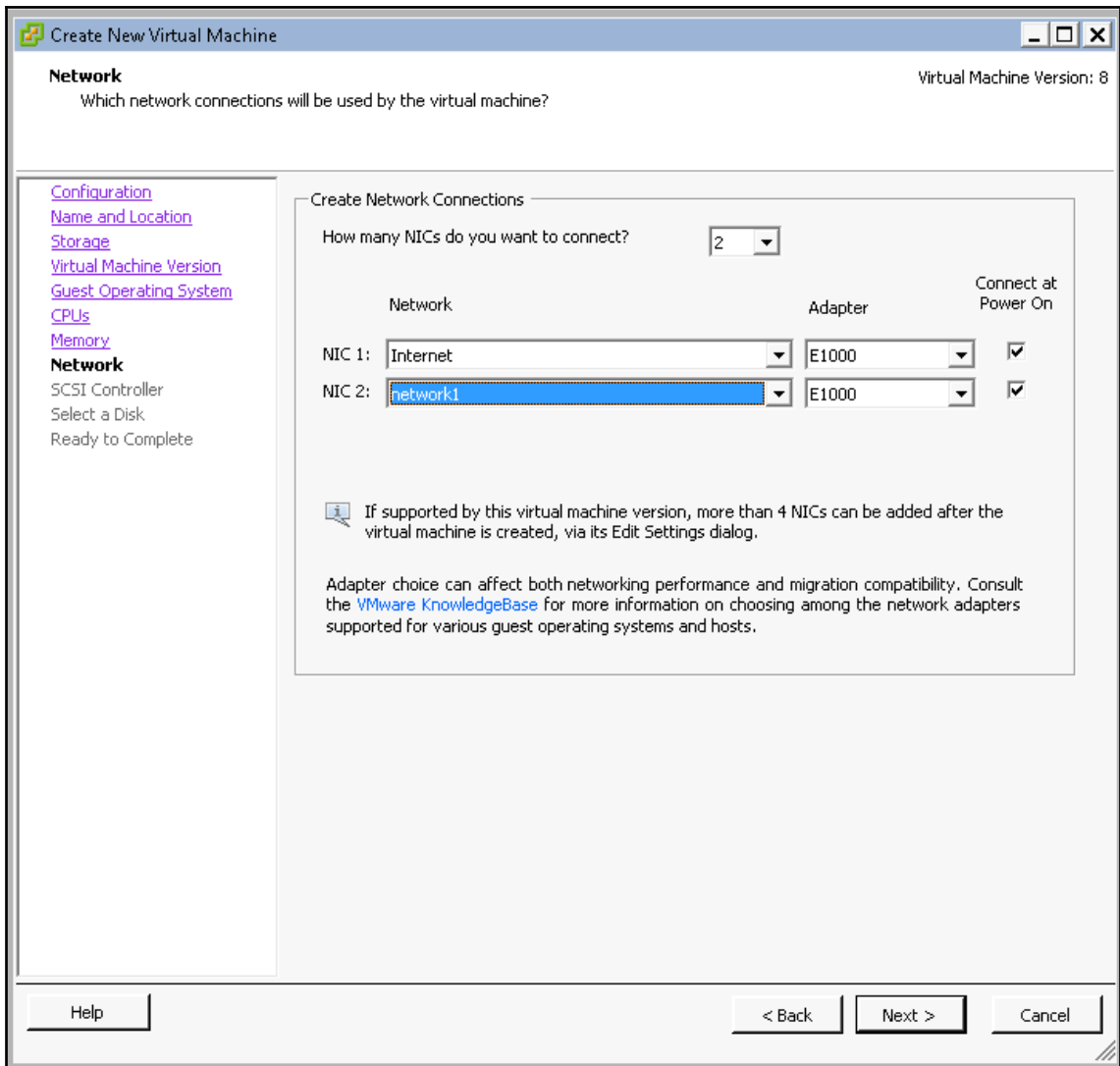


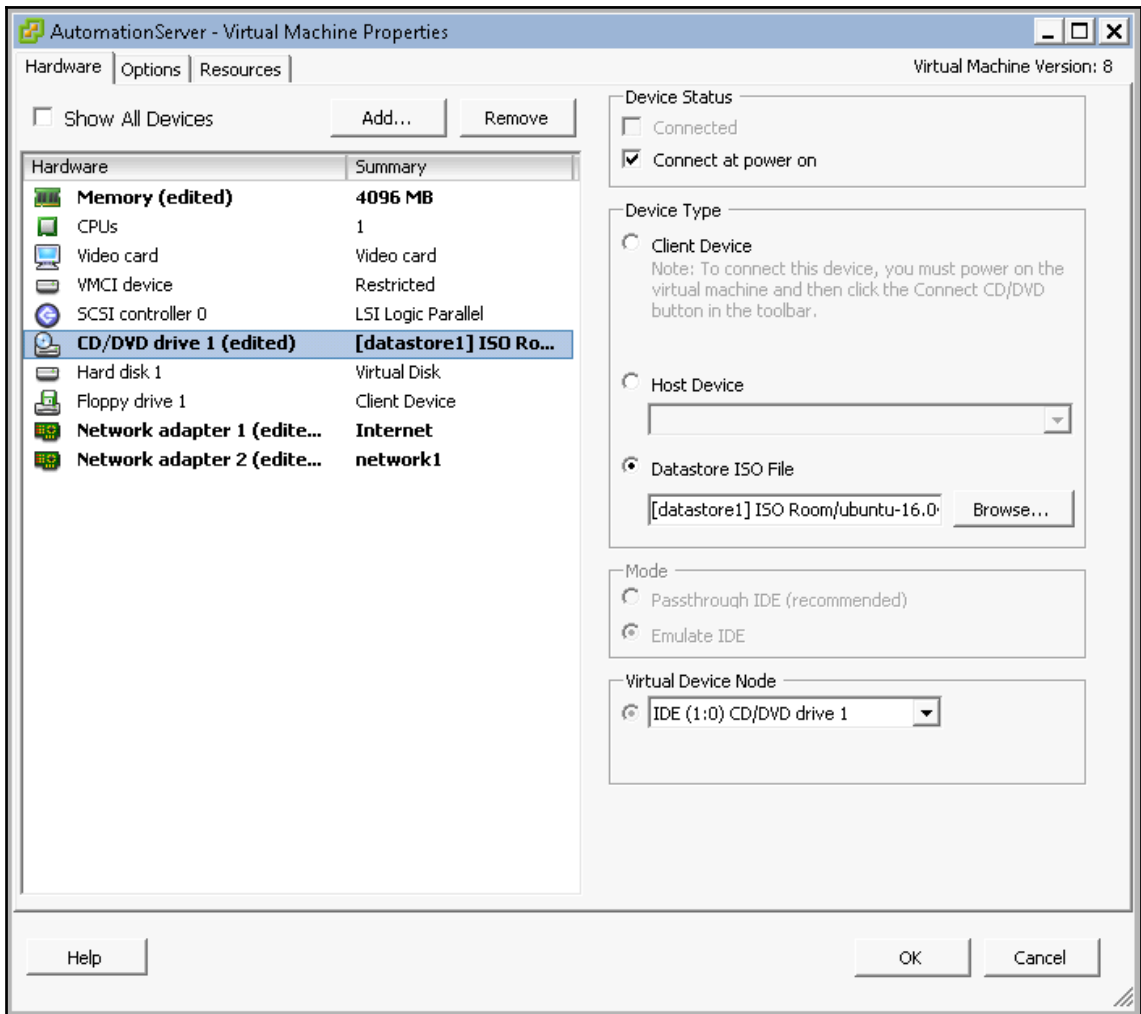
The screenshot shows the Ubuntu Server download page. The top navigation bar is orange and includes the Ubuntu logo and links for Cloud, Server, Containers, Desktop, Core, IoT, Support, Resources, and Downloads. A search bar is also present. Below the navigation bar, there are breadcrumb links: Downloads > Server > ARM > POWER8 > LinuxONE > Provisioning. The main heading is "Download Ubuntu Server". Below this, there is a white box containing the text "Ubuntu Server 16.04.4 LTS" and a description: "The long-term support version of Ubuntu Server, including the Mitaka release of OpenStack and support guaranteed until April 2021 — 64-bit only." To the right of this text is a green "Download" button. Below the description, there are two links: "Ubuntu Server 16.04 release notes" and "Alternative downloads and torrents".

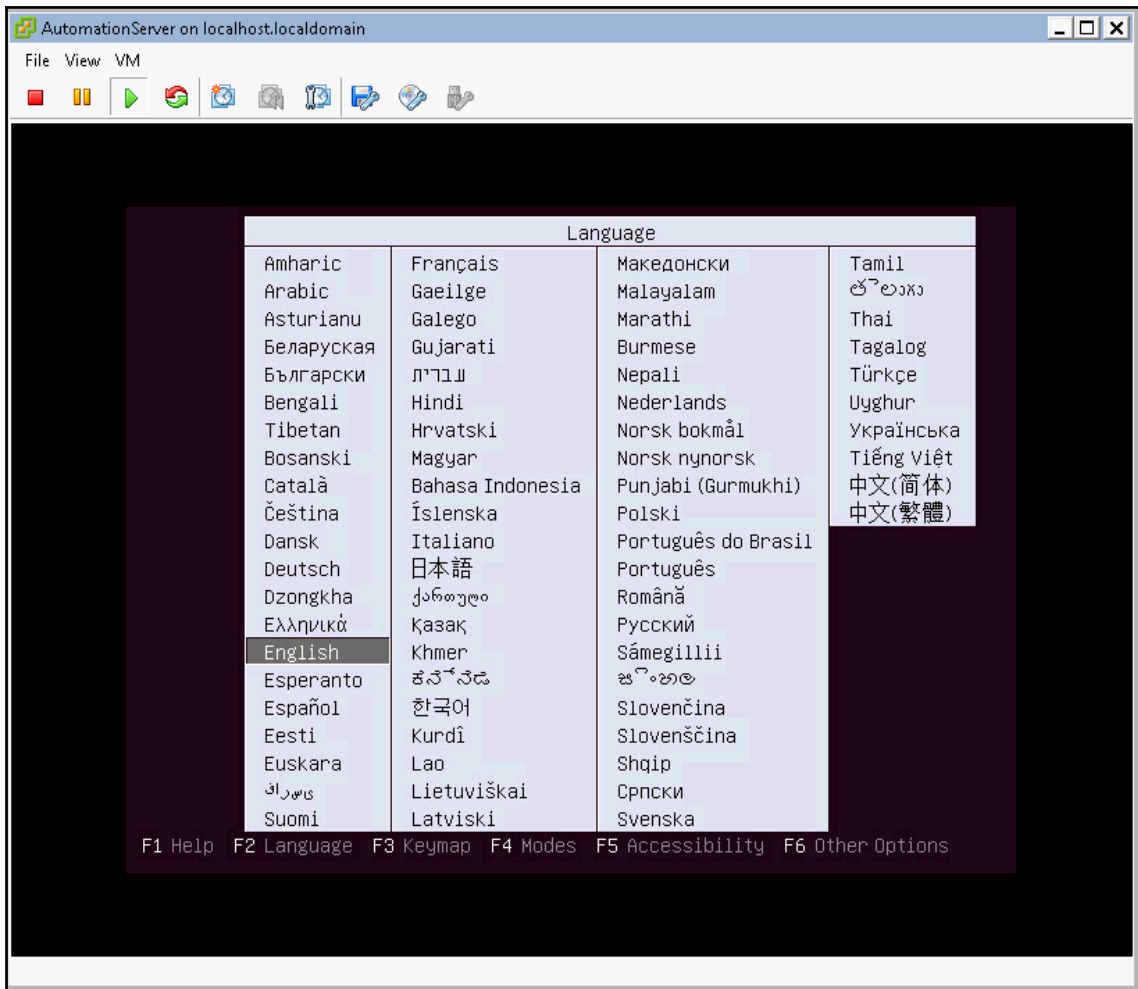


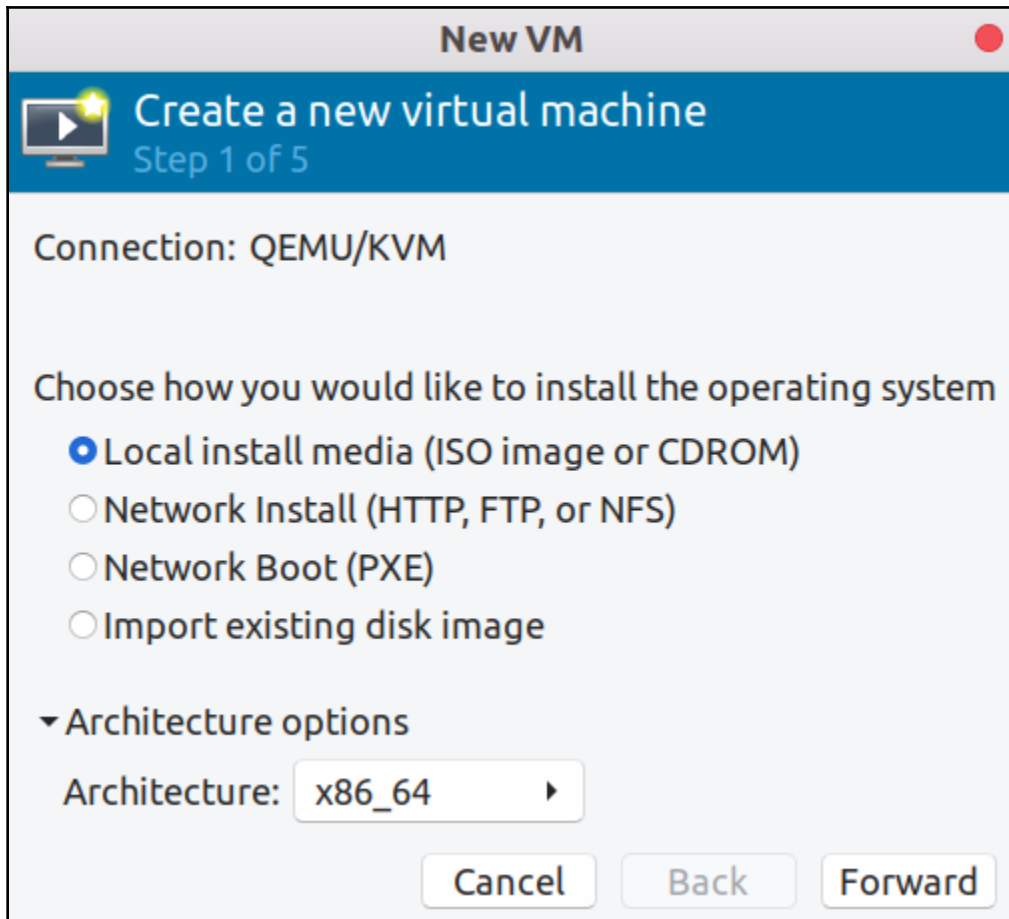


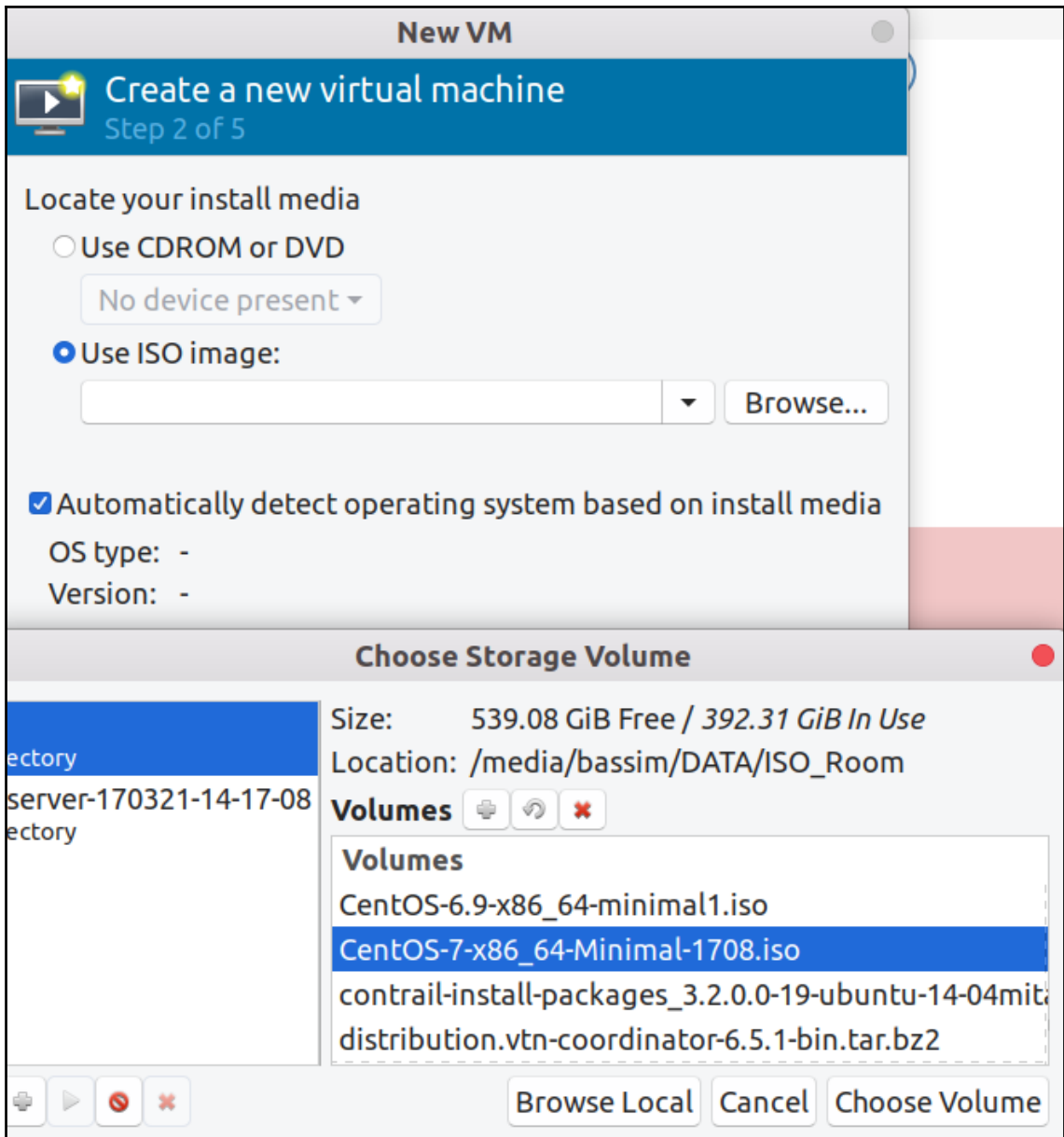


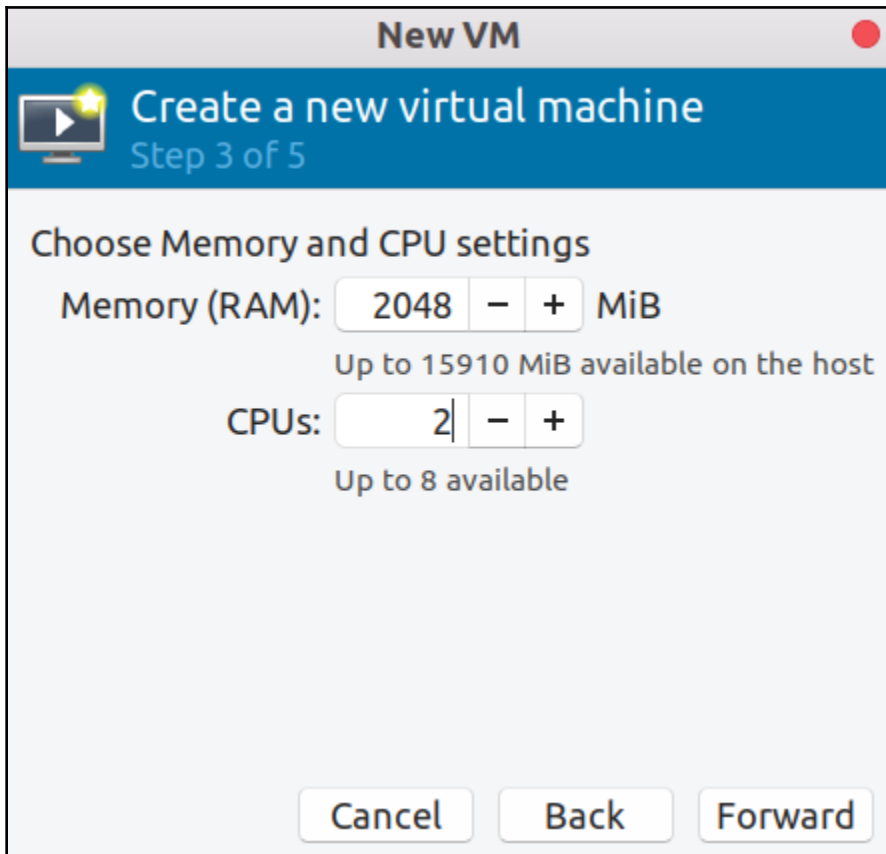


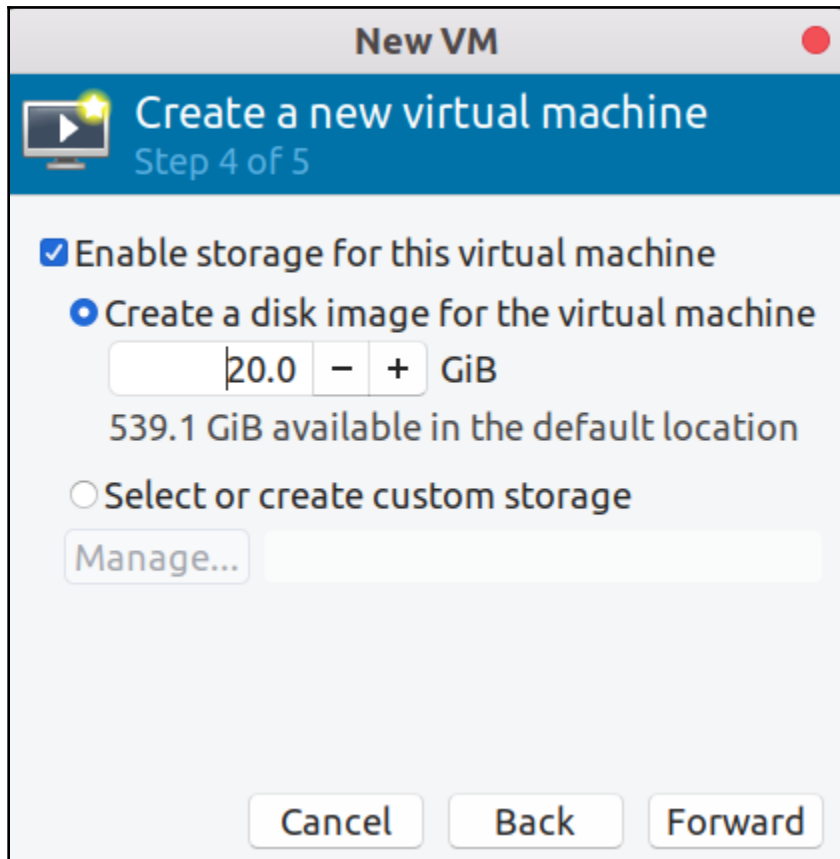


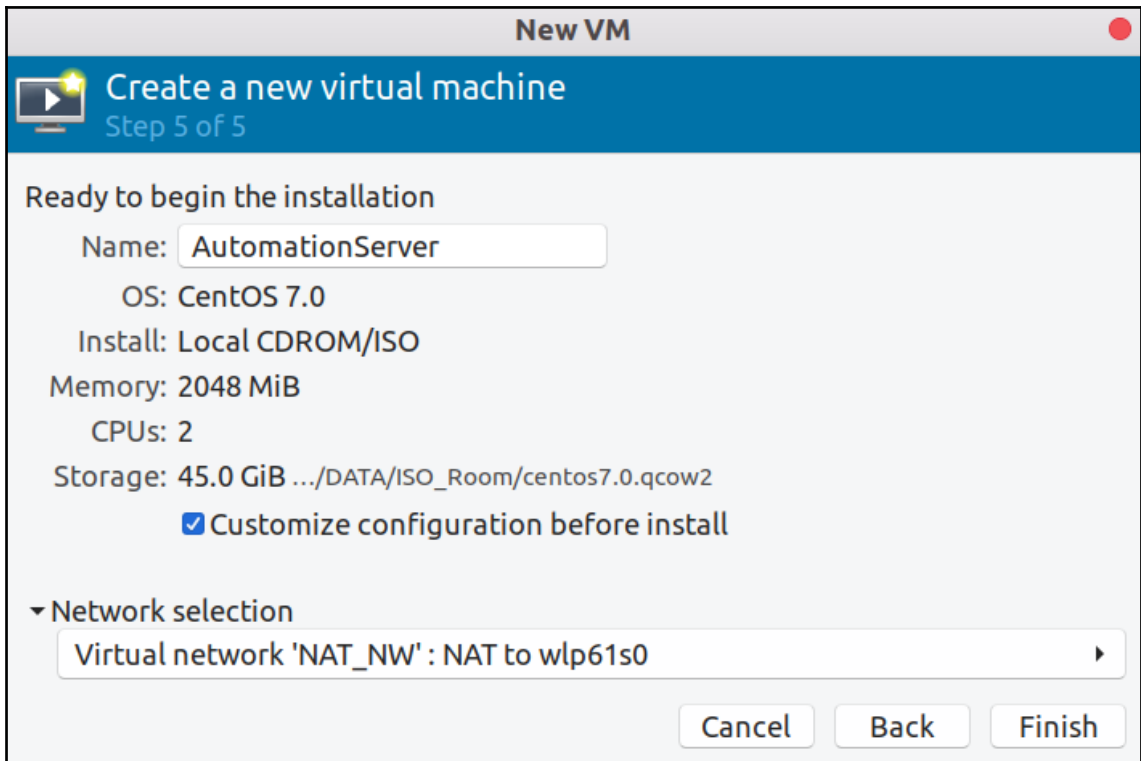


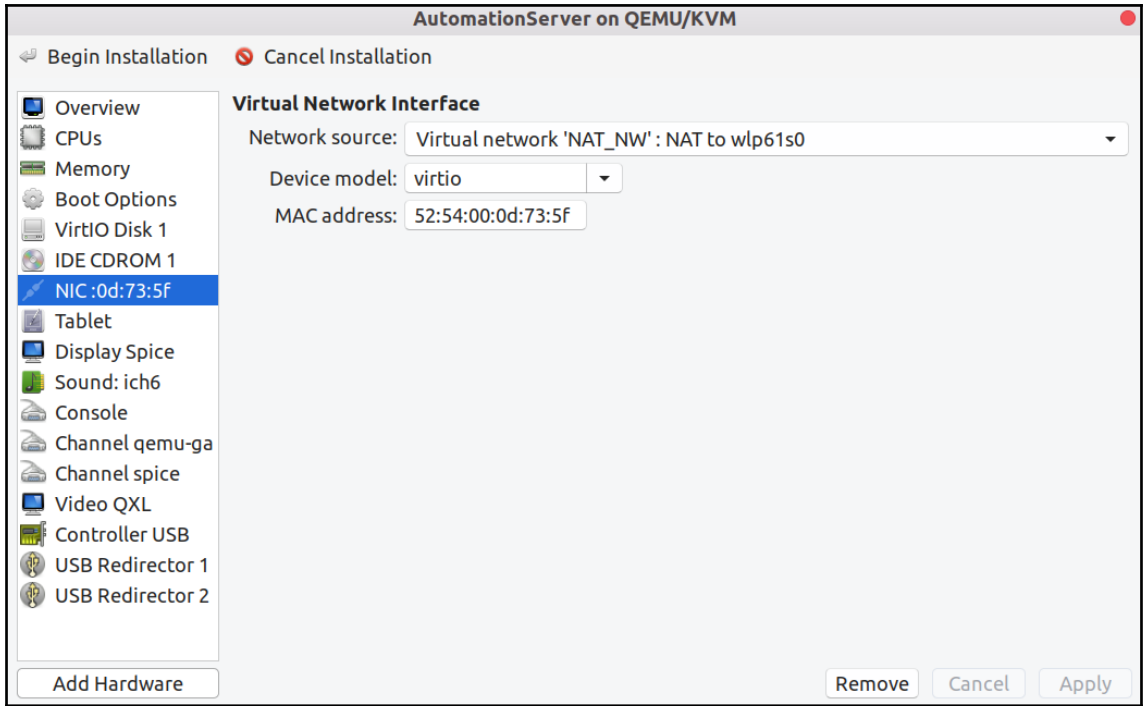


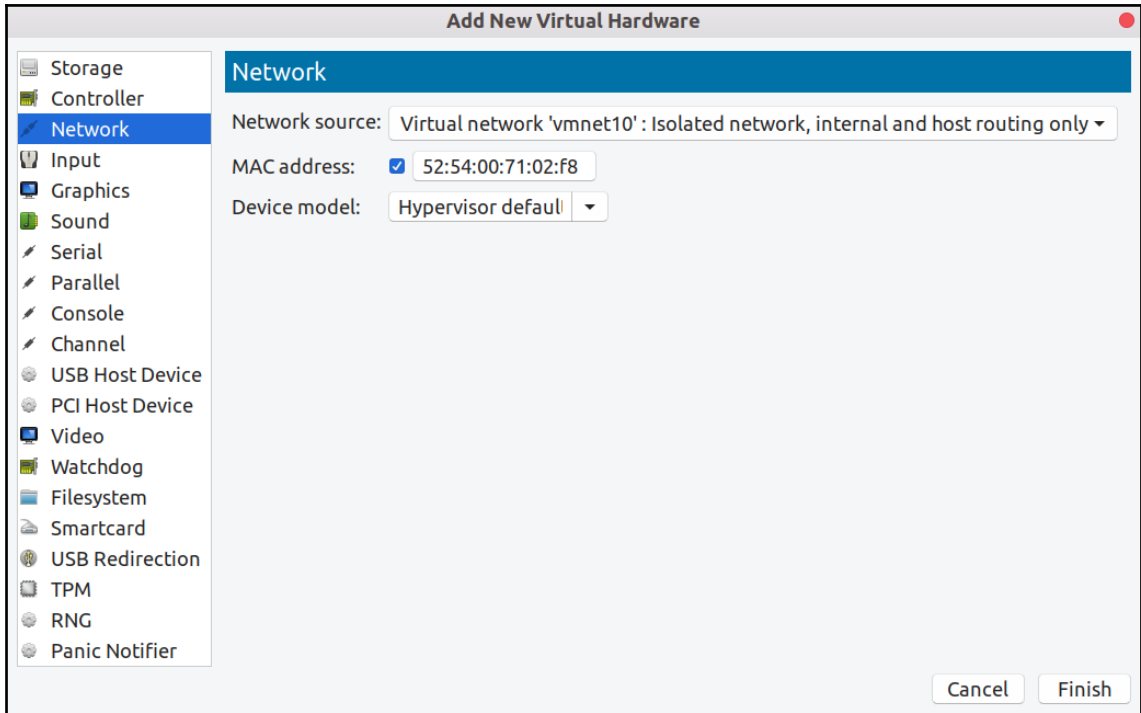


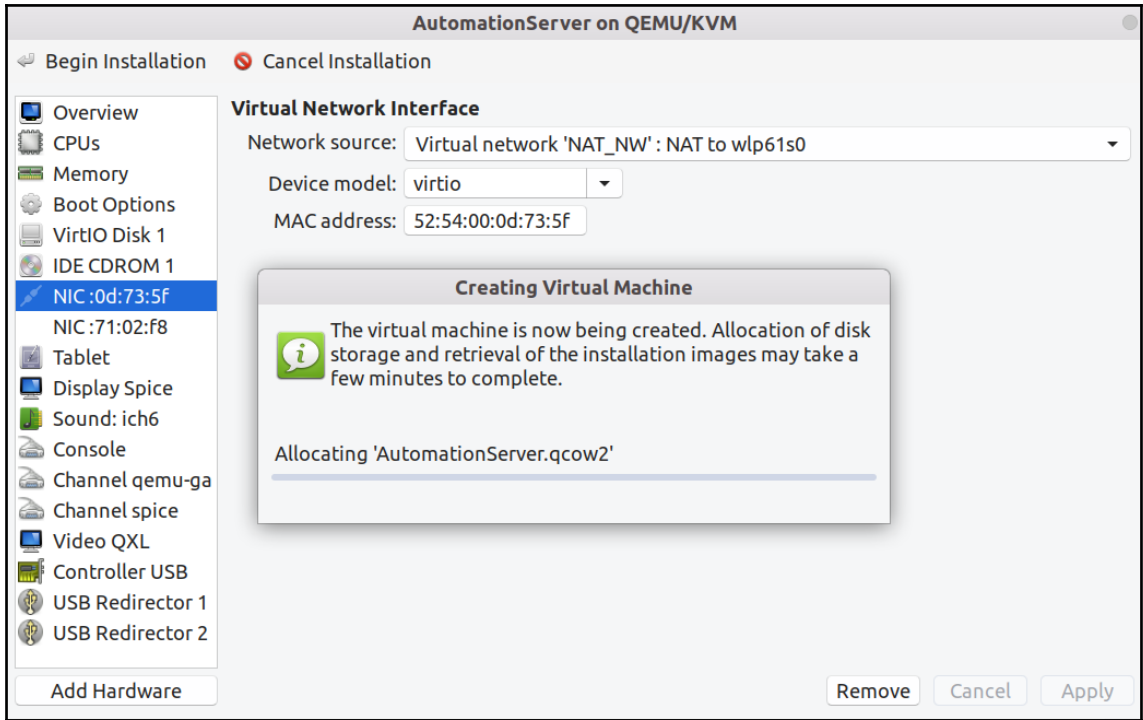


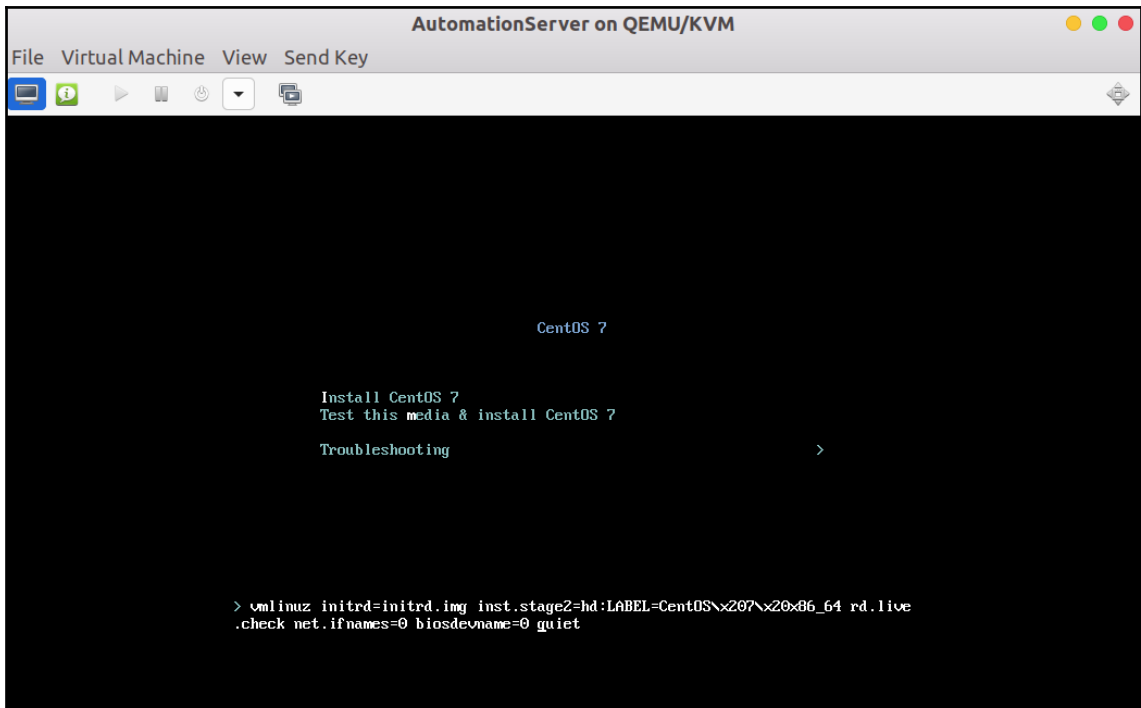


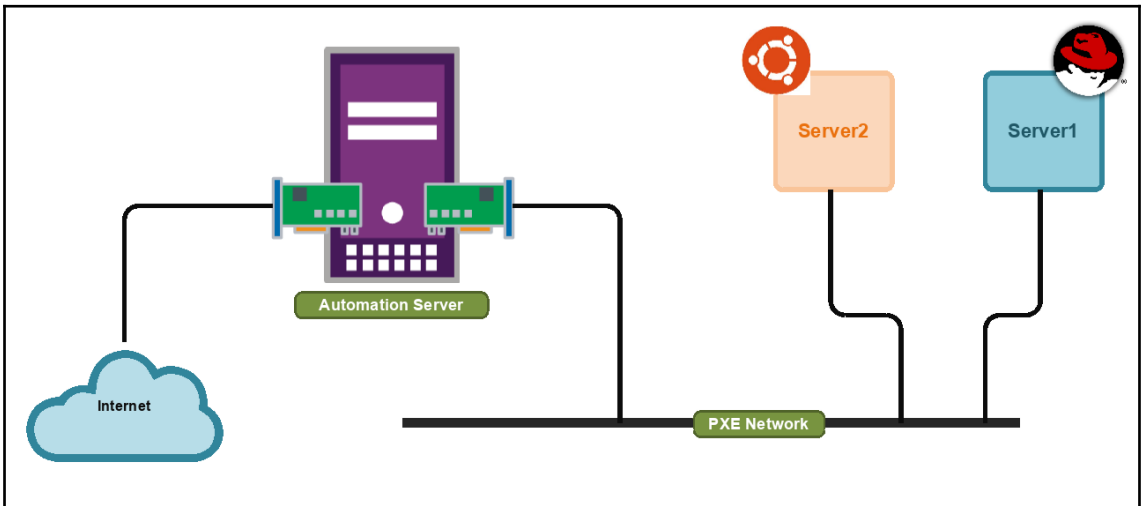
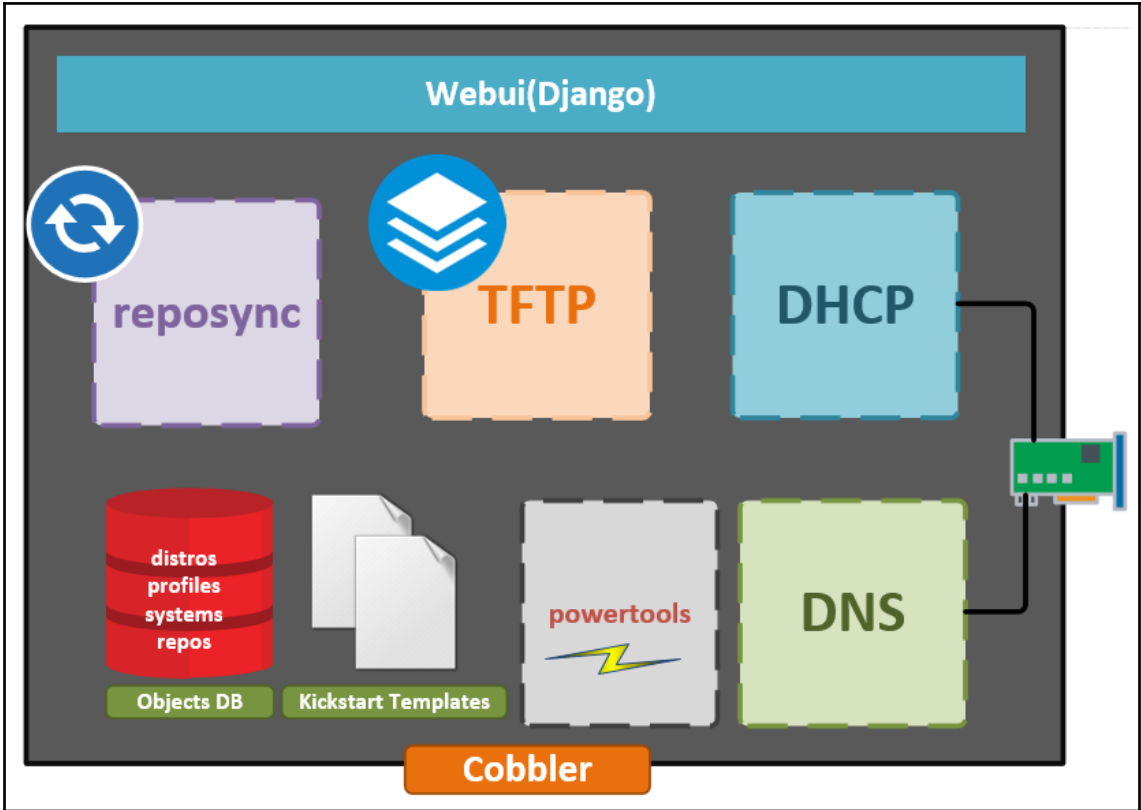


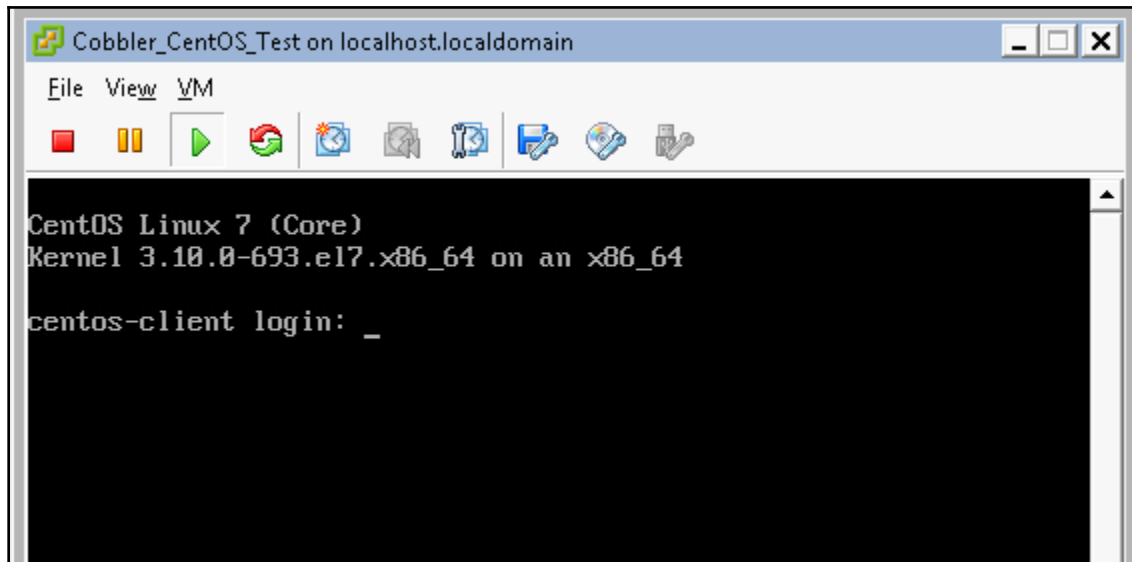




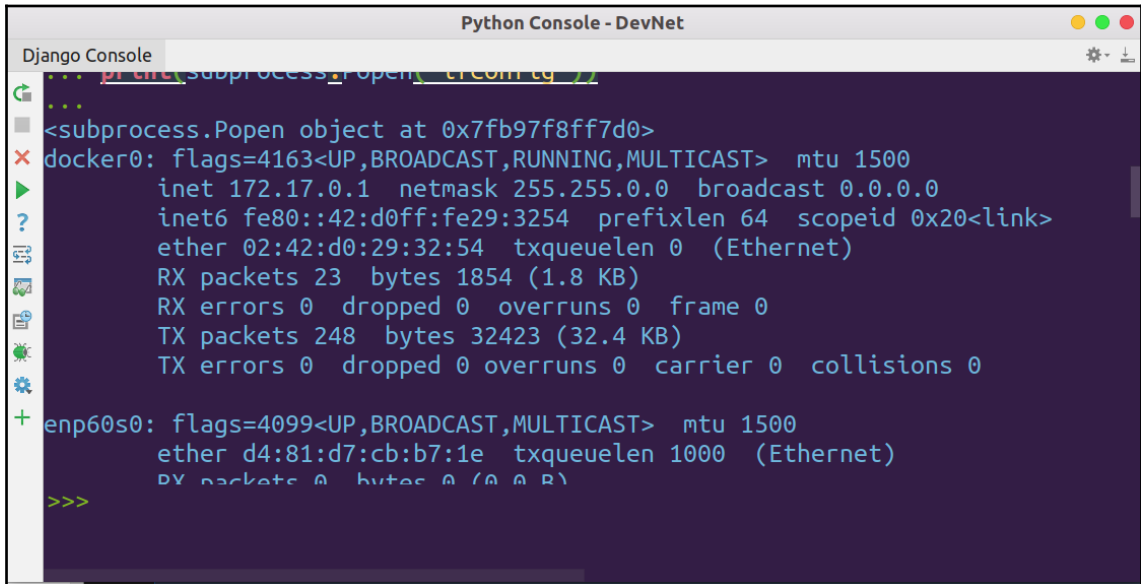




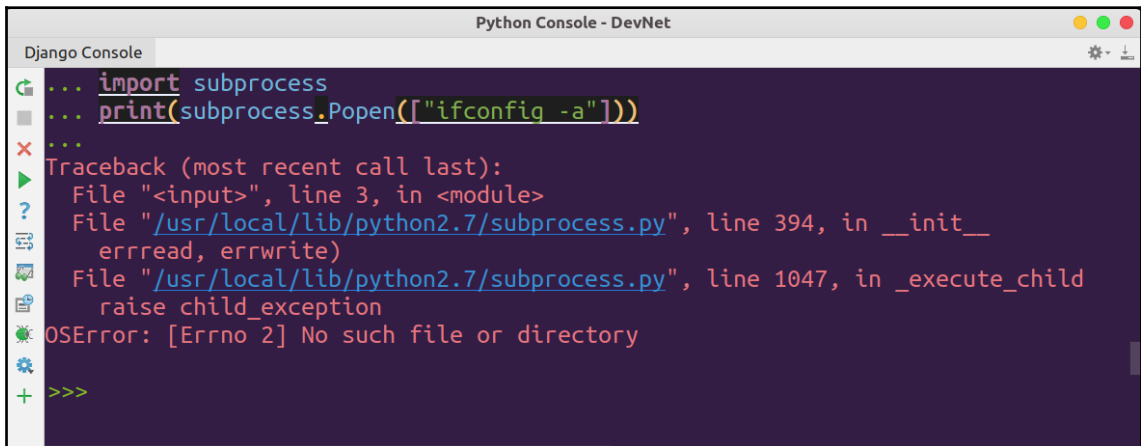




Chapter 9: Using the Subprocess Module



```
Python Console - DevNet
Django Console
... print(subprocess.Popen(['ifconfig']))
...
<subprocess.Popen object at 0x7fb97f8ff7d0>
X docker0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
  inet 172.17.0.1 netmask 255.255.0.0 broadcast 0.0.0.0
  inet6 fe80::42:d0ff:fe29:3254 prefixlen 64 scopeid 0x20<link>
  ether 02:42:d0:29:32:54 txqueuelen 0 (Ethernet)
  RX packets 23 bytes 1854 (1.8 KB)
  RX errors 0 dropped 0 overruns 0 frame 0
  TX packets 248 bytes 32423 (32.4 KB)
  TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
+ enp60s0: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
  ether d4:81:d7:cb:b7:1e txqueuelen 1000 (Ethernet)
  RX packets 0 bytes 0 (0.0 B)
  TX packets 0 bytes 0 (0.0 B)
>>>
```



```
Python Console - DevNet
Django Console
... import subprocess
... print(subprocess.Popen(['ifconfig -a']))
...
Traceback (most recent call last):
  File "<input>", line 3, in <module>
  File "/usr/local/lib/python2.7/subprocess.py", line 394, in __init__
    errread, errwrite)
  File "/usr/local/lib/python2.7/subprocess.py", line 1047, in _execute_child
    raise child_exception
OSError: [Errno 2] No such file or directory
+ >>>
```

```
Python Console - DevNet
Django Console
<subprocess.Popen object at 0x7fb97f86fe10>
# interfaces(5) file used by ifup(8) and ifdown(8)
auto lo
iface lo inet loopback

auto vnet1
iface vnet1 inet static
    address 10.10.88.1
    netmask 255.255.255.0

>>>
```

```
Python Console - DevNet
Django Console
...
====The Standard Output is====
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
64 bytes from 8.8.8.8: icmp_seq=1 ttl=44 time=187 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=44 time=365 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=44 time=380 ms

--- 8.8.8.8 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2002ms
rtt min/avg/max/mdev = 187.616/311.172/380.608/87.592 ms

====The Standard Error is====
None

>>>
```

```
Python Console - DevNet
Django Console
... stdout, stderr = p.communicate(input=b"welcome to subprocess module\nthis line is a n
... print("====The Standard Output is====")
... {}.format(stdout))
... print("====The Standard Error is====")
... {}.format(stderr))
...
====The Standard Output is====
welcome to subprocess module
====The Standard Error is====
None
>>>
```

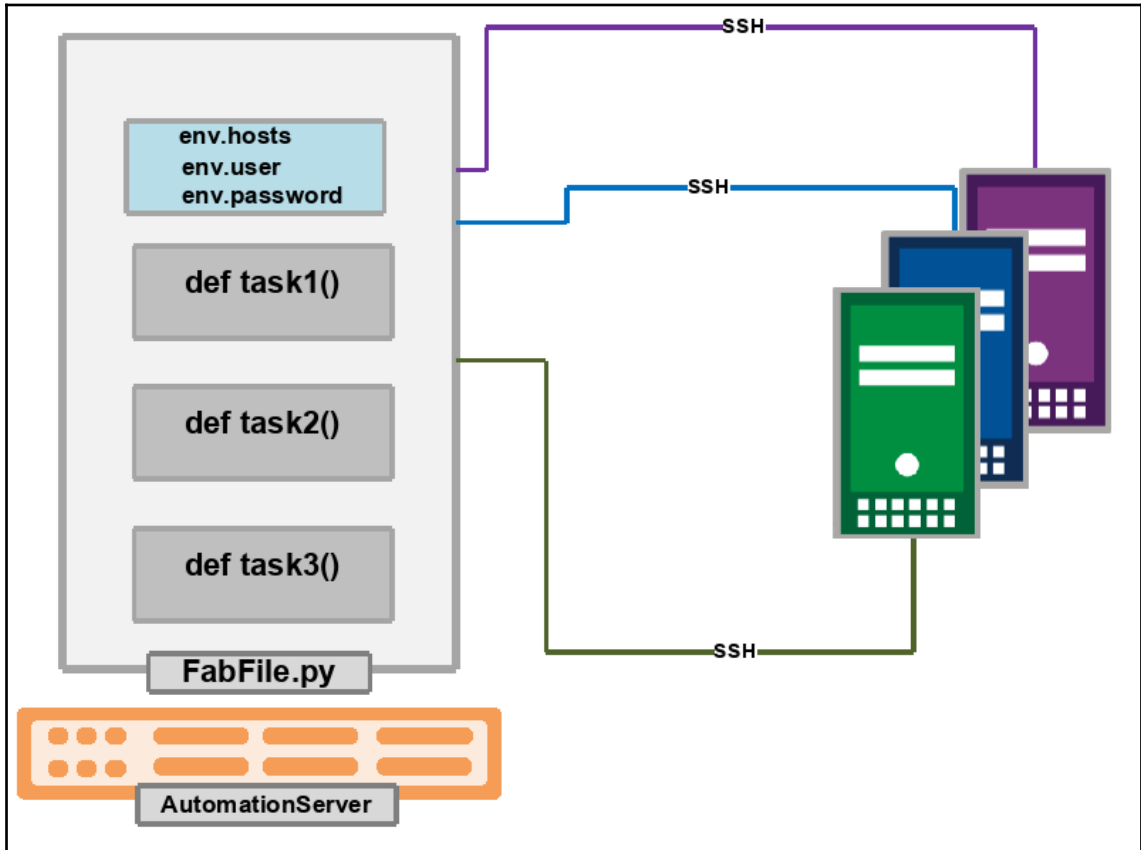
```
Python Console - DevNet
Django Console
... return False, stderr
...
... while True:
...     print(ping_destination(raw_input("Please enter the host:")))
...
Please enter the host:>? 8.8.8.8
Host is alive
(True, 'PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.\n64 bytes from 8.8.8.8: icmp_seq=1 t
Please enter the host:>? HostNotExist
Host is down
(False, 'ping: HostNotExist: Name or service not known\n')
Please enter the host:
>?
```

```
def call(*popenargs, **kwargs):
    """Run command with arguments. Wait for command to complete, then
    return the returncode attribute.

    The arguments are the same as for the Popen constructor. Example:

    retcode = call(["ls", "-l"])
    """
    return Popen(*popenargs, **kwargs).wait()
```

Chapter 10: Running System Administration Tasks with Fabric

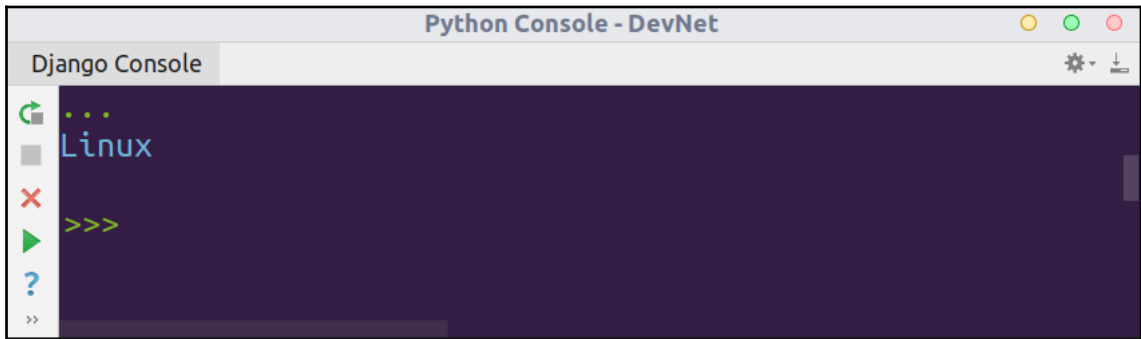


```
[root@AutomationServer ~]#
[root@AutomationServer ~]# pip install fabric
Collecting fabric
  Downloading Fabric-1.14.0-py2-none-any.whl (92kB)
    100% |████████████████████████████████████████| 102kB 738kB/s
Collecting paramiko<3.0,>=1.10 (from fabric)
  Downloading paramiko-2.4.1-py2.py3-none-any.whl (194kB)
    100% |████████████████████████████████████████| 194kB 1.4MB/s
Collecting pyasn1>=0.1.7 (from paramiko<3.0,>=1.10->fabric)
  Downloading pyasn1-0.4.2-py2.py3-none-any.whl (71kB)
    100% |████████████████████████████████████████| 71kB 3.2MB/s
Collecting bcrypt>=3.1.3 (from paramiko<3.0,>=1.10->fabric)
  Downloading bcrypt-3.1.4-cp27-cp27mu-manylinux1_x86_64.whl (57kB)
    100% |████████████████████████████████████████| 61kB 3.3MB/s
Collecting cryptography>=1.5 (from paramiko<3.0,>=1.10->fabric)
  Downloading cryptography-2.2.2-cp27-cp27mu-manylinux1_x86_64.whl (2.2MB)
    100% |████████████████████████████████████████| 2.2MB 353kB/s
Collecting pynacl>=1.0.1 (from paramiko<3.0,>=1.10->fabric)
  Downloading PyNaCl-1.2.1-cp27-cp27mu-manylinux1_x86_64.whl (696kB)
    100% |████████████████████████████████████████| 706kB 918kB/s
Requirement already satisfied (use --upgrade to upgrade): six>=1.4.1 in /usr/lib/python2.7/site-packages (from bcrypt>=3.1.3->paramiko<3.0,>=1.10->fabric)
Collecting cffi>=1.1 (from bcrypt>=3.1.3->paramiko<3.0,>=1.10->fabric)
  Downloading cffi-1.11.5-cp27-cp27mu-manylinux1_x86_64.whl (407kB)
    100% |████████████████████████████████████████| 409kB 1.4MB/s
Collecting enum34; python_version < "3" (from cryptography>=1.5->paramiko<3.0,>=1.10->fabric)
  Downloading enum34-1.1.6-py2-none-any.whl
```

f run	fabric.operations
ssh	paramiko
c _AttributeList	fabric.operations
c _AttributeString	fabric.operations
f _execute	fabric.operations
f _noop	fabric.operations
f _prefix_commands	fabric.operations
f _prefix_env_vars	fabric.operations
f _pty_size	fabric.utils
f _run_command	fabric.operations
f _shell_escape	fabric.operations
f _shell_wrap	fabric.operations
f _sudo_prefix	fabric.operations
f _sudo_prefix_argument	fabric.operations
f abort	fabric.utils
f apply_lcwd	fabric.utils
f char_buffered	fabric.context_managers
c closing	contextlib
v connections	fabric.state
f contextmanager	contextlib
f default_channel	fabric.state
v env	fabric.state
f error	fabric.utils
f get	fabric.operations
f glob	glob
f handle_prompt_abort	fabric.utils
f hide	fabric.context_managers
f indent	fabric.utils
f input_loop	fabric.io
f local	fabric.operations
f needs_host	fabric.network
f open_shell	fabric.operations
f output_loop	fabric.io
f prompt	fabric.operations
f put	fabric.operations
v quiet_manager	fabric.operations
f reboot	fabric.operations

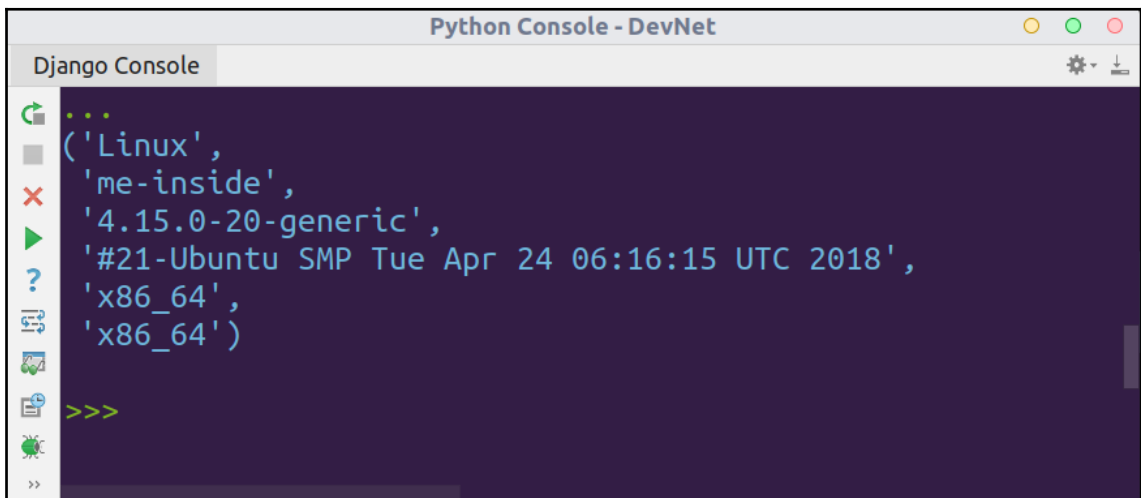
Did you know that Quick Documentation View (Ctrl+Q) works in completion lookups as well? >>π

Chapter 11: Generating System Reports and System Monitoring



```
Python Console - DevNet
Django Console
...
Linux
>>>
```

```
Python 2.7.14 (v2.7.14:84471935ed, Sep 16 2017, 20:19:30) [MSC v.1500 32 bit <Intel>] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> import platform
>>> print(platform.system())
Windows
>>> _
```

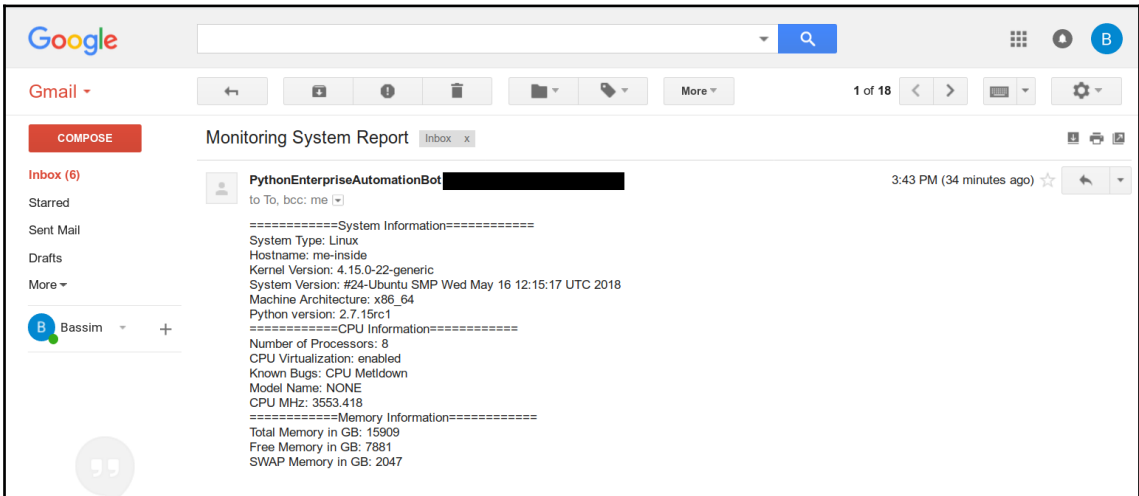


```
Python Console - DevNet
Django Console
...
('Linux',
 'me-inside',
 '4.15.0-20-generic',
 '#21-Ubuntu SMP Tue Apr 24 06:16:15 UTC 2018',
 'x86_64',
 'x86_64')
>>>
```



```
f platform(alias, terse) platform
f uname() platform
f system() platform
f version() platform
f _abspath(path, isabs, join, getcwd, normpath) platform
v _architecture_split platform
f _bcd2str(bcd) platform
v _default_architecture platform
f _dist_try_harder(distname, version, id) platform
f _follow_symlinks(filepath) platform
v _ironpython_sys_version_parser platform
f _java_getprop(name, default) platform
v _libc_search platform
v _lsb_release_version platform
f _mac_ver_gestalt() platform
f _mac_ver_gestalt() platform
Did you know that Quick Documentation View (Ctrl+Q) works in completion lookups as well? >>
```

```
Python Console - DevNet
Django Console
=====System Information=====
System Type: Linux
Hostname: me-inside
Kernel Version: 4.15.0-22-generic
System Version: #24-Ubuntu SMP Wed May 16 12:15:17 UTC 2018
Machine Architecture: x86_64
Python version: 2.7.15rc1
=====CPU Information=====
Number of Processors: 8
CPU Virtualization: enabled
Known Bugs: CPU Mettdown
Model Name: NONE
CPU MHz: 3512.935
=====Memory Information=====
Total Memory in GB: 15909
Free Memory in GB: 9055
SWAP Memory in GB: 2047
>>>
```



====Time Now is 2018-05-23 00:02:11=====

====System Information=====

System Type: Linux

Hostname: me-inside

Kernel Version: 4.15.0-22-generic

System Version: #24-Ubuntu SMP Wed May 16 12:15:17 UTC 2018

Machine Architecture: x86_64

Python version: 2.7.15rc1

====CPU Information=====

Number of Processors: 8

CPU Virtualization: enabled

Known Bugs: CPU Metldown

Model Name: NONE

CPU MHz: 2799.999

====Memory Information=====

Total Memory in GB: 15909

Free Memory in GB: 8429

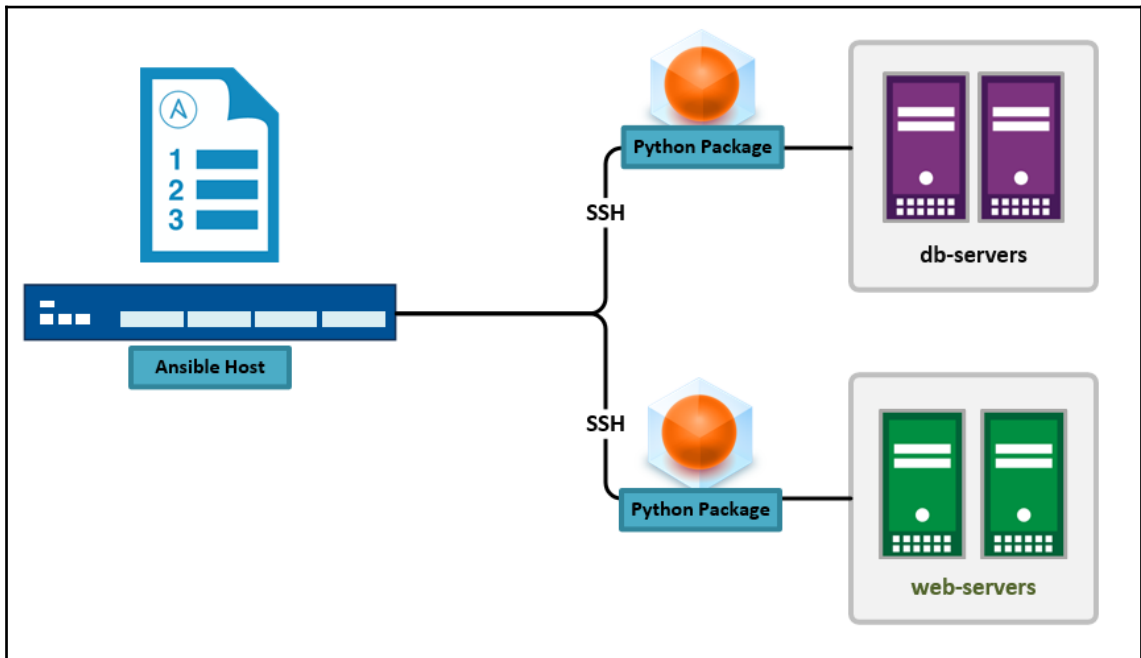
SWAP Memory in GB: 2047

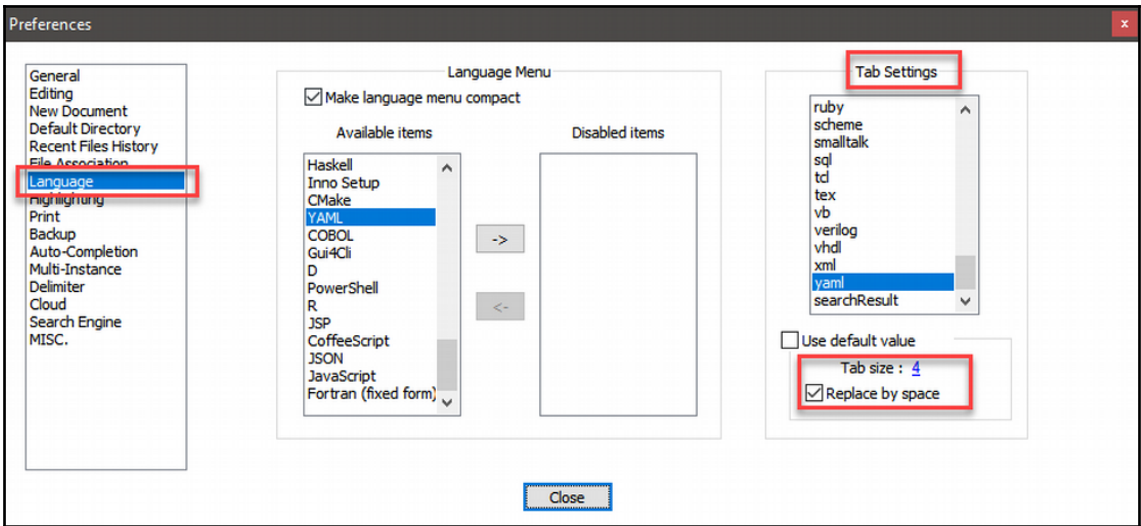
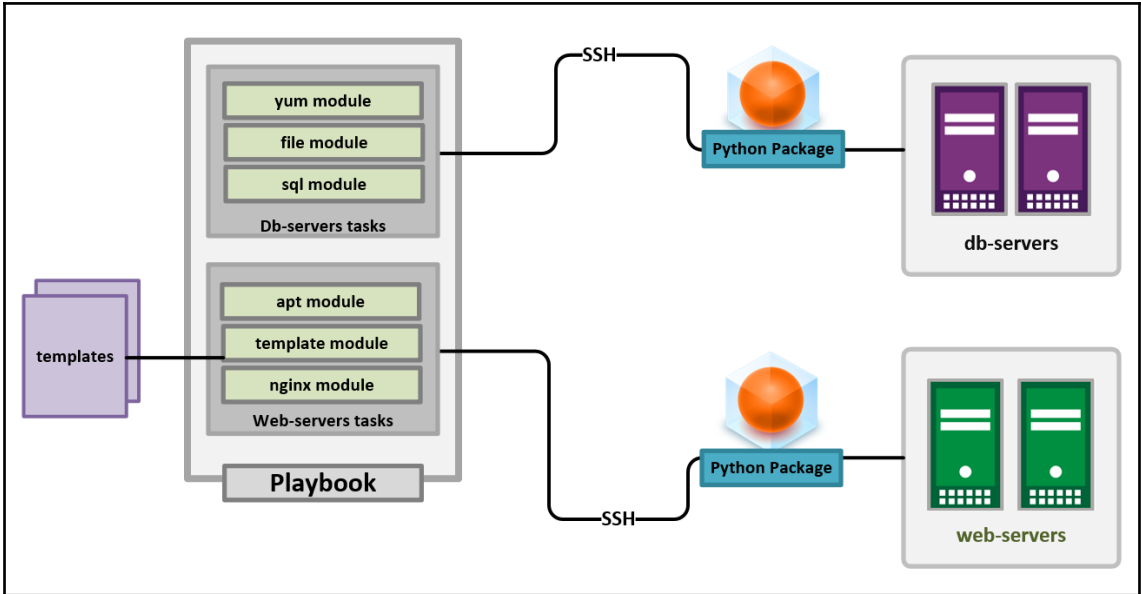
 Reply

 Forward

Chapter 13: Ansible for System Administration

```
bassim@me-inside:~$ ansible --version
ansible 2.5.1
  config file = /etc/ansible/ansible.cfg
  configured module search path = [u'/home/bassim/.ansible/plugins/modules', u'/usr/share/ansible/plugins/modules']
  ansible python module location = /usr/lib/python2.7/dist-packages/ansible
  executable location = /usr/bin/ansible
  python version = 2.7.14 (default, Sep 23 2017, 22:06:14) [GCC 7.2.0]
bassim@me-inside:~$
```





```

PLAY [infra] *****
TASK [Gathering Facts] *****
ok: [centos-machine01]
ok: [ubuntu-machine01]

TASK [Modifying Packages] *****
skipping: [ubuntu-machine01] => (item={u'state': u'absent', u'name': u'python-keyring-5.0-1.el7.noarch'})
skipping: [ubuntu-machine01] => (item={u'state': u'absent', u'name': u'python-django'})
skipping: [ubuntu-machine01] => (item={u'state': u'absent', u'name': u'python-django-bash-completion'})
skipping: [ubuntu-machine01] => (item={u'state': u'present', u'name': u'httpd'})
skipping: [ubuntu-machine01] => (item={u'state': u'present', u'name': u'httpd-tools'})
skipping: [ubuntu-machine01] => (item={u'state': u'present', u'name': u'python-qpidd'})
ok: [centos-machine01] => (item={u'state': u'absent', u'name': u'python-keyring-5.0-1.el7.noarch'})
ok: [centos-machine01] => (item={u'state': u'absent', u'name': u'python-django'})
ok: [centos-machine01] => (item={u'state': u'absent', u'name': u'python-django-bash-completion'})
changed: [centos-machine01] => (item={u'state': u'present', u'name': u'httpd'})
ok: [centos-machine01] => (item={u'state': u'present', u'name': u'httpd-tools'})
changed: [centos-machine01] => (item={u'state': u'present', u'name': u'python-qpidd'})

PLAY RECAP *****
centos-machine01      : ok=2    changed=1    unreachable=0    failed=0
ubuntu-machine01    : ok=1    changed=0    unreachable=0    failed=0

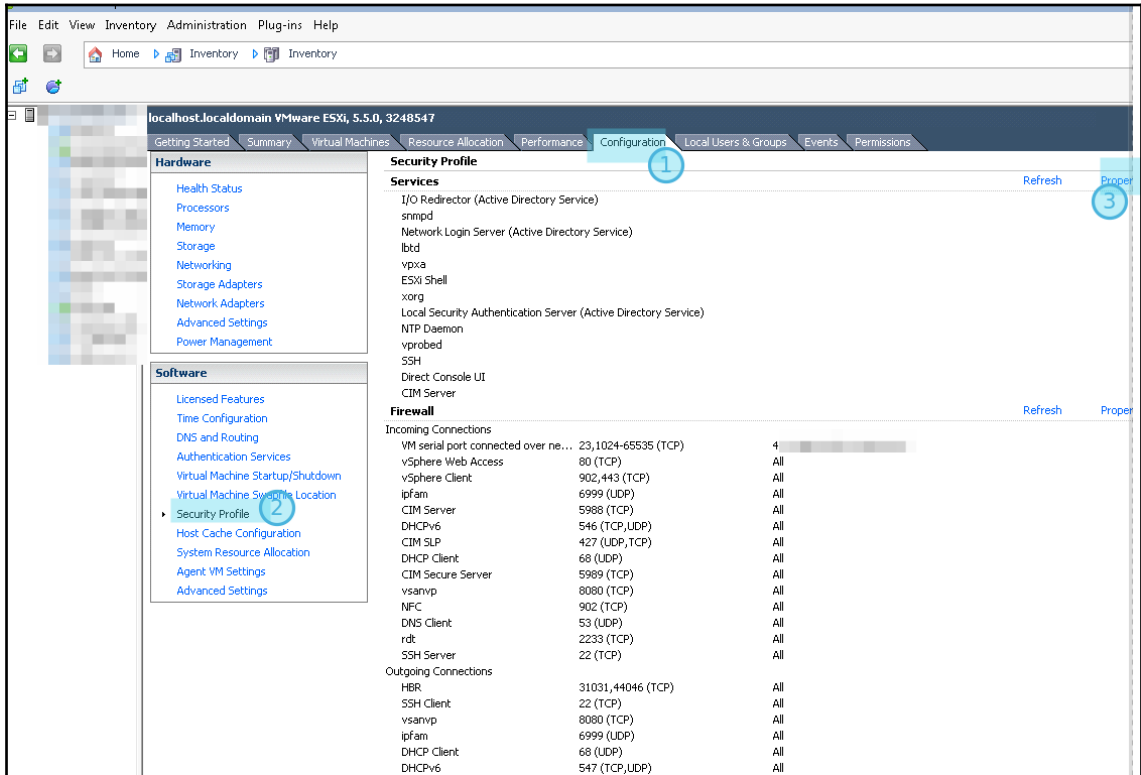
```

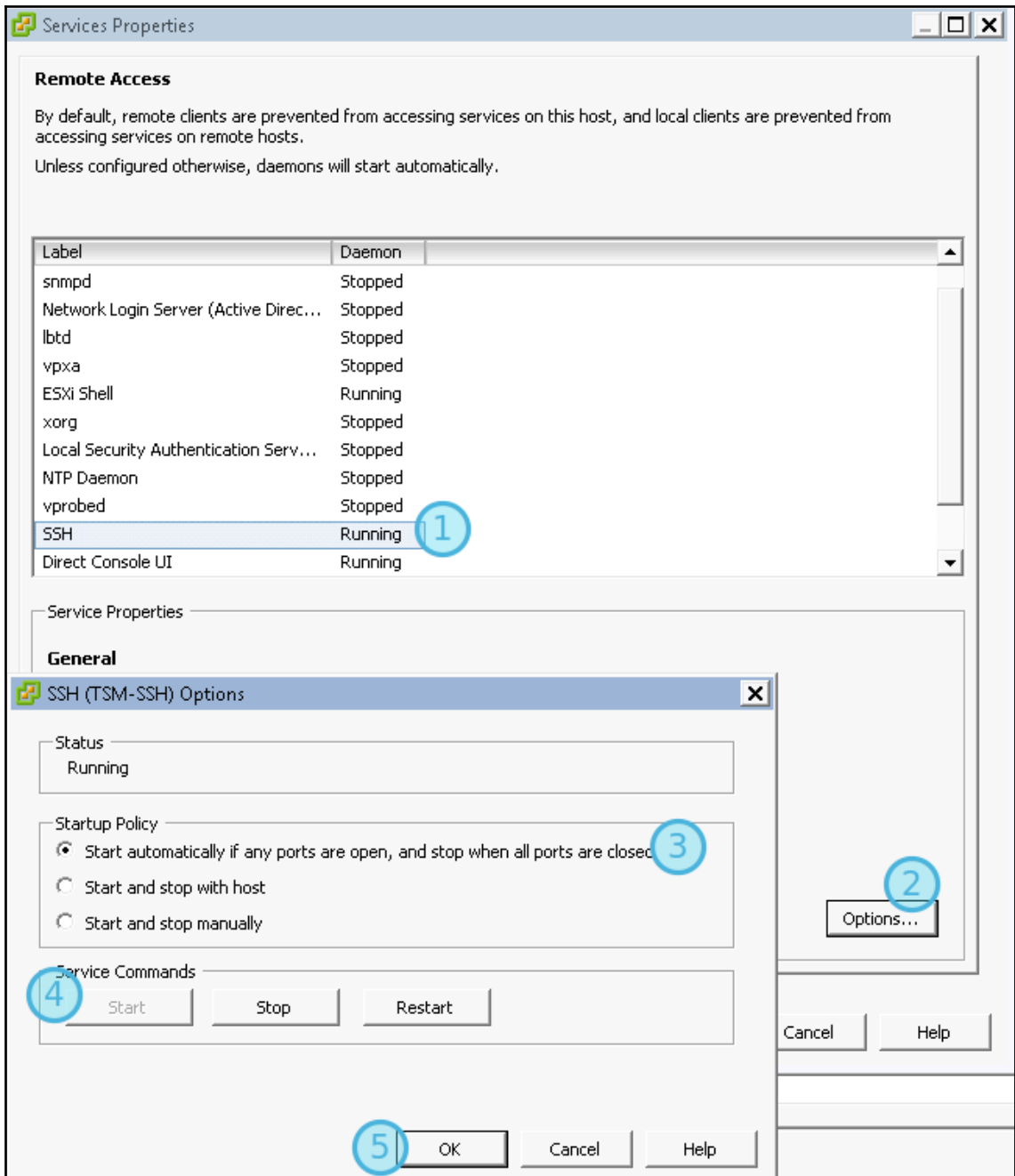
```
ubuntu-machine01 | SUCCESS => {
  "ansible_facts": {
    "ansible_all_ipv4_addresses": [
      "10.10.10.140"
    ],
    "ansible_all_ipv6_addresses": [
      "fe80::20c:29ff:feef:a88c"
    ],
    "ansible_apparmor": {
      "status": "enabled"
    },
    "ansible_architecture": "x86_64",
    "ansible_bios_date": "09/17/2015",
    "ansible_bios_version": "6.00",
    "ansible_cmdline": {
      "BOOT_IMAGE": "/vmlinuz-4.4.0-116-generic",
      "ro": true,
      "root": "/dev/mapper/ubuntu--machine--vg-root"
    },
    "ansible_date_time": {
      "date": "2018-04-26",
      "day": "26",
      "epoch": "1524699626",
      "hour": "01",
      "iso8601": "2018-04-25T23:40:26Z",
      "iso8601_basic": "20180426T014026018841",
      "iso8601_basic_short": "20180426T014026",

```



Chapter 14: Creating and Managing VMware Virtual Machines

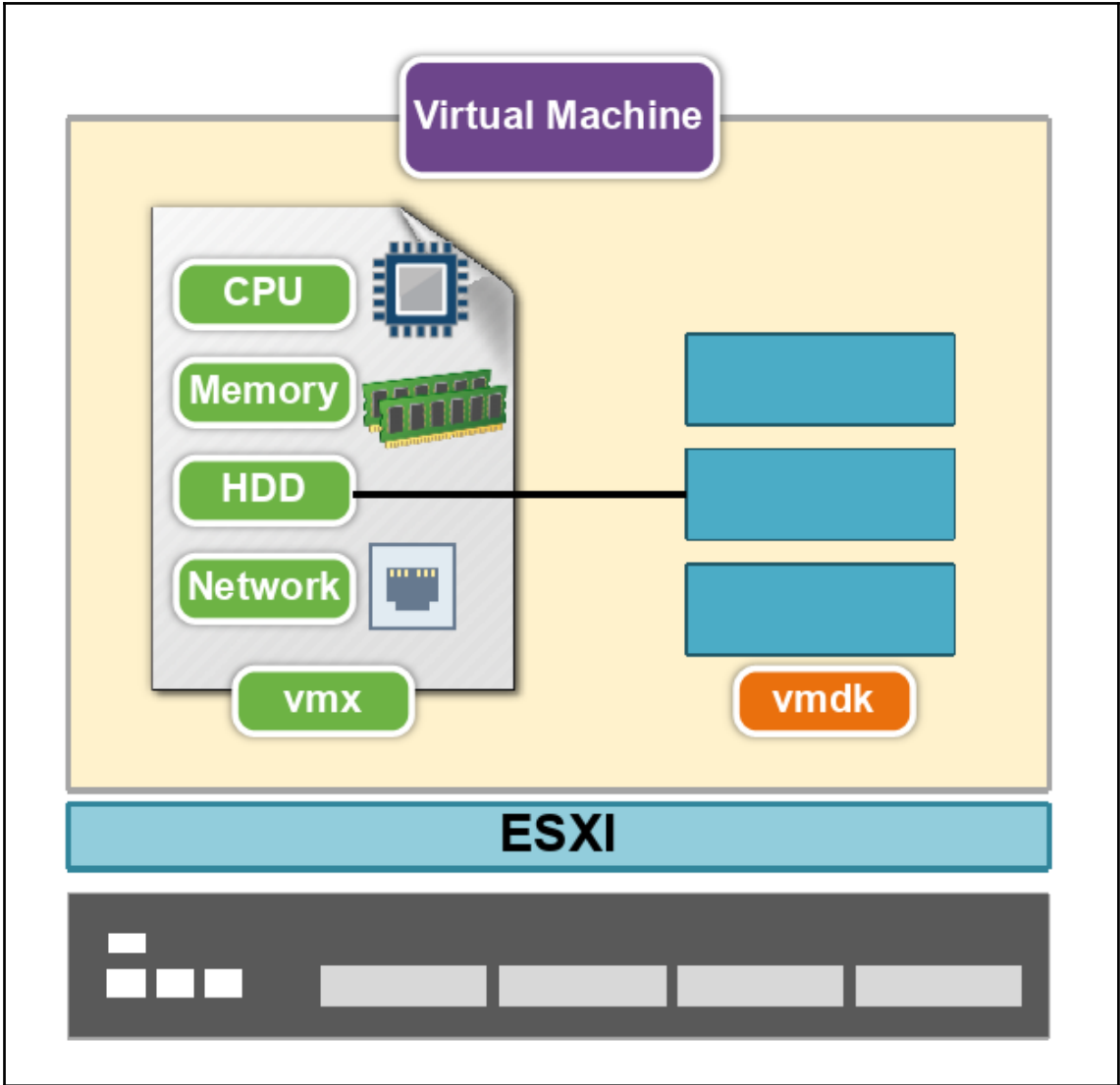


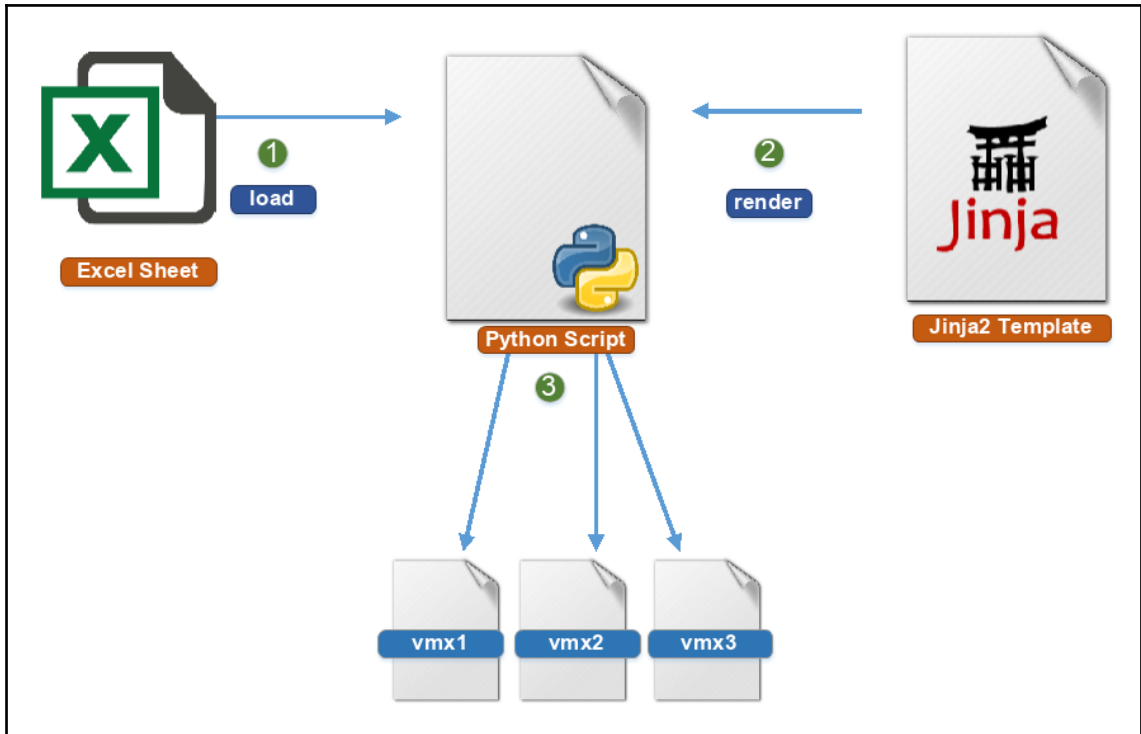


```
✓ UCS-220-ESXI ✕
The time and date of this login have been sent to the system logs.

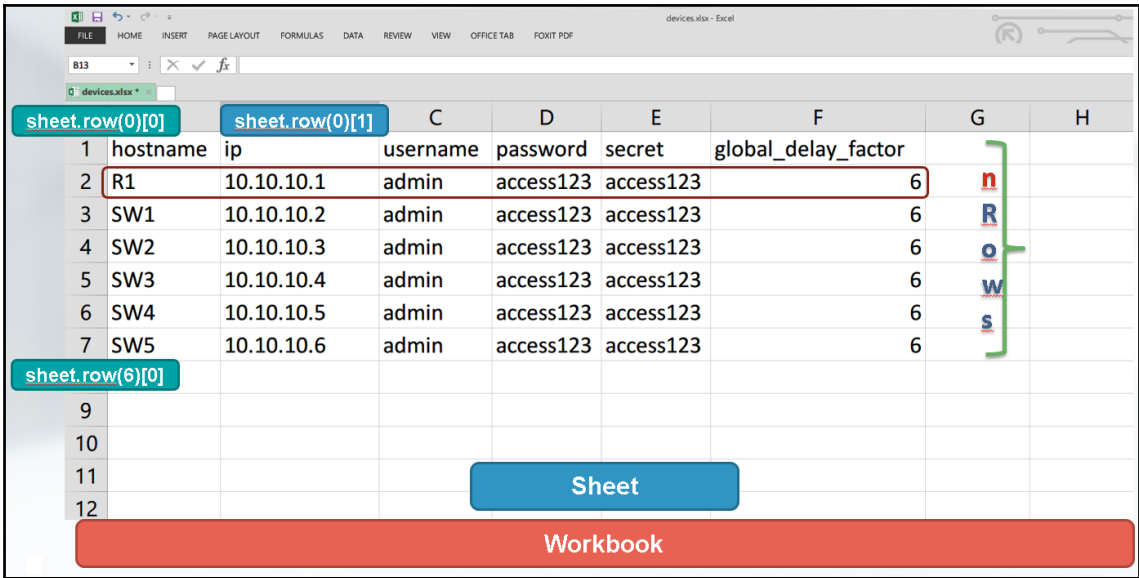
VMware offers supported, powerful system administration tools. Please
see www.vmware.com/go/sysadmintools for details.

The ESXi Shell can be disabled by an administrative user. See the
vSphere Security documentation for more information.
~ #
```





```
[root@AutomationServer ~]# pip install xlrd
Collecting xlrd
  Downloading xlrd-1.1.0-py2.py3-none-any.whl (108kB)
    100% |████████████████████████████████████████| 112kB 750kB/s
Installing collected packages: xlrd
Successfully installed xlrd-1.1.0
[root@AutomationServer ~]#
```



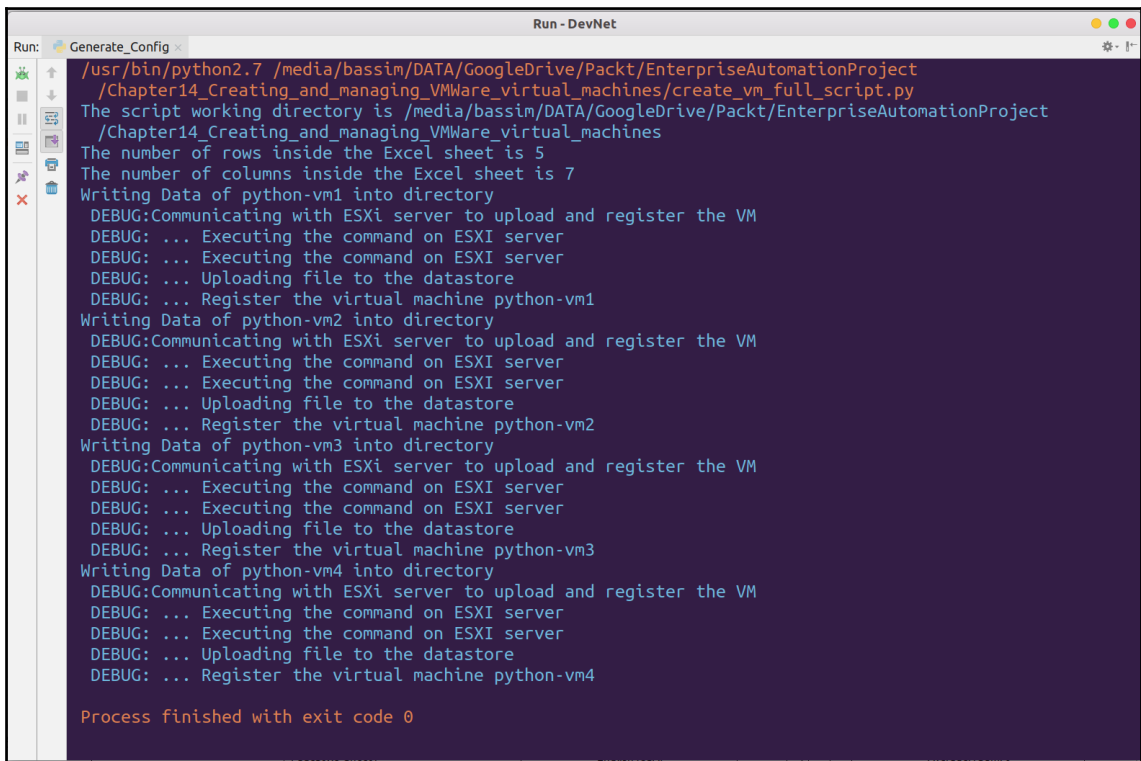
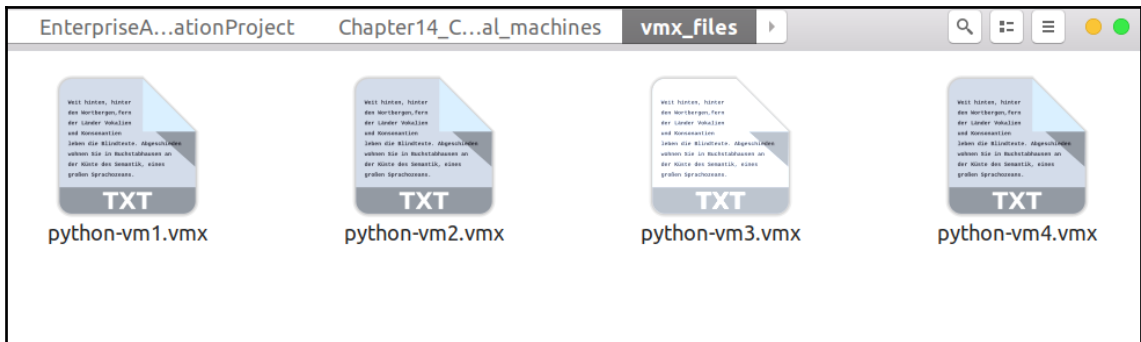
	A	B	C	D	E	F	G
1	virtual machine name	memory	phyCpu	CorePerCpu	Hardisk size	operating system	vswitch
2	python-vm1	4096	2	2	10	ubuntu-64	network1
3	python-vm2	2048	2	2	20	centos-64	networ2
4	python-vm3	3072	1	2	20	windows7-64	network3
5	python-vm4	6144	2	3	15	centos-64	network1
6							
7							

```

Run: Generate_Config
/usr/bin/python2.7 /media/bassim/DATA/GoogleDrive/Packt/EnterpriseAutomationProject
/Chapter14_Creating_and_managing_VMWare_virtual_machines/render_vm_template.py
The script working directory is /media/bassim/DATA/GoogleDrive/Packt/EnterpriseAutomationProject
/Chapter14_Creating_and_managing_VMWare_virtual_machines
The number of rows inside the Excel sheet is 5
The number of columns inside the Excel sheet is 7
Writing Data of python-vm1 into directory
Writing Data of python-vm2 into directory
Writing Data of python-vm3 into directory
Writing Data of python-vm4 into directory

Process finished with exit code 0

```



- vSphere Client

File Edit View Inventory Administration Plug-ins Help

Home Inventory Inventory

AI0-O5
AutomationServer
BNG-Automation
CentOS7
Cisco Prime Network
Cobbler_CentOS_Test
Cobbler_Ubuntu_Test
eve-ng
NFV_POC_COMPUTE_02
NFV_POC_CONTROLLER_01
NSO
python-vm1
python-vm2
python-vm3
python-vm4
Ubuntu16.06
v_CSR-PE1
WAE_6.4.9

v_CSR-PE1

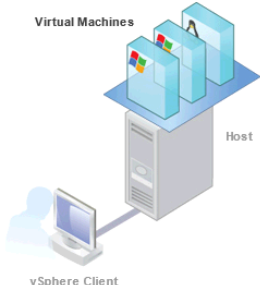
Getting Started Summary Resource Allocation Performance Events Console Permissions

What is a Virtual Machine ?

A virtual machine is a software computer that, like a physical computer, runs an operating system and applications. An operating system installed on a virtual machine is called a guest operating system.

Because every virtual machine is an isolated computing environment, you can use virtual machines as desktop or workstation environments, as testing environments, or to consolidate server applications.

Virtual machines run on hosts. The same host can run many virtual machines.



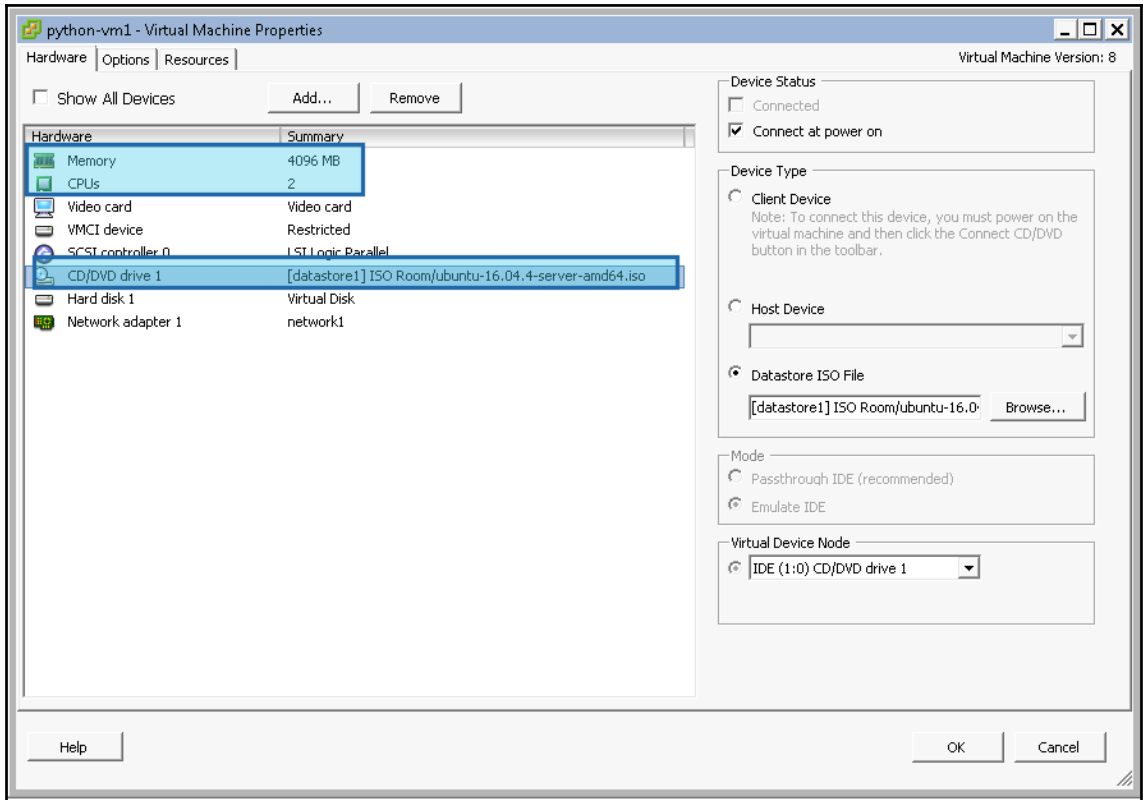
Virtual Machines

Host

vSphere Client

Basic Tasks

- ▶ [Power on the virtual machine](#)
- ▶ [Edit virtual machine settings](#)



[Home](#)

Managed Object Type: **ManagedObjectReference:ServiceInstance**
Managed Object ID: **ServiceInstance**

Properties

NAME	TYPE	VALUE
capability	Capability	capability
content	ServiceContent	content
serverClock	dateTime	"2018-04-14T13:01:18.240839Z"

Methods

RETURN TYPE	NAME
dateTime	CurrentTime
HostVMotionCompatibility[]	QueryVMotionCompatibility
ServiceContent	RetrieveServiceContent
ProductComponentInfo[]	RetrieveProductComponents
Event[]	ValidateMigration

Home

Data Object Type: **AboutInfo**

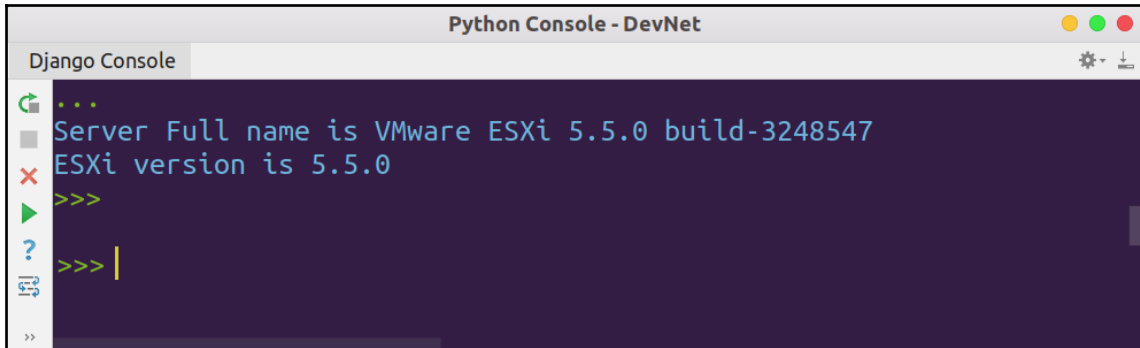
Parent Managed Object ID: **ServiceInstance**

Property Path: **content.about**

Properties

NAME	TYPE	VALUE
apiType	string	"HostAgent"
apiVersion	string	"5.5"
build	string	"3248547"
dynamicProperty	DynamicProperty[]	Unset
dynamicType	string	Unset
fullName	string	"VMware ESXi 5.5.0 build-3248547"
instanceUuid	string	Unset
licenseProductName	string	"VMware ESX Server"
licenseProductVersion	string	"5.0"
localeBuild	string	"000"
localeVersion	string	"INTL"
name	string	"VMware ESXi"
osType	string	"vmnix-x86"
productLineId	string	"embeddedEsx"
vendor	string	"VMware, Inc."
version	string	"5.5.0"

```
[root@AutomationServer ~]# pip install pyvmomi
Collecting pyvmomi
  Downloading pyvmomi-6.5.0.2017.5-1.tar.gz (252kB)
    100% |████████████████████████████████████████| 256kB 1.3MB/s
Requirement already satisfied: requests>=2.3.0 in /usr/lib/python2.7/site-packages (from pyvmomi)
Requirement already satisfied: six>=1.7.3 in /usr/lib/python2.7/site-packages (from pyvmomi)
Requirement already satisfied: certifi>=2017.4.17 in /usr/lib/python2.7/site-packages (from requests>=2.3.0->pyvmomi)
Requirement already satisfied: chardet<3.1.0,>=3.0.2 in /usr/lib/python2.7/site-packages (from requests>=2.3.0->pyvmomi)
Requirement already satisfied: idna<2.7,>=2.5 in /usr/lib/python2.7/site-packages (from requests>=2.3.0->pyvmomi)
Requirement already satisfied: urllib3<1.23,>=1.21.1 in /usr/lib/python2.7/site-packages (from requests>=2.3.0->pyvmomi)
Building wheels for collected packages: pyvmomi
  Running setup.py bdist_wheel for pyvmomi ... done
  Stored in directory: /root/.cache/pip/wheels/5a/e2/d8/1a5692c5a3190b0dc406ea9613ad399943b2e138462b21ae0c
Successfully built pyvmomi
Installing collected packages: pyvmomi
Successfully installed pyvmomi-6.5.0.2017.5-1
[root@AutomationServer ~]#
```



```
Python Console - DevNet
Django Console
...
Server Full name is VMware ESXi 5.5.0 build-3248547
ESXi version is 5.5.0
>>>
>>> |
>>>
```

Home

Managed Object Type: **ManagedObjectReference:Folder**
Managed Object ID: **ha-folder-vm**

Properties

NAME	TYPE	VALUE
alarmActionsEnabled	boolean	Unset
availableField	CustomFieldDef[]	
childEntity	ManagedObjectReference:ManagedEntity[]	111 (NFV_POC_CONTROLLER_01) 119 (NFV_POC_COMPUTE_02) 121 (eve-ng) 123 (BNG-Automation) 124 (WAE_6.4.9) 125 (NSO) 131 (AutomationServer) 132 (Cobbler_Ubuntu_Test) 133 (Cobbler_CentOS_Test) 135 (CentOS7) 136 (Ubuntu16.06) 138 (AiO-OS) 152 (python-vm1) 153 (python-vm2) 154 (python-vm3) 155 (python-vm4) 77 (v_CSR-PE1)

Data Object Type: **VirtualMachineConfigSummary**

Parent Managed Object ID: **131**

Property Path: **summary.config**

Properties

NAME	TYPE	VALUE
annotation	string	""
cpuReservation	int	0
dynamicProperty	DynamicProperty[]	Unset
dynamicType	string	Unset
ftInfo	FaultToleranceConfigInfo	Unset
guestFullName	string	"Ubuntu Linux (64-bit)"
guestId	string	"ubuntu64Guest"
installBootRequired	boolean	Unset
instanceUuid	string	"523b23be-7100-c891-959a-0d5b0b1f7cad"
managedBy	ManagedByInfo	Unset
memoryReservation	int	0
memorySizeMB	int	4096
name	string	"AutomationServer"
numCpu	int	1
numEthernetCards	int	2
numVirtualDisks	int	1
product	VAppProductInfo	Unset
template	boolean	false
uuid	string	"564de65b-1c66-be66-b11d-7472aa3428a6"
vmPathName	string	"[datastore1] AutomationServer/AutomationServer.vmx"

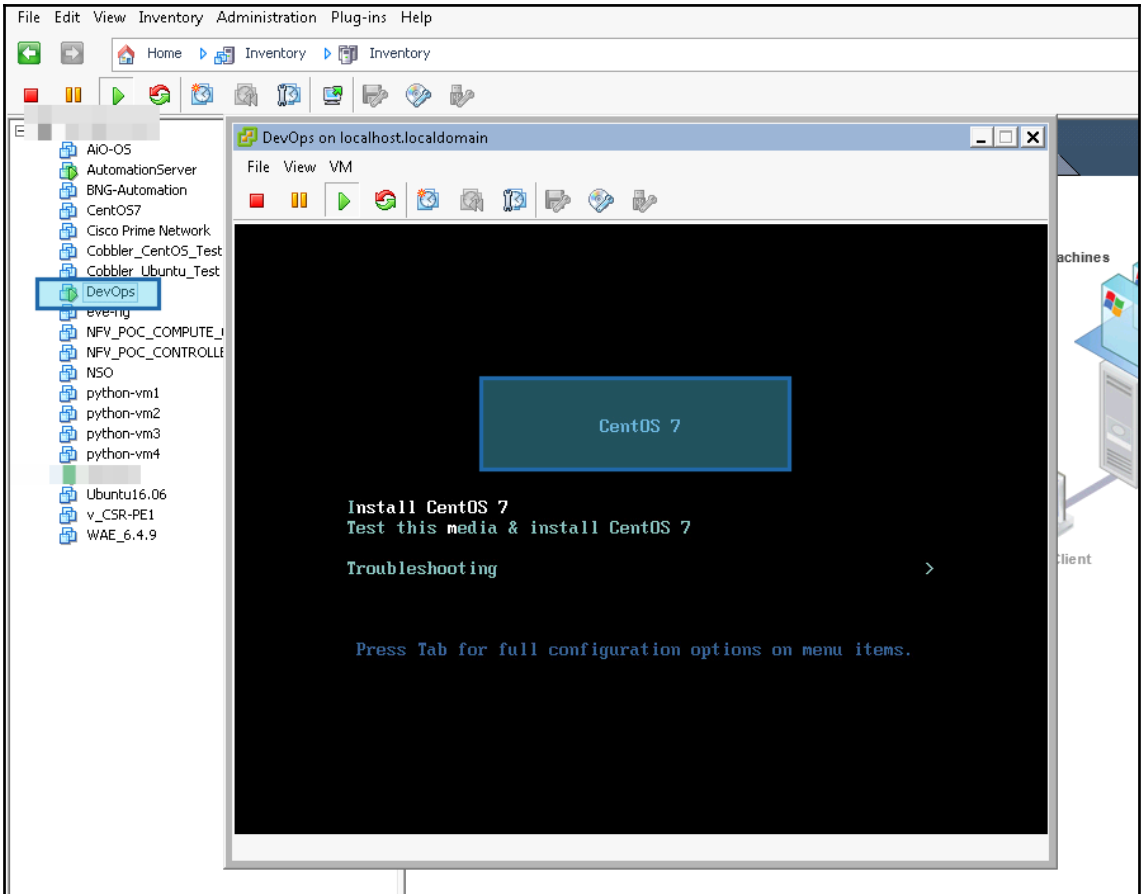
```
Python Console - DevNet
Django Console
Ai0-05
  The Guest vCPU is 20
  The Guest Operating System is Red Hat Enterprise Linux 6 (64-bit)
  The Guest Memory is 32768
  The Guest IP Address is None
=====
python-vm1
  The Guest vCPU is 2
  The Guest Operating System is Ubuntu Linux (64-bit)
  The Guest Memory is 4096
  The Guest IP Address is None
=====
python-vm2
  The Guest vCPU is 2
  The Guest Operating System is CentOS 4/5/6/7 (64-bit)
  The Guest Memory is 2048
  The Guest IP Address is None
=====
python-vm3
  The Guest vCPU is 1
  The Guest Operating System is Microsoft Windows 7 (64-bit)
  The Guest Memory is 3072
  The Guest IP Address is None
=====
python-vm4
  The Guest vCPU is 2
  The Guest Operating System is CentOS 4/5/6/7 (64-bit)
  The Guest Memory is 6144
  The Guest IP Address is None
=====
>>> |
```

```
Python Console - DevNet
Django Console
python-vm1
  The Guest Power state is poweredOff
  **Powered On the virtual machine**
python-vm2
  The Guest Power state is poweredOff
  **Powered On the virtual machine**
python-vm3
  The Guest Power state is poweredOff
  **Powered On the virtual machine**
python-vm4
  The Guest Power state is poweredOff
  **Powered On the virtual machine**
>>>
```

The screenshot shows a vSphere interface. On the left, a list of VMs is displayed, including 'python-vm1' through 'python-vm4'. On the right, a help page titled 'What is a Virtual Machine?' is open, explaining that a VM is a software computer that runs an OS and applications. It also notes that VMs can be used as desktop or workstation environments, testing environments, or for consolidating server applications.

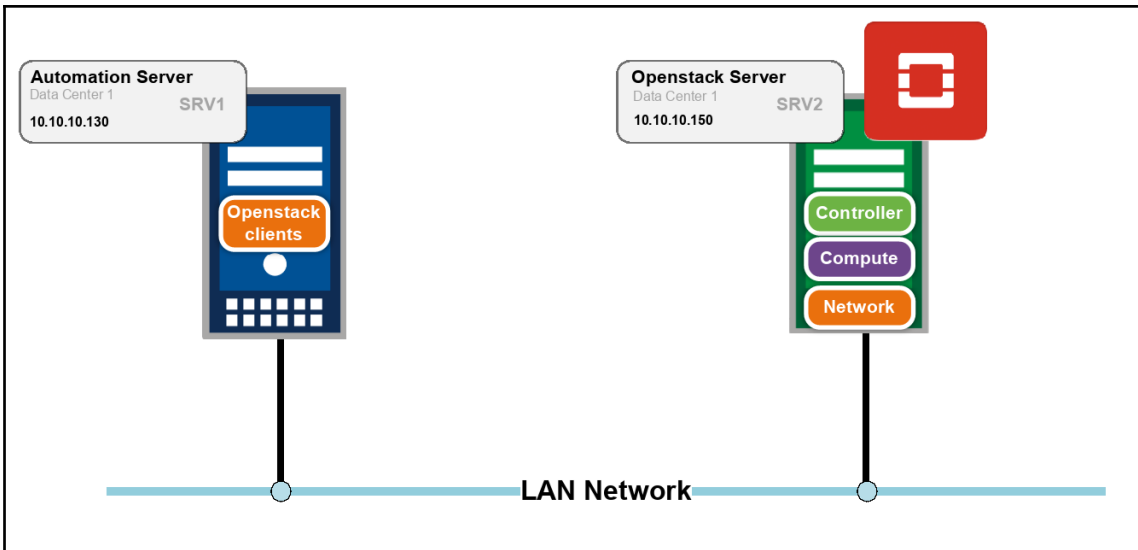
```
TASK [Provision the VM] *****
task path: /root/esxi_create_vm.yml:26
changed: [localhost] => {"changed": true, "instance": {"annotation": "", "current_snapshot": null, "customvalues": {}, "guest_consolidation_needed": false, "guest_question": null, "guest_tools_status": "guestToolsNotRunning", "guest_tools_version": "0", "hw_cores_per_socket": 2, "hw_datastores": ["datastore1"], "hw_esxi_host": "localhost.localdomain", "hw_eth0": {"addressstype": "generated", "ipaddresses": null, "label": "Network adapter 1", "macaddress": "00:0c:29:55:d5:3e", "macaddress_dash": "00-0c-29-55-d5-3e", "summary": "network1"}, "hw_eth1": {"addressstype": "generated", "ipaddresses": null, "label": "Network adapter 2", "macaddress": "00:0c:29:55:d5:48", "macaddress_dash": "00-0c-29-55-d5-48", "summary": "network2"}, "hw_files": ["[datastore1] DevOps/DevOps.vmx", "[datastore1] DevOps/DevOps.vmx", "[datastore1] DevOps/DevOps.vmsd", "[datastore1] DevOps/DevOps.nvram", "[datastore1] DevOps/DevOps.vmdk"], "hw_folder": "/ha-datacenter/vm", "hw_guest_full_name": null, "hw_guest_ha_state": null, "hw_guest_id": null, "hw_interfaces": ["eth0", "eth1"], "hw_is_template": false, "hw_memtotal_mb": 4096, "hw_name": "DevOps", "hw_power_status": "poweredOn", "hw_processor_count": 4, "hw_product_uuid": "564d655b-92bd-384a-7d2e-86907e55d53e", "ipv4": null, "ipv6": null, "module_hw": true, "snapshots": []}}
META: ran handlers
META: ran handlers

PLAY RECAP *****
localhost : ok=5    changed=2    unreachable=0    failed=0
```

Chapter 15: Interacting with the OpenStack API

```
▶ Frame 503: 414 bytes on wire (3312 bits), 414 bytes captured (3312 bits) on interface 0
▶ Ethernet II, Src: Dell_cb:b7:1e (d4:81:d7:cb:b7:1e), Dst: HuaweiTe_31:5e:11 (98:e7:f5:31:5e:11)
▶ Internet Protocol Version 4, Src: 192.168.1.99, Dst: 104.20.104.11
▶ Transmission Control Protocol, Src Port: 49904, Dst Port: 80, Seq: 473, Ack: 1582, Len: 360
▶ Hypertext Transfer Protocol
  GET /files//Downloads/8678545300.jpg HTTP/1.1\r\n
  Host: www.masrawy.com\r\n
  User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:60.0) Gecko/20100101 Firefox/60.0\r\n
  Accept: */*\r\n
  Accept-Language: en-GB,en;q=0.5\r\n
  Accept-Encoding: gzip, deflate\r\n
  Referer: http://www.masrawy.com/\r\n
  Connection: keep-alive\r\n
  \r\n
  [Full request URI: http://www.masrawy.com/files//Downloads/8678545300.jpg]
  [HTTP request 2/4]
  [Prev request in frame: 315]
  [Response in frame: 824]
```





openstack®

Log in

User Name

admin|

Password

Sign In

openstack. admin

API Access

Compute > API Access

Volumes >

Network >

Object Store >

Admin >

Identity >

View Credentials Download OpenStack RC File

Displaying 11 items

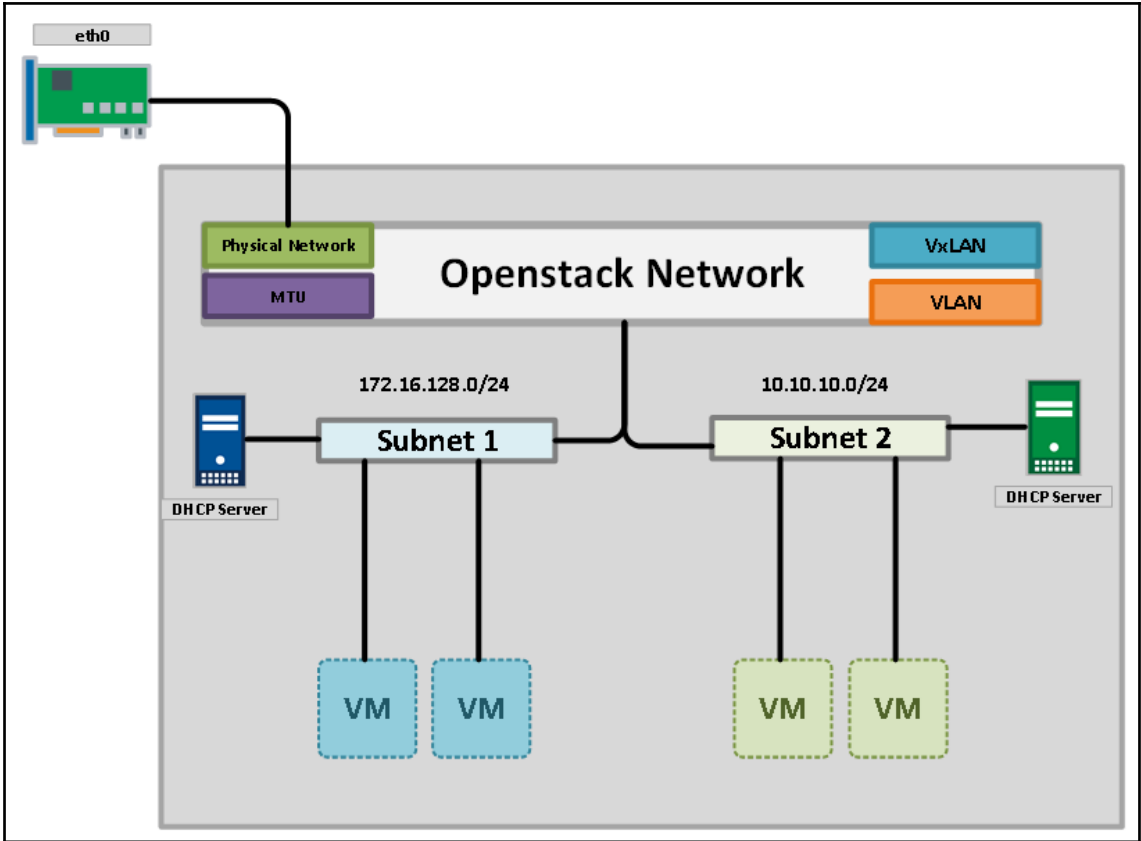
Service	Service Endpoint
Identity	http://10.10.10.150:5000/v3 Openstack API Version
Cloudformation	http://10.10.10.150:8000/v1
Orchestration	http://10.10.10.150:8004/v1/AUTH_8922dc52984041af8fe22061aaedcd13
Object Store	http://10.10.10.150:8080/v1/AUTH_8922dc52984041af8fe22061aaedcd13
Compute	http://10.10.10.150:8774/v2.1/8922dc52984041af8fe22061aaedcd13
Volume	http://10.10.10.150:8776/v1/8922dc52984041af8fe22061aaedcd13
Volumev2	http://10.10.10.150:8776/v2/8922dc52984041af8fe22061aaedcd13
Volumev3	http://10.10.10.150:8776/v3/8922dc52984041af8fe22061aaedcd13
Placement	http://10.10.10.150:8778/placement
Image	http://10.10.10.150:9292
Network	http://10.10.10.150:9696

Flavors

Filter

Displaying 5 items

<input type="checkbox"/>	Flavor Name	VCPUs	RAM	Root Disk	Ephemeral Disk	Swap Disk	RX/TX factor	ID	Public	Metadata
<input type="checkbox"/>	m1.large	4	8GB	80GB	0GB	0MB	1.0	4	Yes	No
<input type="checkbox"/>	m1.medium	2	4GB	40GB	0GB	0MB	1.0	3	Yes	No
<input type="checkbox"/>	m1.small	1	2GB	20GB	0GB	0MB	1.0	2	Yes	No
<input type="checkbox"/>	m1.tiny	1	512MB	1GB	0GB	0MB	1.0	1	Yes	No
<input type="checkbox"/>	m1.xlarge	8	16GB	160GB	0GB	0MB	1.0	5	Yes	No



openstack. admin

Project / Compute / Instances

Instances

Instance ID = Filter [Launch Instance](#) [Delete Instances](#) More

Displaying 1 item

Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Time since created	Actions
<input type="checkbox"/> python-instance	Cirrosimage	172.16.128.20	m1.small	-	Active	nova	None	Running	5 minutes	Create Snapshot

Displaying 1 item

openstack. admin

Project Admin Overview Compute Hypervisors Host Aggregates Instances

Admin / Compute / Instances

Instances

Project Name = [] Filter Delete

Displaying 1 item

<input type="checkbox"/>	Project	Host	Name	Image Name	IP Address	Flavor	Status	Task	Power State	Time since created	Actions	
<input type="checkbox"/>	admin	openstack	ansible_instance	Cirros_Image	10.10.128.10	CIRROS_FLAVOR	Active		None	Running	0 minutes	Edit Instance

Displaying 1 item

Flavors Images Volume Network System Identity

Chapter 16: Automating AWS with Boto3

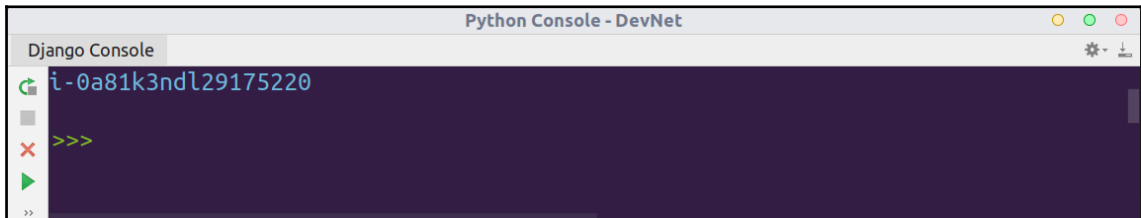
```
bassim:~$ pip install boto3
Collecting boto3
  Downloading https://files.pythonhosted.org/packages/b8/29/f35b0a055014296bf4188043e2cc1fd4ca041a085991765598842232c2f5/boto3-1.7.26-py2.py3-none-any.whl (128kB)
    100% |#####| 133kB 351kB/s
Collecting jmespath<1.0.0,>=0.7.1 (from boto3)
  Downloading https://files.pythonhosted.org/packages/b7/31/05c8d001f7f87f0f07289a5fc0fc3832e9a57f2dbd4d3b0fee70e0d51365/jmespath-0.9.3-py2.py3-none-any.whl
Collecting botocore<1.11.0,>=1.10.26 (from boto3)
  Downloading https://files.pythonhosted.org/packages/87/c5/7ed94b700d30534f346bb55408ca8501325840bc371628cff10d7ba68d/botocore-1.10.26-py2.py3-none-any.whl (4.2MB)
    100% |#####| 4.2MB 324kB/s
Collecting s3transfer<0.2.0,>=0.1.10 (from boto3)
  Downloading https://files.pythonhosted.org/packages/d7/14/2a0004d487464d120c9fb85313a75cd3d71a7506955be458eebf19a6b1d/s3transfer-0.1.13-py2.py3-none-any.whl (59kB)
    100% |#####| 61kB 363kB/s
Collecting docutils>=0.10 (from botocore<1.11.0,>=1.10.26->boto3)
  Downloading https://files.pythonhosted.org/packages/50/09/c53398e0005b11f7ffb27b7aa720c617aba53be4fb4f4f3f06b9b5c60f28/docutils-0.14-py2-none-any.whl (543kB)
    100% |#####| 552kB 391kB/s
Requirement already satisfied: python-dateutil<3.0.0,>=2.1; python_version >= "2.7" in ./local/lib/python2.7/site-packages (from botocore<1.11.0,>=1.10.26->boto3) (2.6.1)
Collecting futures<4.0.0,>=2.2.0; python_version == "2.6" or python_version == "2.7" (from s3transfer<0.2.0,>=0.1.10->boto3)
  Downloading https://files.pythonhosted.org/packages/2d/99/b2c4e9d5a30f6471e410a146232b4118e697fa3ffc06d6a65efde84debd0/futures-3.2.0-py2-none-any.whl
```

```
bassim:~$ python
Python 2.7.15rc1 (default, Apr 15 2018, 21:51:34)
[GCC 7.3.0] on linux2
Type "help", "copyright", "credits" or "license" for more information.
>>> import boto3
>>>
```

Amazon Linux AMI IDs

The latest Amazon Linux AMI 2017.09.1 was released on 2018-01-17.

Region	HVM (SSD) EBS-Backed 64-bit	HVM Instance Store 64-bit	PV EBS-Backed 64-bit	PV Instance Store 64-bit	HVM (NAT) EBS-Backed 64-bit	HVM (Graphics) EBS-Backed 64-bit
US East N. Virginia	ami-97785bed	ami-f6795a8c	ami-c87053b2	ami-a4795ade	ami-8d7655f7	AWS Marketplace
US East Ohio	ami-f63b1193	ami-ca3b11af	n/a	n/a	ami-fc3b1199	n/a
US West Oregon	ami-f2d3638a	ami-74d8680c	ami-31d86849	ami-08d66670	ami-35d6664d	AWS Marketplace
US West N. California	ami-824c4ee2	ami-aa4f4dca	ami-d8494bb8	ami-bc4e4cdc	ami-394e4c59	AWS Marketplace
Canada Central	ami-a954d1cd	ami-2f4ecb4b	n/a	n/a	ami-2b4acf4f	n/a
EU Ireland	ami-d834aba1	ami-072eb17e	ami-e539a69c	ami-d535aaac	ami-a136a9d8	AWS Marketplace
EU	ami-403e2524	ami-b3312ad7	n/a	n/a	ami-87312ae3	n/a



```
Python Console - DevNet
Django Console
i-0a81k3ndl29175220
>>>
```

Chapter 17: Using the Scapy Framework

```
[root@AutomationServer ~]# pip install scapy
Collecting scapy
  Downloading https://files.pythonhosted.org/packages/68/01/b9943984447e7ea6f8948e90c1729b78
161c2bb3eef908430638ec3f7296/scapy-2.4.0.tar.gz (3.1MB)
    100% |████████████████████████████████████████| 3.1MB 256kB/s
Building wheels for collected packages: scapy
  Running setup.py bdist_wheel for scapy ... done
  Stored in directory: /root/.cache/pip/wheels/cf/03/88/296bf69fee1f9ec7a87e122da52253b65f30
67f6ea8719b473
Successfully built scapy
Installing collected packages: scapy
Successfully installed scapy-2.4.0
You are using pip version 9.0.3, however version 10.0.1 is available.
You should consider upgrading via the 'pip install --upgrade pip' command.
[root@AutomationServer ~]#
```

```
[GCC 4.8.5 20150623 (Red Hat 4.8.5-16)] on linux2
Type "help", "copyright", "credits" or "license" for more information.
>>> import scapy
>>>
```

```
[root@AutomationServer ~]# sudo scapy
WARNING: Cannot read wireshark manu database
INFO: Can't import matplotlib. Won't be able to plot.
INFO: Can't import PyX. Won't be able to use psdump() or pdfdump().
WARNING: No route found for IPv6 destination :: (no default route?)
WARNING: IPython not available. Using standard Python shell instead.
AutoCompletion, History are disabled.
```

```

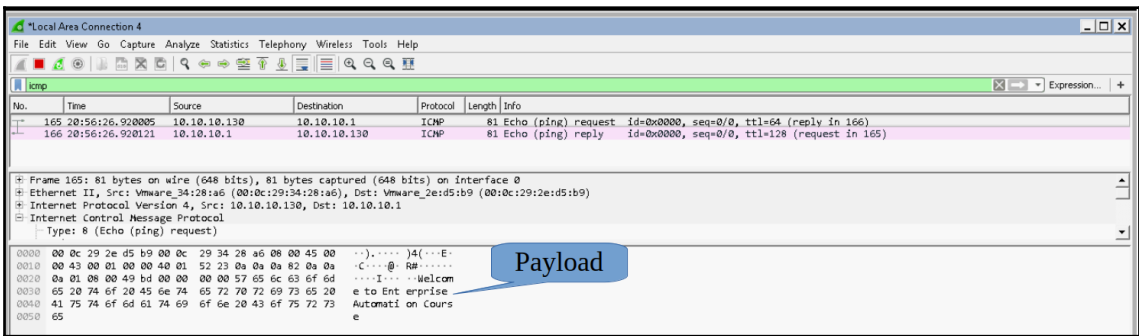
          aSPY//YASa
        apyyyyCY/////////YCa
      sY////////YSpCs  scpCY//Pp
ayp ayyyyyySCP//Pp      syY//C
AYAsAYYYYYYYY//Ps      cY//S
      pCCCCY//p          cSSps y//Y
      SPPPP///a          pP///AC//Y
          A//A          cyP////C
          p///Ac          sC///a
          P////YCpc          A//A
      sccccp///pSP///p          p//Y
sY/////////y caa          S//P
cayCyayP//Ya          pY/Ya
      sY/PsY////YCc          aC//Yp
      sc sccaCY//PCypaapyCP//YSs
          spCPY////////YPSps
          ccaacs

```

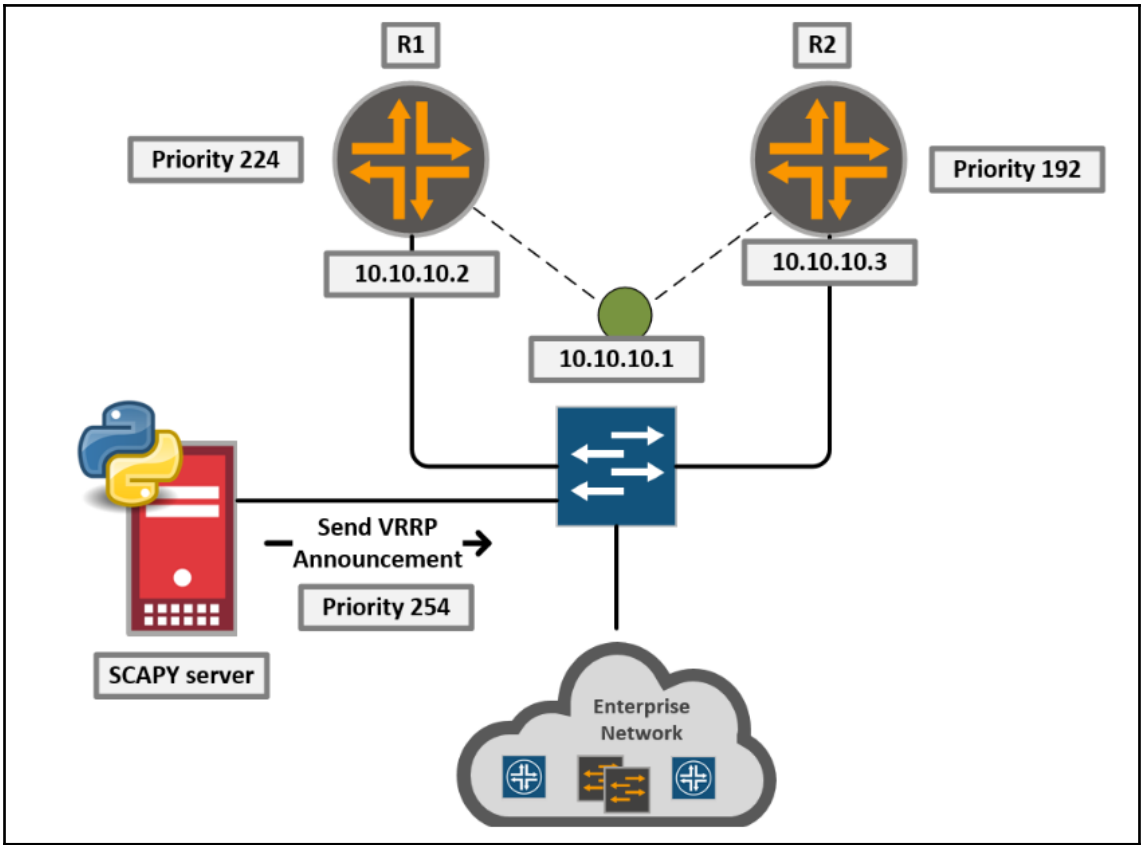
```

| Welcome to Scapy
| Version 2.4.0
|
| https://github.com/secdev/scapy
|
| Have fun!
|
| We are in France, we say Skappee.
| OK? Merci.
|
| -- Sebastien Chabal

```



```
>>> ls(IP)
version      : BitField (4 bits)           = (4)
ihl          : BitField (4 bits)         = (None)
tos          : XByteField                 = (0)
len          : ShortField                 = (None)
id           : ShortField                 = (1)
flags        : FlagsField (3 bits)       = (<Flag 0 (>)>)
frag         : BitField (13 bits)        = (0)
ttl          : ByteField                  = (64)
proto        : ByteEnumField              = (0)
chksum       : XShortField                = (None)
src          : SourceIPField              = (None)
dst          : DestIPField                = (None)
options      : PacketListField           = ([])
>>> █
```



Capturing from Local Area Connection 4

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Filter: Expression...

No.	Time	Source	Destination	Protocol	Length	Info
13	23:59:02.085537	10.10.10.130	224.0.0.18	VRRP	60	Announcement (v2)
16	23:59:04.090085	10.10.10.130	224.0.0.18	VRRP	60	Announcement (v2)
19	23:59:05.094504	10.10.10.130	224.0.0.18	VRRP	60	Announcement (v2)
22	23:59:08.098945	10.10.10.130	224.0.0.18	VRRP	60	Announcement (v2)
27	23:59:10.102357	10.10.10.130	224.0.0.18	VRRP	60	Announcement (v2)
31	23:59:12.104590	10.10.10.130	224.0.0.18	VRRP	60	Announcement (v2)
36	23:59:14.107574	10.10.10.130	224.0.0.18	VRRP	60	Announcement (v2)

Frame 13: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface 0

Ethernet II, Src: IETF-VRRP-VRID_01 (00:00:5e:00:01:01), Dst: IPv4mcast_30 (01:00:5e:00:00:30)

- Destination: IPv4mcast_30 (01:00:5e:00:00:30)
- Source: IETF-VRRP-VRID_01 (00:00:5e:00:01:01)
- Type: IPv4 (0x0800)
- Padding: 0000000000000000

Internet Protocol Version 4, Src: 10.10.10.130, Dst: 224.0.0.18

Virtual Router Redundancy Protocol

- Version 2, Packet type 1 (Advertisement)
 - Virtual Rtr ID: 1
 - Priority: 254 (Non-default backup priority)
 - Addr Count: 1
 - Auth Type: No Authentication (0)
 - Adver Int: 1
 - Checksum: 0xccc0 [correct]
 - [Checksum Status: Good]

```

0000  01 00 5e 00 00 30 00 00 5e 00 01 01 08 00 45 00  ...0...E.
0010  00 28 00 01 00 00 ff 70 c6 c5 0a 0a 0a 82 e0 00  (-...p.....
0020  00 12 21 01 01 00 01 cc f0 0a 0a 0a 01 00 00  ...!.....
  
```

*Local Area Connection 4

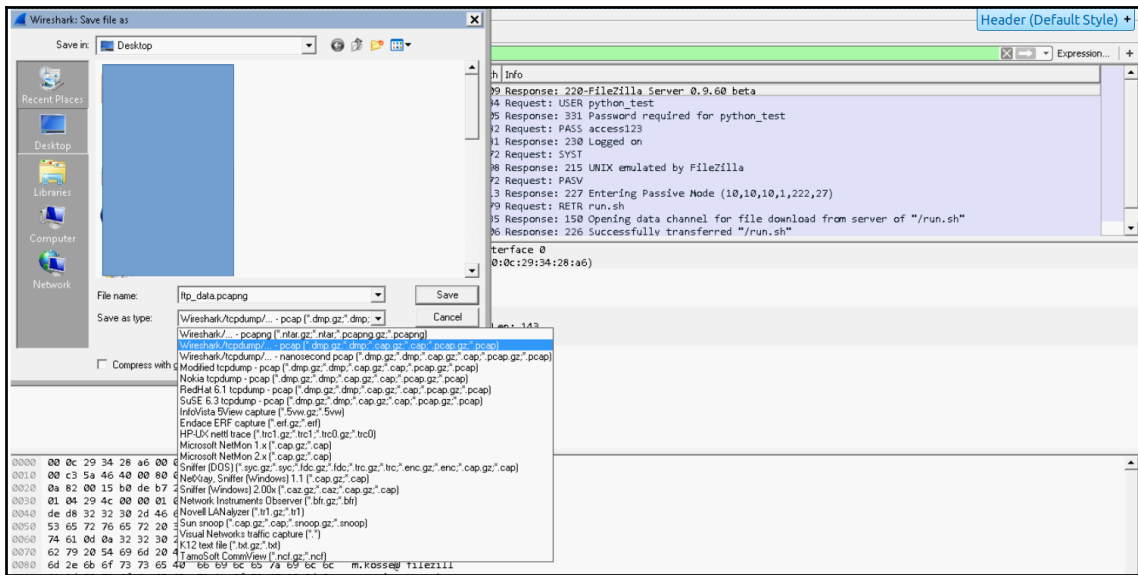
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Filter: Expression...

No.	Time	Source	Destination	Protocol	Length	Info
5486	22:33:10.928426	Vmware_34:28:a6	Broadcast	ARP	60	Who has 10.10.10.3? Tell 10.10.10.130
5487	22:33:10.928899	Vmware_34:28:a6	Broadcast	ARP	60	Who has 10.10.10.4? Tell 10.10.10.130
5488	22:33:10.929350	Vmware_34:28:a6	Broadcast	ARP	60	Who has 10.10.10.5? Tell 10.10.10.130
5489	22:33:10.929833	Vmware_34:28:a6	Broadcast	ARP	60	Who has 10.10.10.6? Tell 10.10.10.130
5490	22:33:10.930281	Vmware_34:28:a6	Broadcast	ARP	60	Who has 10.10.10.7? Tell 10.10.10.130
5491	22:33:10.930754	Vmware_34:28:a6	Broadcast	ARP	60	Who has 10.10.10.8? Tell 10.10.10.130
5492	22:33:10.931201	Vmware_34:28:a6	Broadcast	ARP	60	Who has 10.10.10.9? Tell 10.10.10.130
5493	22:33:10.931684	Vmware_34:28:a6	Broadcast	ARP	60	Who has 10.10.10.10? Tell 10.10.10.130
5494	22:33:10.932127	Vmware_34:28:a6	Broadcast	ARP	60	Who has 10.10.10.11? Tell 10.10.10.130
5495	22:33:10.932598	Vmware_34:28:a6	Broadcast	ARP	60	Who has 10.10.10.12? Tell 10.10.10.130
5496	22:33:10.933046	Vmware_34:28:a6	Broadcast	ARP	60	Who has 10.10.10.13? Tell 10.10.10.130
5497	22:33:10.933532	Vmware_34:28:a6	Broadcast	ARP	60	Who has 10.10.10.14? Tell 10.10.10.130
5498	22:33:10.933988	Vmware_34:28:a6	Broadcast	ARP	60	Who has 10.10.10.15? Tell 10.10.10.130
5499	22:33:10.934453	Vmware_34:28:a6	Broadcast	ARP	60	Who has 10.10.10.16? Tell 10.10.10.130
5500	22:33:10.934907	Vmware_34:28:a6	Broadcast	ARP	60	Who has 10.10.10.17? Tell 10.10.10.130
5501	22:33:10.935350	Vmware_34:28:a6	Broadcast	ARP	60	Who has 10.10.10.18? Tell 10.10.10.130
5502	22:33:10.935849	Vmware_34:28:a6	Broadcast	ARP	60	Who has 10.10.10.19? Tell 10.10.10.130
5503	22:33:10.936296	Vmware_34:28:a6	Broadcast	ARP	60	Who has 10.10.10.20? Tell 10.10.10.130
5505	22:33:10.937035	Vmware_34:28:a6	Broadcast	ARP	60	Who has 10.10.10.21? Tell 10.10.10.130
5506	22:33:10.937615	Vmware_34:28:a6	Broadcast	ARP	60	Who has 10.10.10.22? Tell 10.10.10.130
5507	22:33:10.938177	Vmware_34:28:a6	Broadcast	ARP	60	Who has 10.10.10.23? Tell 10.10.10.130
5508	22:33:10.938761	Vmware_34:28:a6	Broadcast	ARP	60	Who has 10.10.10.24? Tell 10.10.10.130

```
[root@AutomationServer ~]# python ping_arp.py
Begin emission:
Finished sending 256 packets.
*
Received 1 packets, got 1 answers, remaining 255 packets
 00:0c:29:2e:d5:b9 10.10.10.1
[root@AutomationServer ~]#
```

```
[root@AutomationServer ~]# python reading_pkt.py
###[ Ethernet ]###
dst      = 00:0c:29:34:28:a6
src      = 00:0c:29:2e:d5:b9
type     = IPv4
###[ IP ]###
version  = 4
ihl      = 5
tos      = 0x0
len      = 195
id       = 27000
flags    = DF
frag     = 0
ttl      = 128
proto    = tcp
chksum   = 0x0
src      = 10.10.10.1
dst      = 10.10.10.130
\options \
###[ TCP ]###
sport    = ftp
dport    = 45380
```



```
[root@AutomationServer ~]# python manipulate_packets.py
###[ IP ]###
version      = 4
ihl          = 5
tos          = 0x0
len          = 195
id           = 27000
flags        = DF
frag         = 0
ttl          = 128
proto        = tcp
chksum       = None
src          = 10.10.88.100
dst          = 10.10.88.1
\options     \
###[ TCP ]###
sport        = ftp
dport        = 45380
seq          = 2298262710
ack          = 1884773834
dataofs      = 8
reserved     = 0
flags        = PA
window       = 260
chksum       = None
urgptr       = 0
options      = [('NOP', None), ('NOP', None), ('Timestamp', (40372295, 265470205))]
```

Checksum is deleted and will be calculated when sending the packet

New IP Addresses

Capturing from Local Area Connection 4

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Filter: ftp

No.	Time	Source	Destination	Protocol	Length	Info
580	02:19:26.160188	10.10.88.100	10.10.88.1	FTP	209	Response: 220-FileZilla Server 0.9.60 beta

Frame 580: 209 bytes on wire (1672 bits), 209 bytes captured (1672 bits) on interface 0

- Ethernet II, Src: Vmware_34:28:a6 (00:0c:29:34:28:a6), Dst: Vmware_2e:d5:b9 (00:0c:29:2e:d5:b9)
 - Destination: Vmware_2e:d5:b9 (00:0c:29:2e:d5:b9)
 - Source: Vmware_34:28:a6 (00:0c:29:34:28:a6)
 - Type: IPv4 (0x0800)
- Internet Protocol Version 4, Src: 10.10.88.100, Dst: 10.10.88.1
 - 0100 = Version: 4
 - 0101 = Header Length: 20 bytes (5)
 - Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
 - Total Length: 195
 - Identification: 0x6978 (27000)
 - Flags: 0x4000, Don't fragment
 - Time to live: 128
 - Protocol: TCP (6)
 - Header checksum: 0xc0d3 [validation disabled]
 - [Header checksum status: Unverified]
 - Source: 10.10.88.100
 - Destination: 10.10.88.1
- Transmission Control Protocol, Src Port: 21, Dst Port: 45380, Seq: 1, Ack: 1, Len: 143
- File Transfer Protocol (FTP)
 - 220-FileZilla Server 0.9.60 beta\r\n
 - 220-written by Tim Kosse (tim.kosse@filezilla-project.org)\r\n
 - 220 Please visit https://filezilla-project.org/\r\n
 - \r\n
 - \f022\r\n
 - [Current working directory:]

```

0010 00 c3 69 78 40 00 80 06  c4 43 0a 0a 58 64 0a 0a  ..ix@...  k..Xd..
0020 58 01 00 15 b1 44 88 fc  b4 b6 70 57 5d ca 80 18  X...D...pW]...
0030 01 04 50 c9 00 00 01 01  08 0a 02 68 08 47 0f d2  ..P.....hG...
0040 c0 fd 32 32 30 2d 46 69  6c 65 5a 69 6c 6c 61 20  ..220-Fi lezilla
0050 53 65 72 76 65 72 20 30  2e 39 2e 36 30 20 62 65  Server 0.9.60 be
0060 74 61 0a 32 32 30 2d 77  72 69 74 74 65 6e 20 62  ta:220-w ritten b
0070 79 20 54 69 6d 20 4b 6f  73 73 65 20 28 74 69 6d  y Tim Kosse (tim
0080 2e 6b 6f 73 73 65 40 66  69 6c 65 7a 69 6c 6c 61  .kosse@filezilla
0090 2d 70 72 6f 6a 65 63 74  2e 6f 72 67 29 0a 32 32  -project.org):22
00a0 30 20 50 6c 65 61 73 65  20 76 69 73 69 74 20 68  0 Please visit h
00b0 74 74 70 73 3a 2f 66 69  6c 65 7a 69 6c 6c 61  ttps://f ilezilla
00c0 2d 70 72 6f 6a 65 63 74  2e 6f 72 67 2f 0a 0c 12  -project.org/...

```

Header checksum (ip.checksum), 2 bytes

Packets: 1039 • Displayed: 1 (0.1%)

Profile: Default

```

[root@AutomationServer ~]# python sniff_all.py
^CEther / IPv6 / UDP fe80::c1ec:5f5d:9e9b:c874:dhcpv6_client > ff02::1:2:dhcpv6_server / DHCP
P6_Solicit / DHCP6OptElapsedTime / DHCP6OptClientId / DHCP6OptIA_NA / DHCP6OptClientFQDN / D
HCP6OptVendorClass / DHCP6OptOptReq
Ether / ARP who has 10.10.10.130 says 10.10.10.1 / Padding
Ether / ARP is at 00:0c:29:34:28:a6 says 10.10.10.130
Ether / IP / ICMP 10.10.10.1 > 10.10.10.130 echo-request 0 / Raw
Ether / IP / ICMP 10.10.10.130 > 10.10.10.1 echo-reply 0 / Raw
Ether / IPv6 / UDP fe80::c1ec:5f5d:9e9b:c874:dhcpv6_client > ff02::1:2:dhcpv6_server / DHCP6
_Solicit / DHCP6OptElapsedTime / DHCP6OptClientId / DHCP6OptIA_NA / DHCP6OptClientFQDN / DHC
P6OptVendorClass / DHCP6OptOptReq
Ether / IP / ICMP 10.10.10.1 > 10.10.10.130 echo-request 0 / Raw
Ether / IP / ICMP 10.10.10.130 > 10.10.10.1 echo-reply 0 / Raw
Ether / IP / ICMP 10.10.10.1 > 10.10.10.130 echo-request 0 / Raw
Ether / IP / ICMP 10.10.10.130 > 10.10.10.1 echo-reply 0 / Raw
Ether / IP / ICMP 10.10.10.1 > 10.10.10.130 echo-request 0 / Raw
Ether / IP / ICMP 10.10.10.130 > 10.10.10.1 echo-reply 0 / Raw
Ether / IP / TCP 10.10.10.1:49250 > 10.10.10.130:ssh PA / Raw
Ether / IP / TCP 10.10.10.130:ssh > 10.10.10.1:49250 A

```

```
[root@AutomationServer ~]# python sniff_icmp_eth0.py
Begin capturing all packets from all interfaces. send ctrl+c to terminate and print summary
^CEther / IP / ICMP 10.10.10.1 > 10.10.10.130 echo-request 0 / Raw
Ether / IP / ICMP 10.10.10.130 > 10.10.10.1 echo-reply 0 / Raw
Ether / IP / ICMP 10.10.10.1 > 10.10.10.130 echo-request 0 / Raw
Ether / IP / ICMP 10.10.10.130 > 10.10.10.1 echo-reply 0 / Raw
Ether / IP / ICMP 10.10.10.1 > 10.10.10.130 echo-request 0 / Raw
Ether / IP / ICMP 10.10.10.130 > 10.10.10.1 echo-reply 0 / Raw
Ether / IP / ICMP 10.10.10.1 > 10.10.10.130 echo-request 0 / Raw
Ether / IP / ICMP 10.10.10.130 > 10.10.10.1 echo-reply 0 / Raw
None
```

Chapter 18: Building a Network Scanner Using Python

```
Python Console - DevNet
Django Console
Starting Nmap 7.60 ( https://nmap.org ) at 2018-05-28 17:22 EET
Nmap scan report for _gateway (192.168.1.1)
Host is up (0.010s latency).
MAC Address: 98:E7: (Huawei Technologies)
Nmap scan report for 192.168.1.2
Host is up (0.26s latency).
MAC Address: FC:19: (Samsung Electronics)
Nmap scan report for 192.168.1.3
```

```
Python Console - DevNet
Django Console
... print Host_Table
... network = "192.168.1.0/24"
... try:
...     IPNetwork(network) #This will validate the network is correctly formatted
...     p = subprocess.Popen(["sudo", "nmap", "-sP", network], stdout=subprocess.PIPE)
...     nmap_report(p.stdout.read())
... except AddrFormatError:
...     print("Please Enter a valid network IP address in x.x.x.x/y format")
...
+ Number of Live Hosts is 11
+-----+-----+-----+
| IP | MAC | Vendor |
+-----+-----+-----+
| _gateway (192.168.1.1) | 98:E7: | Huawei Technologies |
| 192.168.1.2 | FC:19: | Samsung Electronics |
| 192.168.1.3 | AC:37: | HTC |
| 192.168.1.5 | 60:E3: | Tp-link Technologies |
| 192.168.1.7 | 88:32: | Samsung Electro-mechanics |
| 192.168.1.10 | DC:55: | Guangdong Oppo Mobile Telecommunications |
| 192.168.1.16 | 00:18: | Terabytes Server Storage Tech |
| 192.168.1.19 | 24:00: | Huawei Technologies |
| 192.168.1.50 | 4C:E6: | Buffalo.inc |
| 192.168.1.91 | 68:05: | Samsung Electronics |
| 192.168.1.254 | 3C:1E: | D-Link International |
+-----+-----+-----+
```

```
Python Console - DevNet
Django Console
...
Please Enter a valid network IP address in x.x.x.x/y format
>>>
```

```
bassim:~$ nmap -p 80 www.google.com

Starting Nmap 7.60 ( https://nmap.org ) at 2018-05-28 23:18 EET
Nmap scan report for www.google.com (172.217.19.36)
Host is up (0.058s latency).
Other addresses for www.google.com (not scanned): 2a00:1450:4006:802::200
rDNS for 172.217.19.36: ham02s11-in-f36.1e100.net

PORT      STATE SERVICE
80/tcp    open  http

Nmap done: 1 IP address (1 host up) scanned in 0.31 seconds
bassim:~$
```

Port 80(HTTP) is opened

Create a new repository

A repository contains all the files for your project, including the revision history.

Owner

 TheNetworker ▾

Repository name

My_Great_Project ✓

Great repository names are short and memorable. Need inspiration? How about [upgraded-potato](#).

Description (optional)

Public



Anyone can see this repository. You choose who can commit.

Private



You choose who can see and commit to this repository.

Initialize this repository with a README

This will let you immediately clone the repository to your computer. Skip this step if you're importing an existing repository.

Add .gitignore: None ▾

Add a license: None ▾



Create repository

TheNetworker / My_Great_Project

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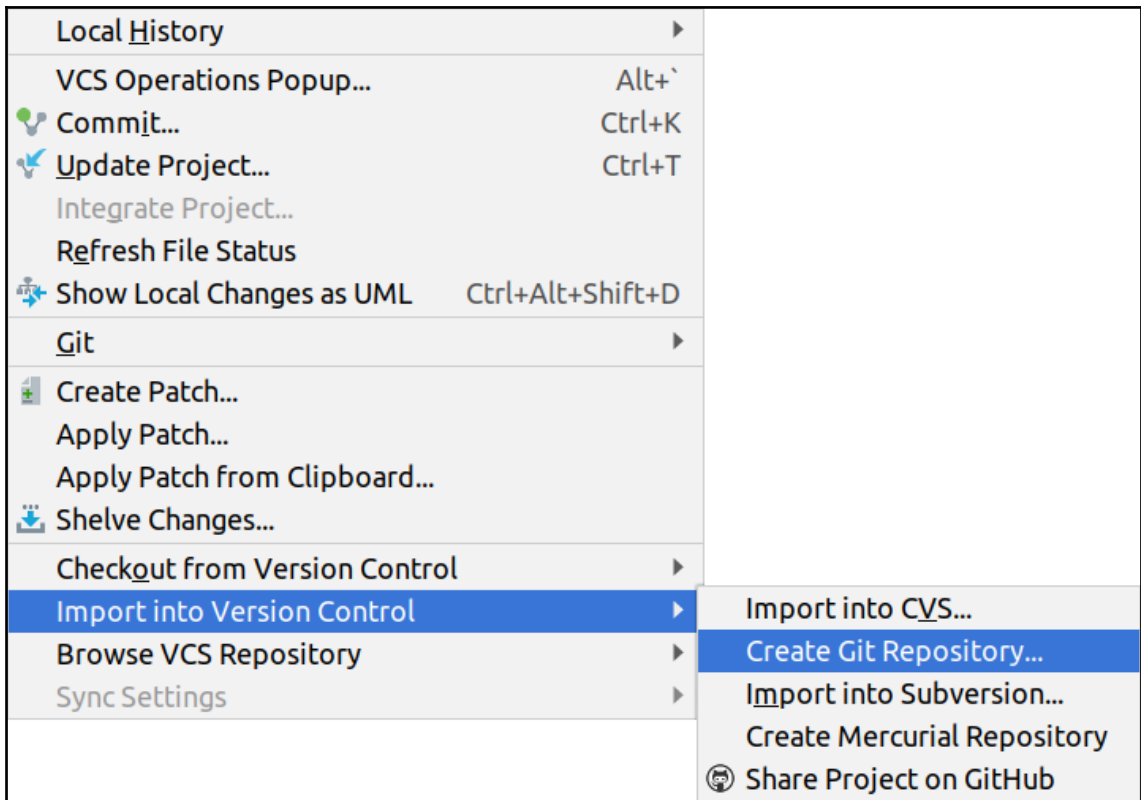
Settings

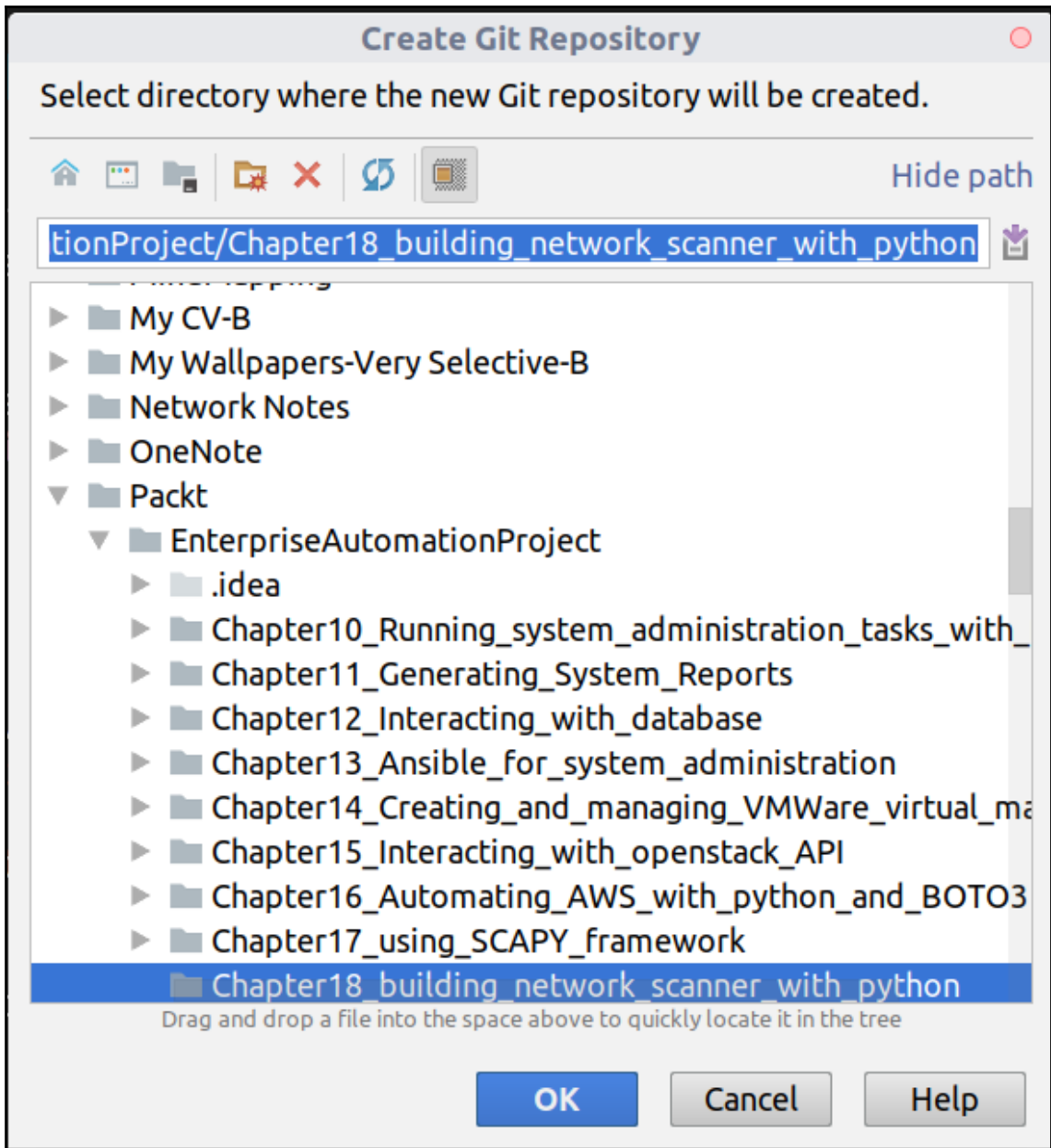
Quick setup — if you've done this kind of thing before

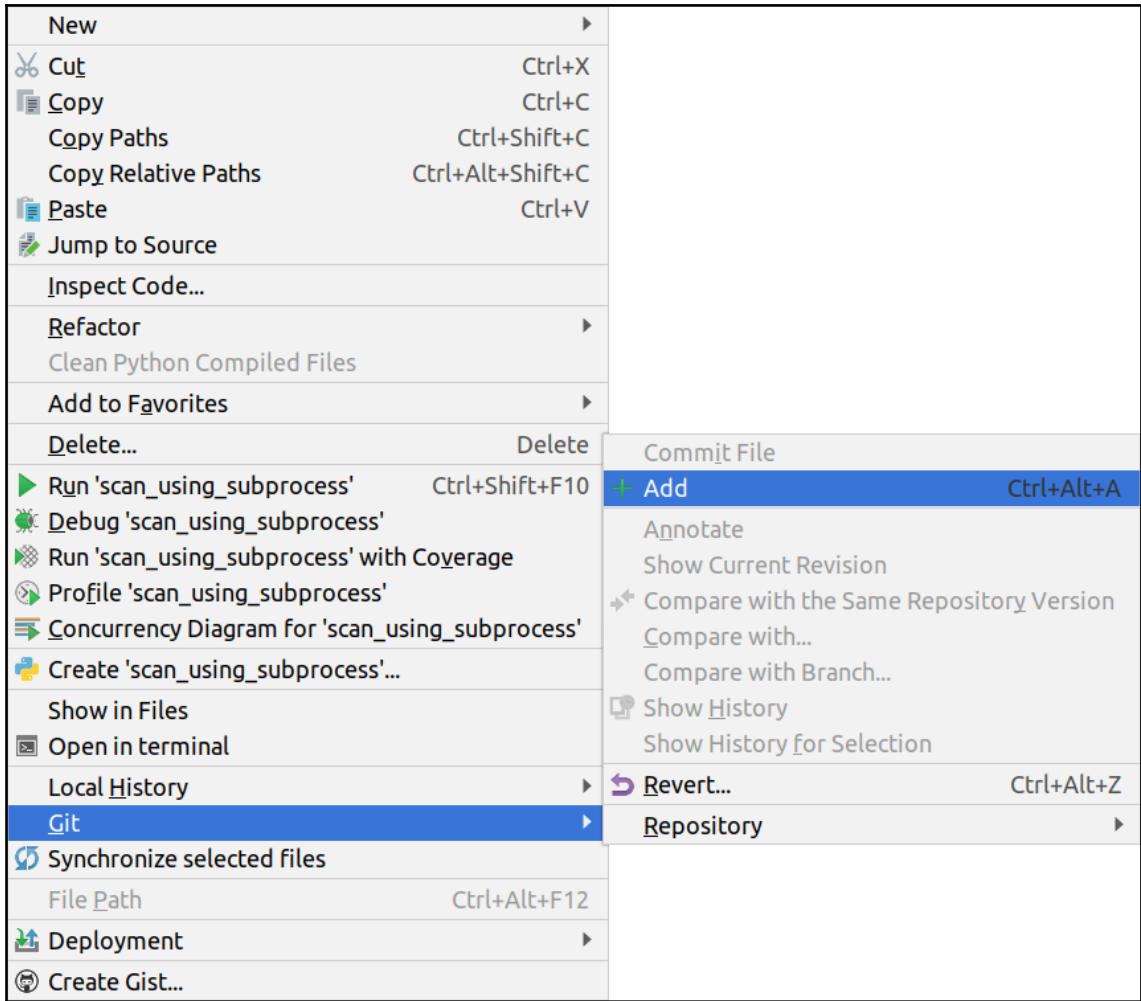
or **HTTPS** **SSH** `https://github.com/TheNetworker/My_Great_Project.git`

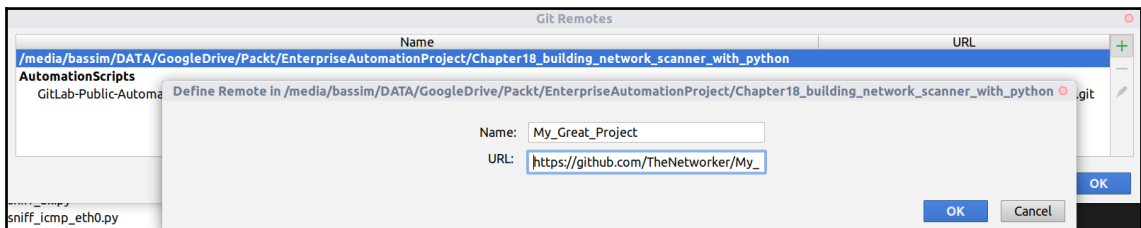
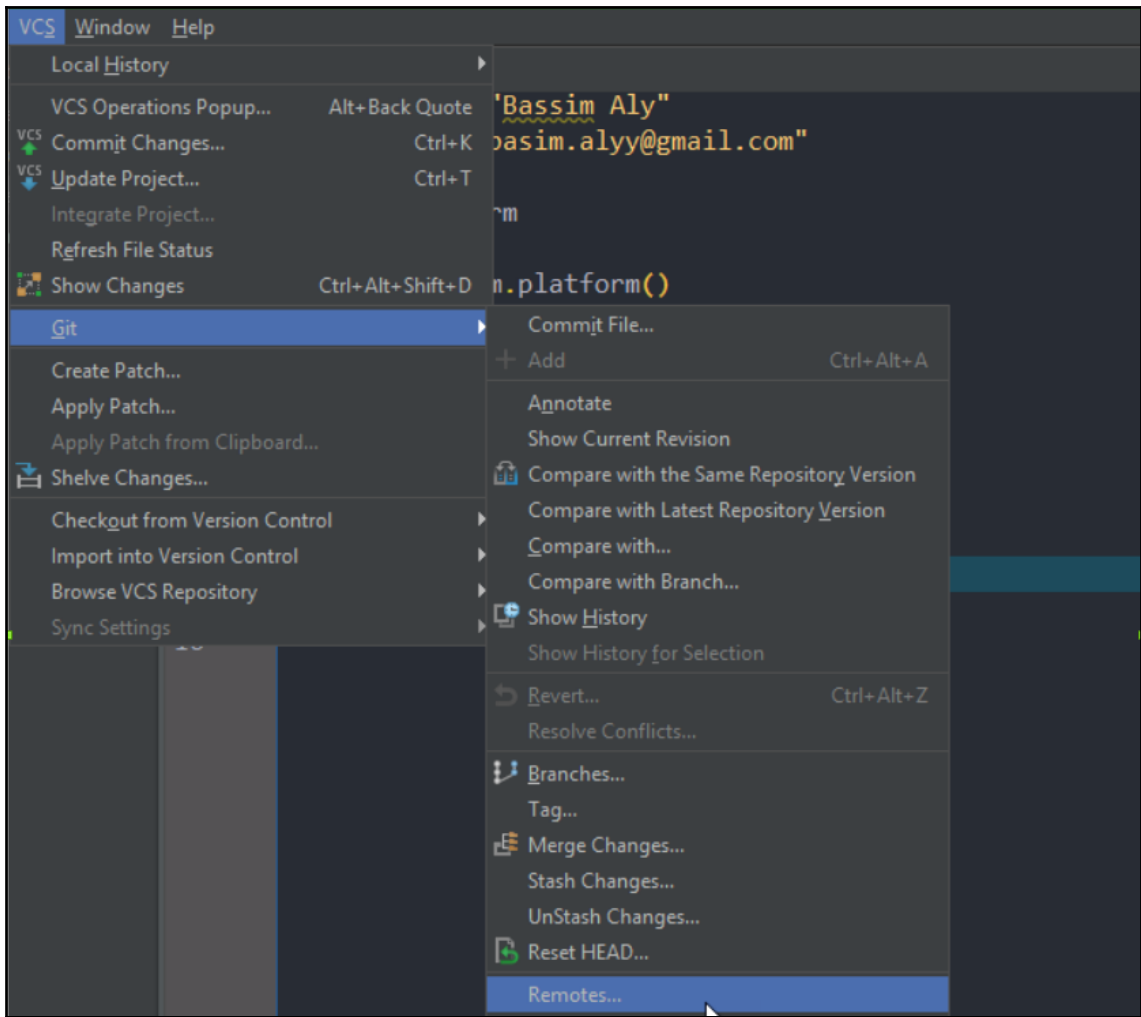


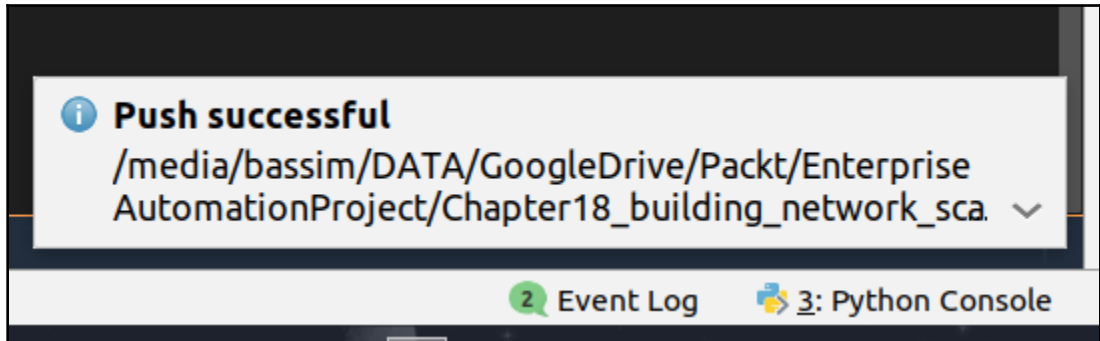
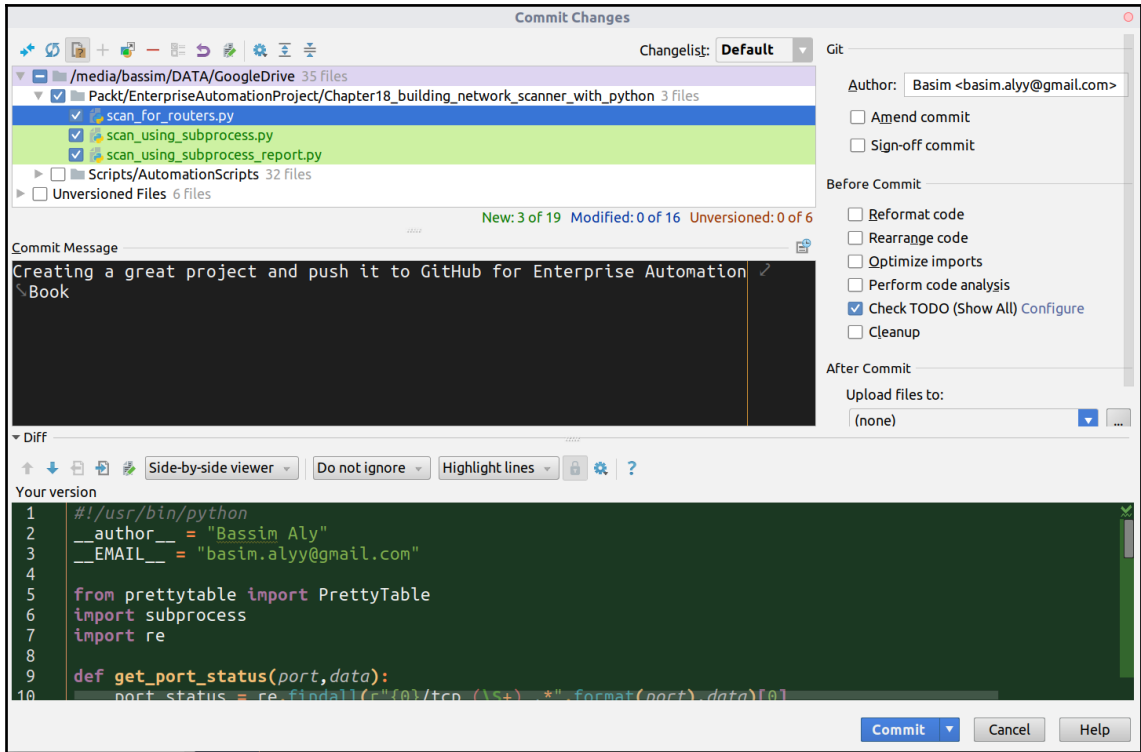
We recommend every repository include a [README](#), [LICENSE](#), and [.gitignore](#).











TheNetworker / My_Great_Project

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scan_for_routers.py	Creating a great project and push it to GitHub for Enterprise Automat...	3 minutes ago
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