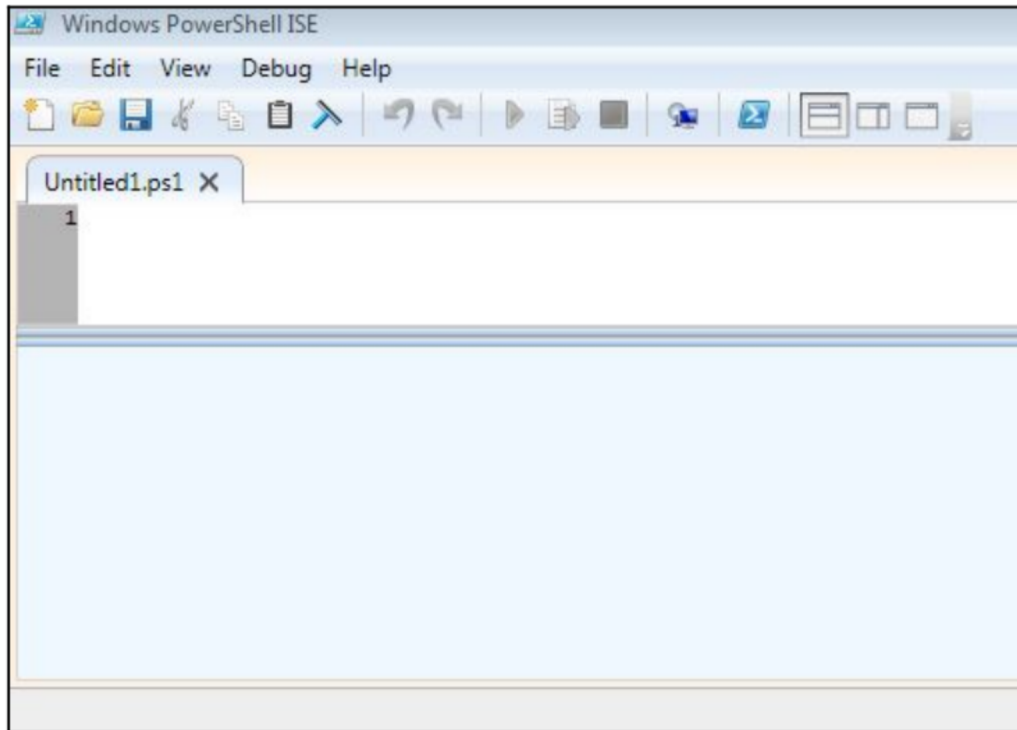
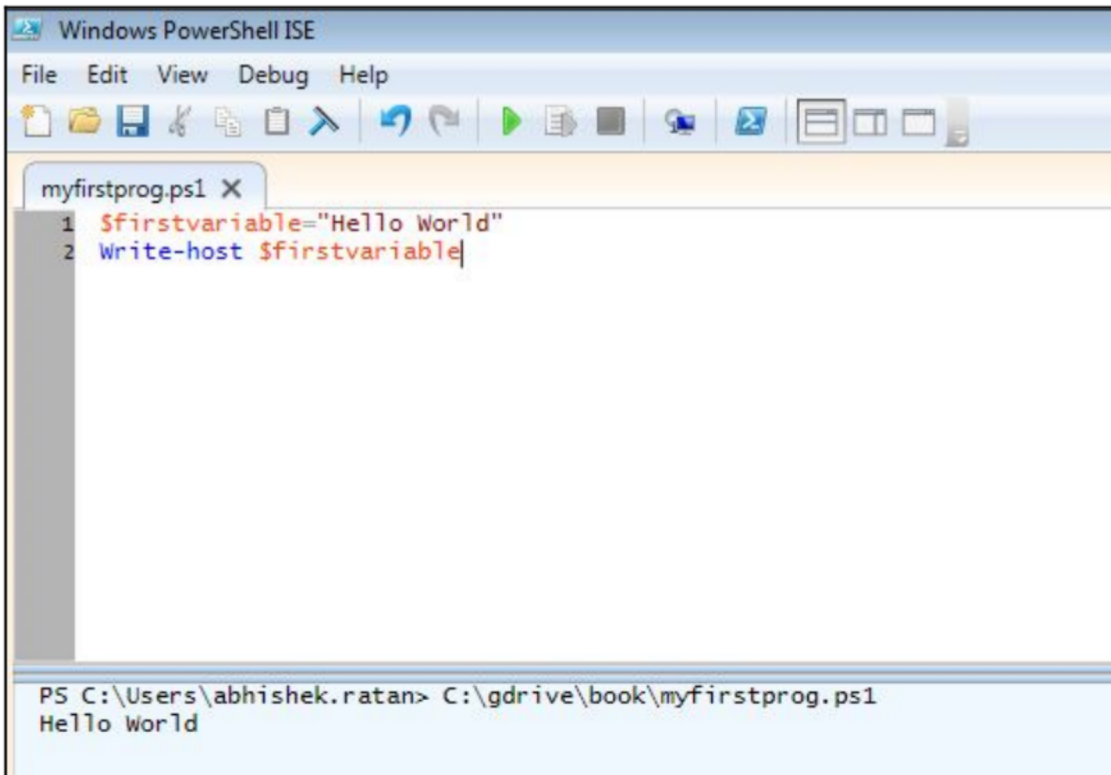


Chapter 1: Fundamental Concepts



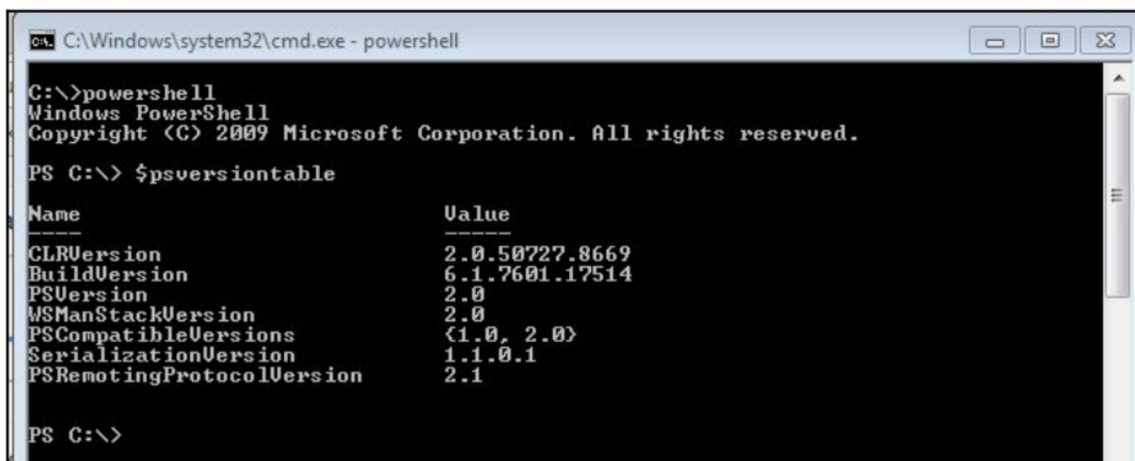


The screenshot shows the Windows PowerShell ISE interface. The menu bar includes File, Edit, View, Debug, and Help. The toolbar contains icons for file operations and execution. A script file named 'myfirstprog.ps1' is open, containing two lines of PowerShell code:

```
1 $firstvariable="Hello World"
2 Write-host $firstvariable
```

The console output at the bottom shows the command prompt path and the result of the script execution:

```
PS C:\Users\abhishek.ratan> C:\gdrive\book\myfirstprog.ps1
Hello World
```



The screenshot shows a Windows command prompt window titled 'C:\Windows\system32\cmd.exe - powershell'. The user has entered the command 'powershell' to launch the PowerShell shell. The output shows the PowerShell version information:

```
C:\>powershell
Windows PowerShell
Copyright (C) 2009 Microsoft Corporation. All rights reserved.

PS C:\> $psversiontable
```

Name	Value
CLRVersion	2.0.50727.8669
BuildVersion	6.1.7601.17514
PSVersion	2.0
WSManStackVersion	2.0
PSCompatibleVersions	{1.0, 2.0}
SerializationVersion	1.1.0.1
PSRemotingProtocolVersion	2.1

```
PS C:\>
```

```
Windows PowerShell
C:\>powershell
Windows PowerShell
Copyright (C) 2014 Microsoft Corporation. All rights reserved.

PS C:\> $psversiontable

Name                           Value
----                           -
PSVersion                      4.0
WSManStackVersion              3.0
SerializationVersion          1.1.0.1
CLRVersion                     4.0.30319.42000
BuildVersion                   6.3.9600.18728
PSCompatibleVersions           {1.0, 2.0, 3.0, 4.0}
PSRemotingProtocolVersion     2.2

PS C:\>
```

```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)]
on win32
Type "copyright", "credits" or "license()" for more information.
>>> |
```

```
helloworld.py - C:/gdrive/book/helloworld.py (3.6.1)
File Edit Format Run Options Window Help
newvalue="hello world"
print (newvalue)

Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)]
on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/gdrive/book/helloworld.py =====
hello world
>>>
```

```
C:\Windows\system32\cmd.exe
C:\>
C:\>python
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)]
on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>> print ("hello world")
hello world
>>> exit()
C:\>
```

```
Windows PowerShell
PS C:\> Invoke-RestMethod -Uri https://blogs.msdn.microsoft.com/powershell/feed/
! format-table -property title

title
-----
PowerShell Documentation Migration
PowerShell 6.0 Roadmap: CoreCLR, Backwards Compatibility, and More!
DSC Resource Kit Release July 2017
Getting Started with PowerShell Core on Windows, Mac, and Linux
DSC Resource Kit Release May 2017
Coming Soon - PowerShell in Azure Cloud Shell
Windows 10 Creators Update and PowerShell DSC
Announcing PowerShell for Visual Studio Code 1.0!
PowerShell Core 6 Beta.1 Release
OpenSSH Security Testing Kick Off

PS C:\> _
```

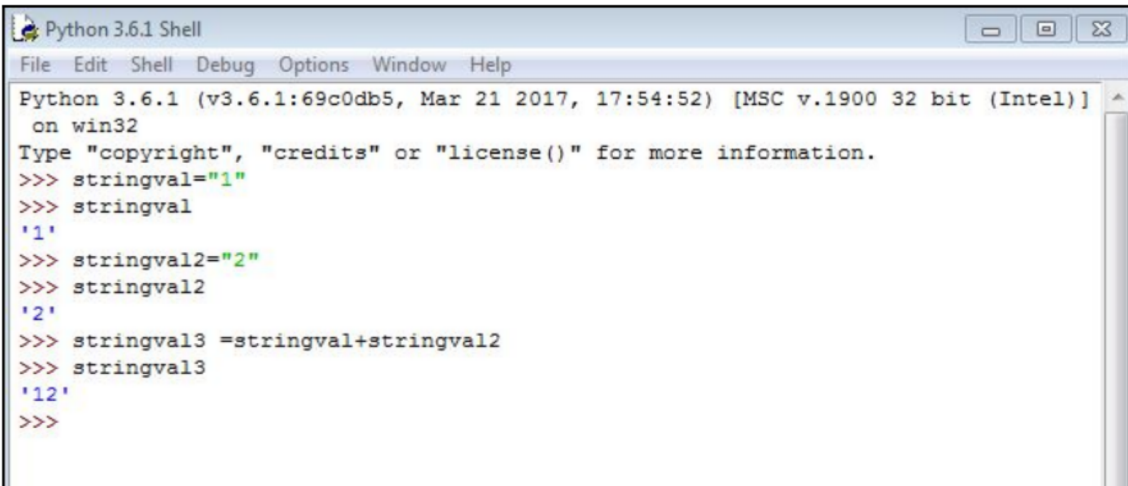
```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)] on win32
Type "copyright", "credits" or "license()" for more information.
>>> import requests
>>> r=requests.get('http://maps.googleapis.com/maps/api/geocode/json?address=google')
>>> r.json()
{'results': [{'address_components': [{'long_name': '111', 'short_name': '111', 'types': ['street_number']}, {'long_name': '8th Avenue', 'short_name': '8th Ave', 'types': ['route']}, {'long_name': 'Manhattan', 'short_name': 'Manhattan', 'types': ['political', 'sublocality', 'sublocality_level_1']}, {'long_name': 'New York', 'short_name': 'New York', 'types': ['locality', 'political']}, {'long_name': 'New York County', 'short_name': 'New York County', 'types': ['administrative_area_level_2', 'political']}, {'long_name': 'New York', 'short_name': 'NY', 'types': ['administrative_area_level_1', 'political']}, {'long_name': 'United States', 'short_name': 'US', 'types': ['country', 'political']}, {'long_name': '10011', 'short_name': '10011', 'types': ['postal_code']}], 'formatted_address': '111 8th Ave, New York, NY 10011, USA', 'geometry': {'location': {'lat': 40.7406375, 'lng': -74.0020388}, 'location_type': 'ROOFTOP', 'viewport': {'northeast': {'lat': 40.7419864802915, 'lng': -74.00068981970848}, 'southwest': {'lat': 40.7392885197085, 'lng': -74.00338778029149}}}, 'place_id': 'ChIJH_XxFL92wokR8F3XW7NaG8w', 'types': ['establishment', 'point_of_interest']}, {'status': 'OK'}]
>>>
```

Chapter 2: Python for Network Engineers

```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)]
on win32
Type "copyright", "credits" or "license()" for more information.
>>> intvalue=2
>>> intvalue
2
>>> stringvalue='this is a test'
>>> stringvalue
'this is a test'
>>> booleanvalue=True
>>> booleanvalue
True
>>> bytevalue=bytes(3)
>>> bytevalue
b'\x00\x00\x00'
>>>
```

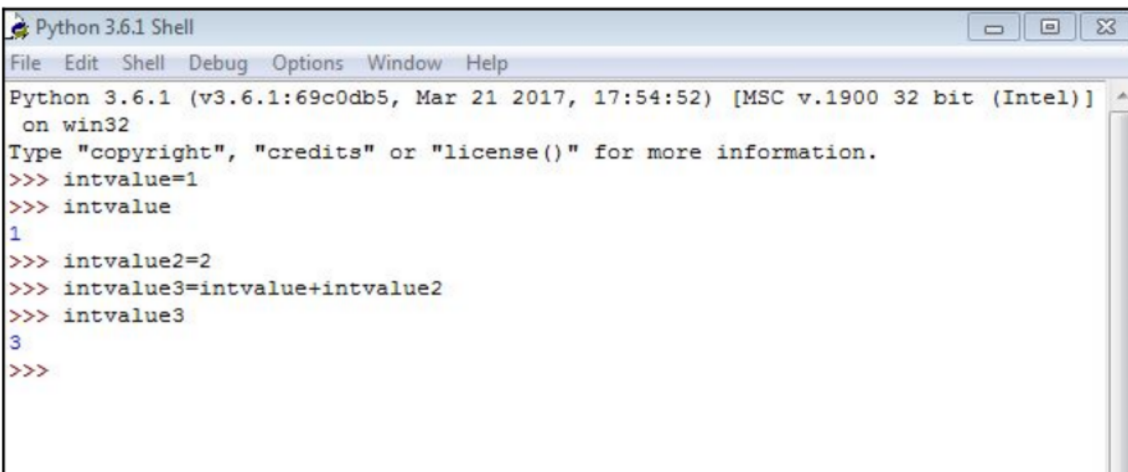
```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)]
on win32
Type "copyright", "credits" or "license()" for more information.
>>> listvalue = [1, 2, 3, 4, 5]
>>> listvalue
[1, 2, 3, 4, 5]
>>> tuplevalue = ("one", "two")
>>> tuplevalue
('one', 'two')
>>> setvalue = set(["India", "US", "UK"])
>>> setvalue
{'India', 'UK', 'US'}
>>> dictvalue = {'Country': 'India', 'Currency': 'Rupee', 'Capital': 'Delhi'}
>>> dictvalue
{'Country': 'India', 'Currency': 'Rupee', 'Capital': 'Delhi'}
>>> |
```

```
>>> type(listvalue)
<class 'list'>
>>> type(setvalue)
<class 'set'>
>>> type(dictvalue)
<class 'dict'>
>>> type(tuplevalue)
<class 'tuple'>
>>> |
```



The screenshot shows a Python 3.6.1 Shell window with a menu bar (File, Edit, Shell, Debug, Options, Window, Help). The main text area contains the following code and output:

```
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)]
on win32
Type "copyright", "credits" or "license()" for more information.
>>> stringval="1"
>>> stringval
'1'
>>> stringval2="2"
>>> stringval2
'2'
>>> stringval3 =stringval+stringval2
>>> stringval3
'12'
>>>
```



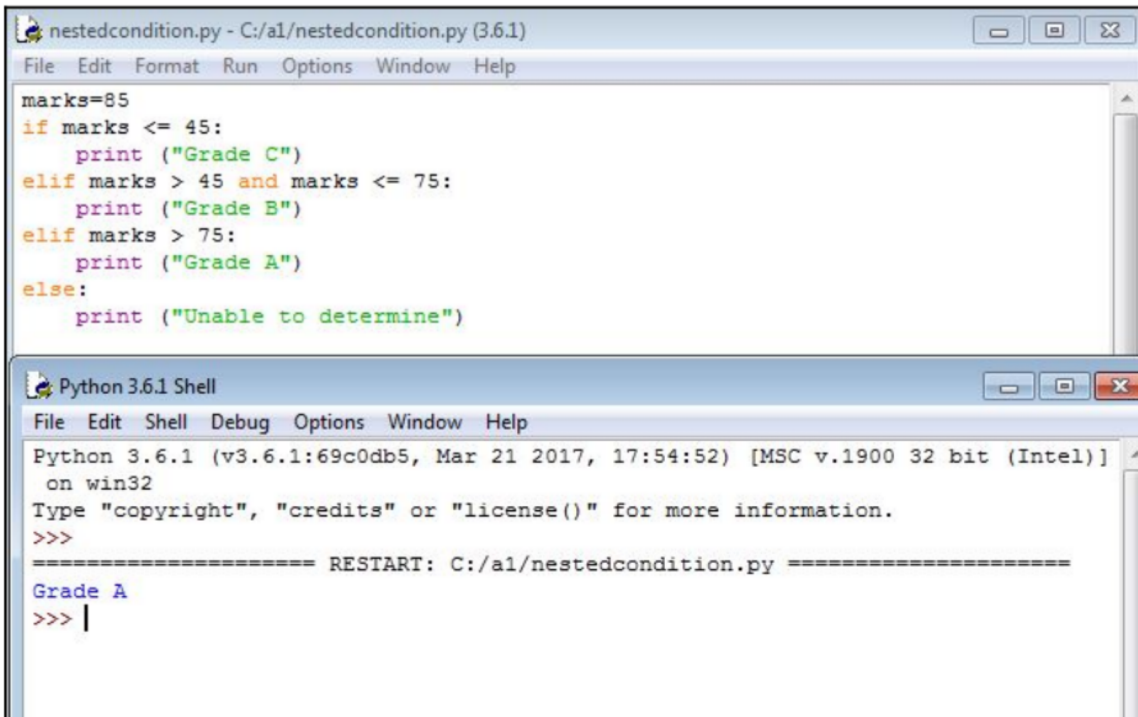
The screenshot shows a Python 3.6.1 Shell window with a menu bar (File, Edit, Shell, Debug, Options, Window, Help). The main text area contains the following code and output:

```
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)]
on win32
Type "copyright", "credits" or "license()" for more information.
>>> intvalue=1
>>> intvalue
1
>>> intvalue2=2
>>> intvalue3=intvalue+intvalue2
>>> intvalue3
3
>>>
```

```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)]
on win32
Type "copyright", "credits" or "license()" for more information.
>>> stringvalue='1'
>>> intvalue=2
>>> mixedvalue=stringvalue+intvalue
Traceback (most recent call last):
  File "<pysHELL#2>", line 1, in <module>
    mixedvalue=stringvalue+intvalue
TypeError: must be str, not int
>>> |
```

```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)]
on win32
Type "copyright", "credits" or "license()" for more information.
>>> if 2>3:
    print ("left value is greater")
else:
    print ("right value is greater")

right value is greater
>>>
```



The image shows a screenshot of a Python IDE with two windows. The top window is titled "nestedcondition.py - C:/a1/nestedcondition.py (3.6.1)" and contains the following Python code:

```
marks=85
if marks <= 45:
    print ("Grade C")
elif marks > 45 and marks <= 75:
    print ("Grade B")
elif marks > 75:
    print ("Grade A")
else:
    print ("Unable to determine")
```

The bottom window is titled "Python 3.6.1 Shell" and shows the execution output:

```
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)]
on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/a1/nestedcondition.py =====
Grade A
>>> |
```



```
nestedcondition.py - C:/a1/nestedcondition.py (3.6.1)
File Edit Format Run Options Window Help
car_details="Car is blue color and a sedan"

if "Car" in car_details:
    if "blue" in car_details:
        if "sedan" in car_details:
            print ("I will buy this car")
        else:
            print ("This is not a sedan")
    else:
        print ("This is not a blue car")
else:
    print ("This is not a car")

Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)]
on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/a1/nestedcondition.py =====
I will buy this car
>>>
```

```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)]
on win32
Type "copyright", "credits" or "license()" for more information.
>>> for x in range(1,10):
        print (x)

1
2
3
4
5
6
7
8
9
>>>
```

```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)]
on win32
Type "copyright", "credits" or "license()" for more information.
>>> countries=['India','UK','USA','France']
>>> for country in countries:
    print (country + " is good")

India is good
UK is good
USA is good
France is good
>>>
```

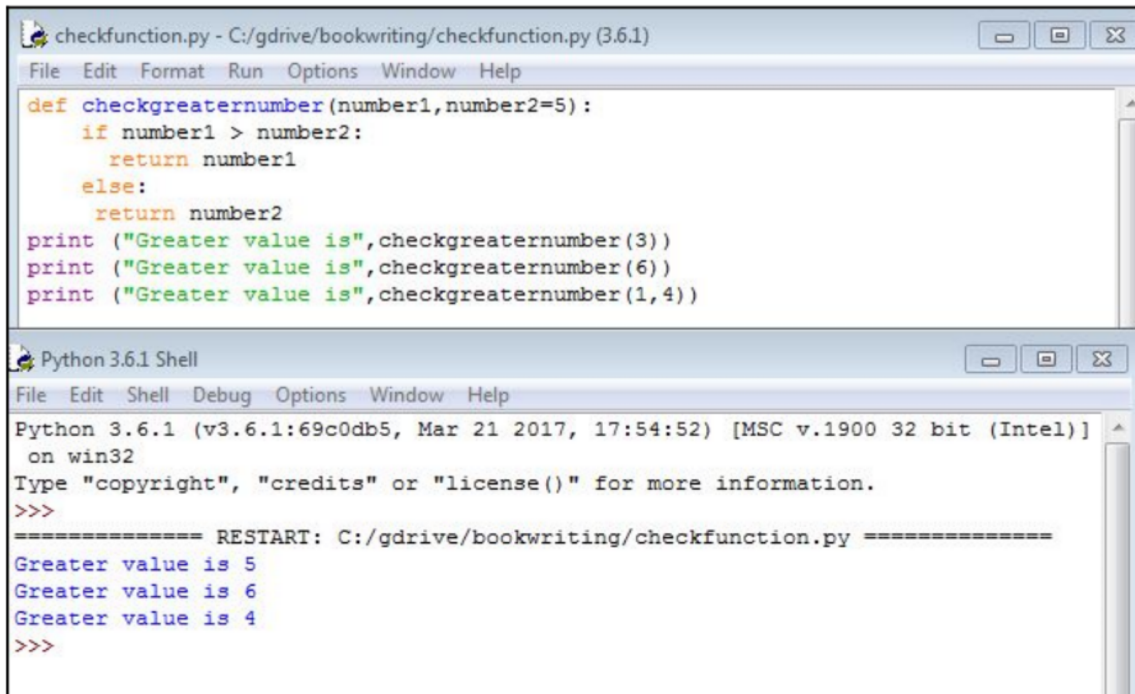
```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)]
on win32
Type "copyright", "credits" or "license()" for more information.
>>> x=1
>>> while True:
    print (x)
    if x>=10:
        break
    x=x+1

1
2
3
4
5
6
7
8
9
10
>>>
```

```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)]
on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/a1/book/checkvowel.py =====
Enter country name:India
Vowel found
>>>
===== RESTART: C:/a1/book/checkvowel.py =====
Enter country name:UK
No vowel found
>>>
===== RESTART: C:/a1/book/checkvowel.py =====
Enter country name:USA
Vowel found
>>>
```

```
checkfunction.py - C:/gdrive/bookwriting/checkfunction.py (3.6.1)
File Edit Format Run Options Window Help
def checkgreaternumber(number1,number2):
    if number1 > number2:
        print ("Greater number is ",number1)
    else:
        print ("Greater number is",number2)
checkgreaternumber(2,4)
checkgreaternumber(3,1)
```

```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)]
on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/gdrive/bookwriting/checkfunction.py =====
Greater number is 4
Greater number is 3
>>>
```



The image shows a screenshot of a Python IDE with two windows. The top window is titled "checkfunction.py - C:/gdrive/bookwriting/checkfunction.py (3.6.1)" and contains the following code:

```
def checkgreaternumber(number1, number2=5):  
    if number1 > number2:  
        return number1  
    else:  
        return number2  
print ("Greater value is", checkgreaternumber(3))  
print ("Greater value is", checkgreaternumber(6))  
print ("Greater value is", checkgreaternumber(1, 4))
```

The bottom window is titled "Python 3.6.1 Shell" and shows the execution output:

```
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)]  
on win32  
Type "copyright", "credits" or "license()" for more information.  
>>>  
===== RESTART: C:/gdrive/bookwriting/checkfunction.py =====  
Greater value is 5  
Greater value is 6  
Greater value is 4  
>>>
```

The image shows a screenshot of a Python IDE window titled "checkfunction.py - C:/gdrive/bookwriting/checkfunction.py (3.6.1)". The window contains the following Python code:

```
globalval=6

def checkglobalvalue():
    return globalval

def localvariablevalue():
    globalval=8
    return globalval

print ("This is global value",checkglobalvalue())
print ("This is global value",globalval)
print ("This is local value",localvariablevalue())
print ("This is global value",globalval)
```

Below the code editor is a "Python 3.6.1 Shell" window. It displays the output of running the script:

```
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)]
on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/gdrive/bookwriting/checkfunction.py =====
This is global value 6
This is global value 6
This is local value 8
This is global value 6
>>>
```

The image shows a screenshot of a Python IDE with two windows. The top window is a text editor titled "checkfunction.py - C:\gdrive\bookwriting\checkfunction.py (3.6.1)". It contains the following Python code:

```
globalval=6

def checkglobalvalue():
    global globalval
    return globalval

def localvariablevalue():
    global globalval
    globalval=8
    return globalval

print ("This is global value",checkglobalvalue())
print ("This is global value",globalval)
print ("This is local value",localvariablevalue())
print ("This is global value",globalval)
```

The bottom window is a "Python 3.6.1 Shell" with a menu bar (File, Edit, Shell, Debug, Options, Window, Help). It shows the execution output of the script:

```
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)]
on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:\gdrive\bookwriting\checkfunction.py =====
This is global value 6
This is global value 6
This is local value 8
This is global value 8
>>>
```

```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)]
on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/a1/book/checkparallel.py =====
22:11:31.791000
22:11:31.795000
22:11:31.797000
22:11:31.799000
22:11:31.802000
22:11:31.804000
22:11:31.806000
22:11:31.807000
22:11:31.809000

Now printing parallel threads

22:11:31.813000
22:11:31.814000
22:11:31.814000
22:11:31.814000
22:11:31.815000

22:11:31.814000
22:11:31.815000

22:11:31.815000
22:11:31.816000

>>>
```

```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)]
on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/a1/checknetmiko.py =====
Cisco IOS Software, 3700 Software (C3745-ADVENTERPRISEK9-M), Version 12.4(15)T14
, RELEASE SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2010 by Cisco Systems, Inc.
Compiled Tue 17-Aug-10 12:55 by prod_rel_team

ROM: ROMMON Emulation Microcode
ROM: 3700 Software (C3745-ADVENTERPRISEK9-M), Version 12.4(15)T14, RELEASE SOFTW
ARE (fc2)

|estrouter uptime is 2 minutes
System returned to ROM by unknown reload cause - suspect boot_data[BOOT_COUNT] 0
x0, BOOT_COUNT 0, BOOTDATA 19
System image file is "tftp://255.255.255.255/unknown"

This product contains cryptographic features and is subject to United
States and local country laws governing import, export, transfer and
use. Delivery of Cisco cryptographic products does not imply
third-party authority to import, export, distribute or use encryption.
Importers, exporters, distributors and users are responsible for
compliance with U.S. and local country laws. By using this product you
agree to comply with applicable laws and regulations. If you are unable
to comply with U.S. and local laws, return this product immediately.

A summary of U.S. laws governing Cisco cryptographic products may be found at:
http://www.cisco.com/wwl/export/crypto/tool/stqrg.html

If you require further assistance please contact us by sending email to
export@cisco.com.

Cisco 3745 (R7000) processor (revision 2.0) with 249856K/12288K bytes of memory.
Processor board ID FTX0945WOMY
R7000 CPU at 350MHz, Implementation 39, Rev 2.1, 256KB L2, 512KB L3 Cache
```



```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)]
on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/a1/checknetmiko.py =====
Before config push
Building configuration...

Current configuration : 102 bytes
!
interface FastEthernet0/0
 ip address 192.168.255.249 255.255.255.252
 duplex auto
 speed auto
end

After config push
Building configuration...

Current configuration : 123 bytes
!
interface FastEthernet0/0
 description my test
 ip address 192.168.255.249 255.255.255.252
 duplex auto
 speed auto
end

>>>
```

This product contains cryptographic features and is subject to United States and local country laws governing import, export, transfer and use. Delivery of Cisco cryptographic products does not imply third-party authority to import, export, distribute or use encryption. Importers, exporters, distributors and users are responsible for compliance with U.S. and local country laws. By using this product you agree to comply with applicable laws and regulations. If you are unable to comply with U.S. and local laws, return this product immediately.

A summary of U.S. laws governing Cisco cryptographic products may be found at:
<http://www.cisco.com/wl/export/crypto/tool/stqrg.html>

If you require further assistance please contact us by sending email to export@cisco.com.

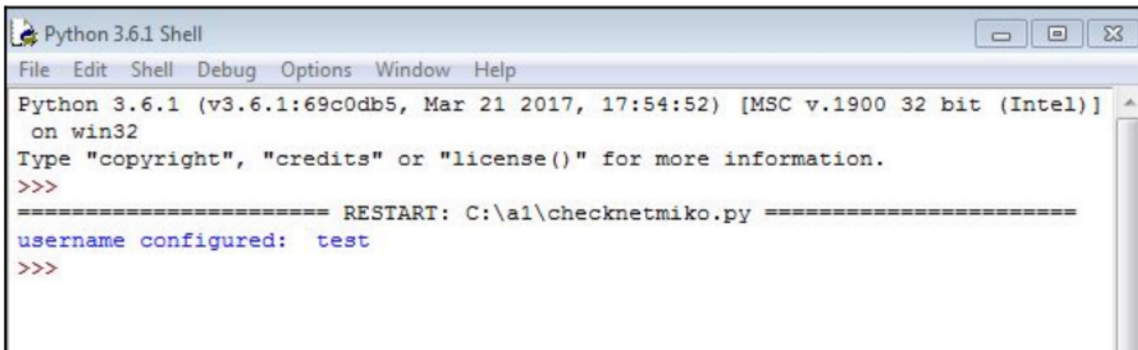
Cisco 3745 (R7000) processor (revision 2.0) with 249856K/12288K bytes of memory.
Processor board ID FTX0945W0MY
R7000 CPU at 350MHz, Implementation 39, Rev 2.1, 256KB L2, 512KB L3 Cache
3 FastEthernet interfaces
1 Serial(sync/async) interface
DRAM configuration is 64 bits wide with parity enabled.
151K bytes of NVRAM.

Configuration register is 0x2102

Interface	IP-Address	OK?	Method	Status	Protocol
FastEthernet0/0	192.168.255.249	YES	NVRAM	up	up
Serial0/0	unassigned	YES	NVRAM	administratively down	down
FastEthernet0/1	unassigned	YES	NVRAM	administratively down	down
FastEthernet1/0	unassigned	YES	NVRAM	administratively down	down

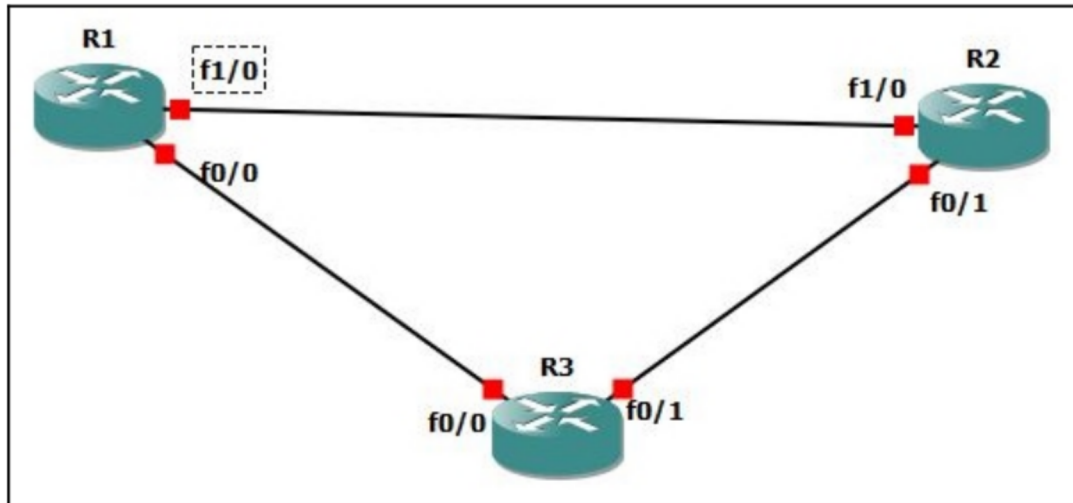
*00:26:48.907 UTC Fri Mar 1 2002
username configured: cisco
>>>

```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)]
on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:\a1\checknetmiko.py =====
username configured: cisco
username configured: test
Authenticated successfully with username test
>>>
```



```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)]
on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:\a1\checknetmiko.py =====
username configured: test
>>>
```

Chapter 3: Accessing and Mining Data from Network



```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)]
on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/a1/checksnmp.py =====
SNMPv2-MIB::sysDescr.0 = Cisco IOS Software, 3700 Software (C3745-ADVENTERPRISEK
9-M), Version 12.4(15)I14, RELEASE SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2010 by Cisco Systems, Inc.
Compiled Tue 17-Aug-10 12:55 by prod_rel_team
>>>
```

```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)]
on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:\a1\checksnmp.py =====
SNMPv2-SMI::mib-2.2.2.1.2.1 = FastEthernet1/0
SNMPv2-SMI::mib-2.2.2.1.2.2 = FastEthernet0/0
SNMPv2-SMI::mib-2.2.2.1.2.3 = Serial0/0
SNMPv2-SMI::mib-2.2.2.1.2.4 = FastEthernet0/1
SNMPv2-SMI::mib-2.2.2.1.2.6 = Null0
>>>
```

```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)]
on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/a1/checkre.py =====
IP address is : 10.10.10.20
Subnet mask is : 255.255.255.255
>>>
```

```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)]
on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/a1/validateipaddress.py =====
Correct IPv4 IP
Correct IPv6 IP
wrong IPv4 IP
wrong IPv6 IP
>>>
```

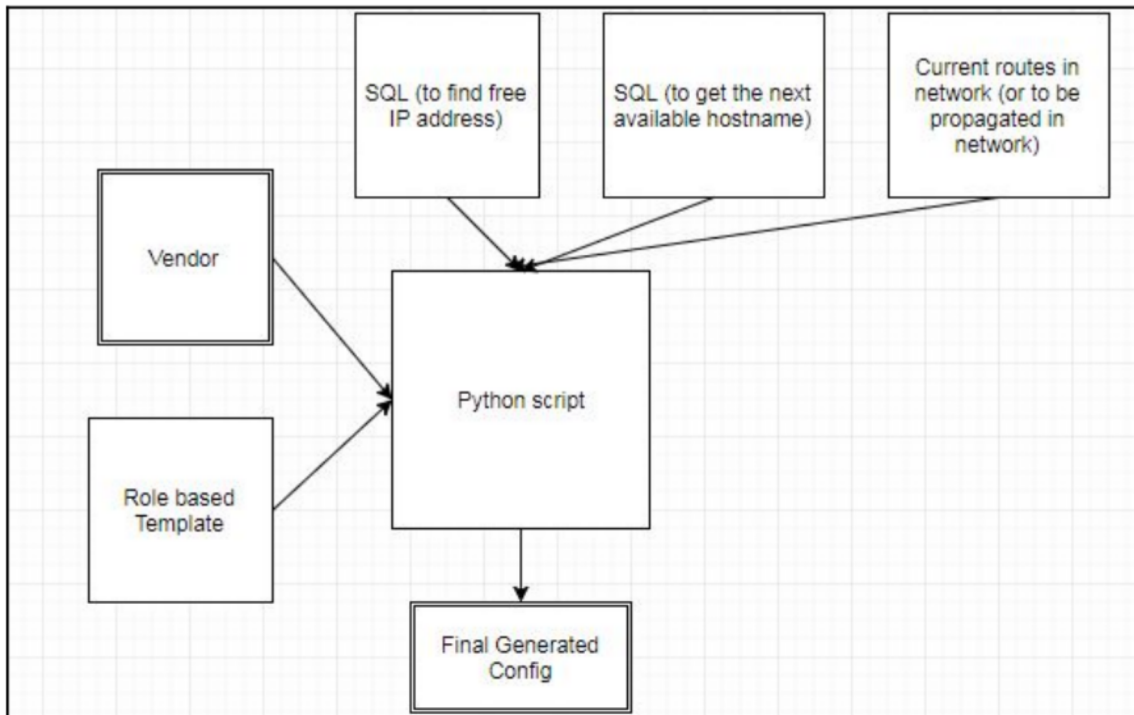
```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)]
on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/a1/checksample.py =====
Trunk enabled on fa0/1
Trunk enabled on fa1/0
Trunk enabled on fa2/1
Trunk enabled on te3/1
>>>
```

```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)]
on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/a1/checksample.py =====
Trunk enabled on fa0/1
Trunk enabled on fa1/0
Trunk enabled on fa2/1
>>>
```

```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)]
on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/a1/parseconfig.py =====
wrong IPv4 IP 25.25.25.298
>>>
```

```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)]
on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/a1/checkmyrouter.py =====
Current config:
boot-start-marker
boot-end-marker
New config:
boot-start-marker
boot system flash:c3745-adventerprisek9-mz.124-15.T14.bin
boot-end-marker
>>>
```

```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)]
on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/a1/ipv4toipv6.py =====
2002::a0a:a0a
2002::c0a8:6401
>>>
```



```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)]
on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:\a1\checkmyrouter.py =====
Do you want a pre or post check [pre|post]: pre
File write completed precheck.txt
>>>
===== RESTART: C:\a1\checkmyrouter.py =====
Do you want a pre or post check [pre|post]: post
File write completed postcheck.txt
>>>
```



```

Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/a1/diffcheck.py =====
Codes: 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

Gateway of last resort is not set

      192.168.255.0/30 is subnetted, 1 subnets
C       192.168.255.248 is directly connected, FastEthernet0/0
- *00:05:31.431 UTC Fri Mar 1 2002
?      ^ - -
+ *00:05:54.143 UTC Fri Mar 1 2002
?      ^^^

Interface                IP-Address      OK? Method Status          Protocol
FastEthernet0/0          192.168.255.249 YES NVRAM    up              up
Serial0/0                 unassigned      YES NVRAM    administratively down down
FastEthernet0/1          unassigned      YES NVRAM    administratively down down
FastEthernet1/0          unassigned      YES NVRAM    administratively down down

```

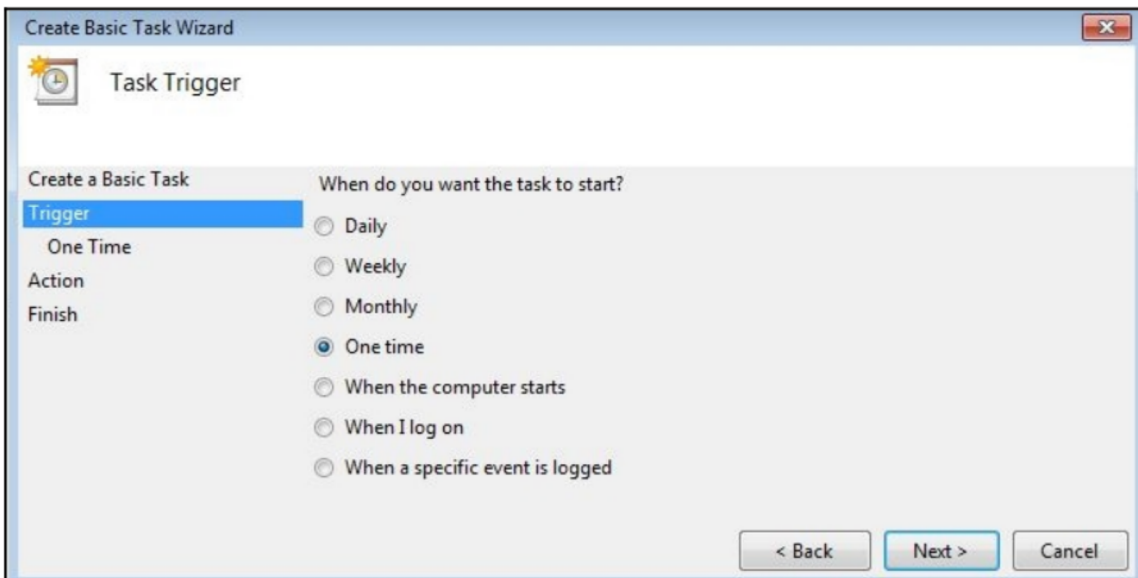
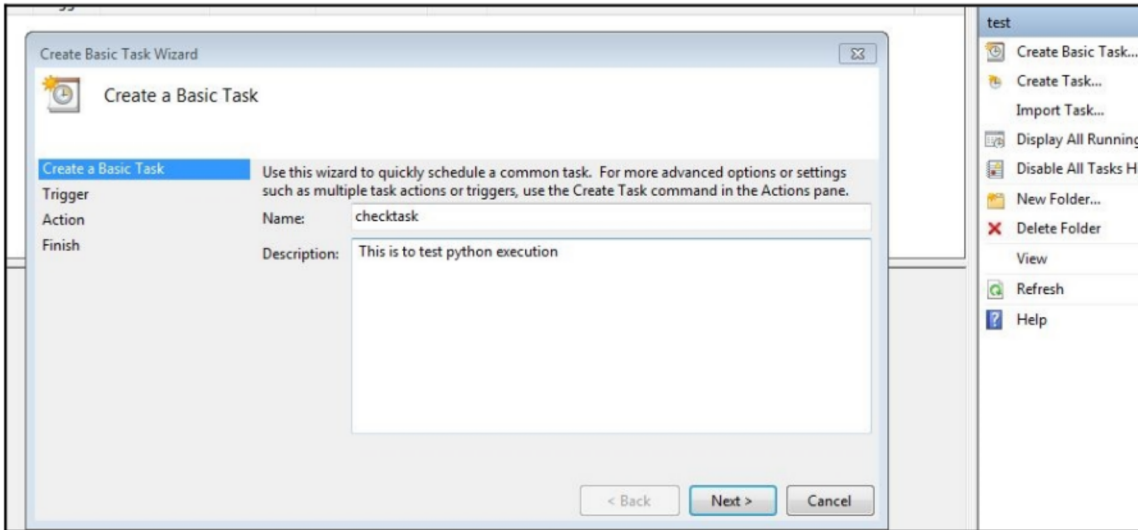
Task Scheduler

File Action View Help

Task Scheduler (Local)

Task Scheduler Library

Name	Status	Triggers	Next Run Time	Last Run Time
Adobe Acro...	Queued	Multiple triggers defined	9/16/2017 1:00:00 PM	9/15/2017 8:50:48 PM
fff	Ready	At 4:19 PM every day	9/16/2017 4:19:26 PM	9/15/2017 4:19:25 PM
OneDrive St...	Ready	At 4:00 AM on 5/1/1992 - After triggered, repeat every 1.00:00:00 indefinitely.	9/16/2017 7:10:40 AM	9/15/2017 1:55:26 PM
PMTask	Ready	When computer is idle		9/15/2017 4:06:54 PM
RtHDVBg_D...	Running	At log on of any user		9/4/2017 8:34:09 AM
RtHDVBg_LE...	Running	At log on of any user		9/4/2017 8:34:09 AM
RTKCPL	Running	At log on of any user		9/4/2017 8:34:09 AM



Create Basic Task Wizard

Start a Program

Create a Basic Task

Trigger	Program/script:
One Time	C:\Python\Python36-32\python.exe <input type="button" value="Browse..."/>
Action	Add arguments (optional):
Start a Program	"c:\a1\testpython.py"
Finish	Start in (optional):
	<input type="text"/>

Create Basic Task Wizard

Summary

Create a Basic Task

Trigger	Name:
One Time	checktask
Action	Description:
Start a Program	This is to test python execution
Finish	

Trigger: One time; At 10:11 PM on 9/15/2017

Action: Start a program; C:\Python\Python36-32\python.exe "c:\a1\testpython.py"

Open the Properties dialog for this task when I click Finish

When you click Finish, the new task will be created and added to your Windows schedule.

```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)]
on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/a1/checksnmpvendor.py =====
192.168.255.248
SNMPv2-MIB::sysDescr.0 = Cisco IOS Software, 3600 Software (C3660-A3JK9S-M), Ver
sion 12.4(19), RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2008 by Cisco Systems, Inc.
Compiled Fri 29-Feb-08 23:47 by prod_rel_team

192.168.255.249
SNMPv2-MIB::sysDescr.0 = Cisco IOS Software, 3700 Software (C3745-ADVENTERPRISEK
9-M), Version 12.4(15)T14, RELEASE SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2010 by Cisco Systems, Inc.
Compiled Tue 17-Aug-10 12:55 by prod_rel_team

>>>
```

```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)]
on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/a1/checkbyod.py =====
Validating IP 192.168.255.249
Interface has fastethernet0/0 : True
Device is of vendor Cisco: True
Device 192.168.255.249 has passed all validations and eligible for BYOD

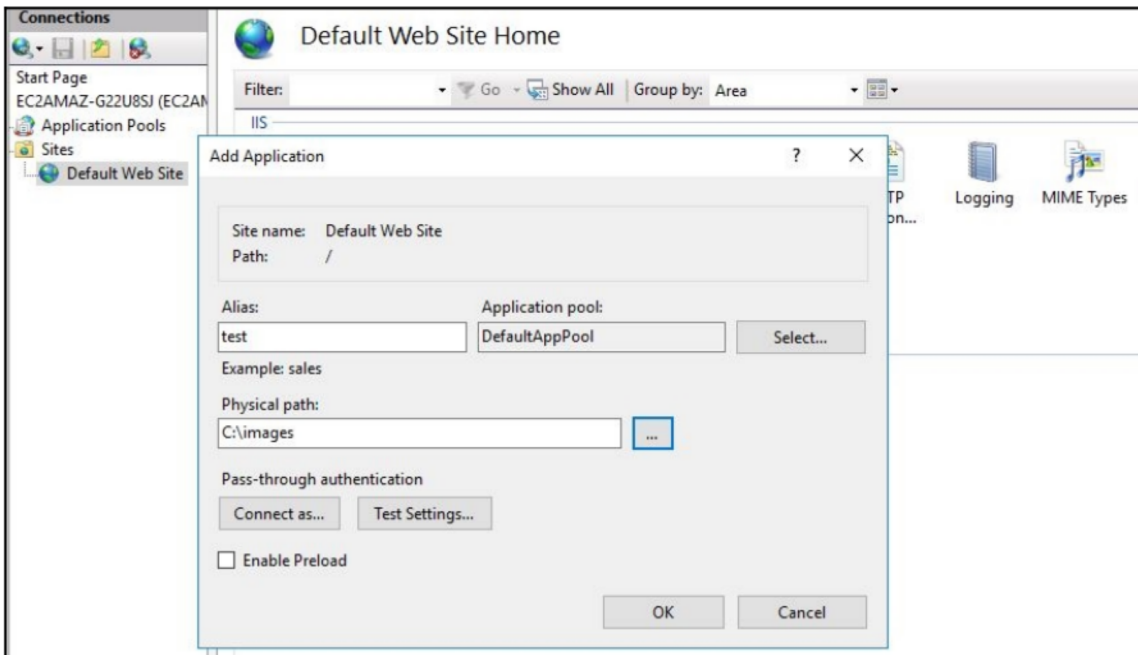
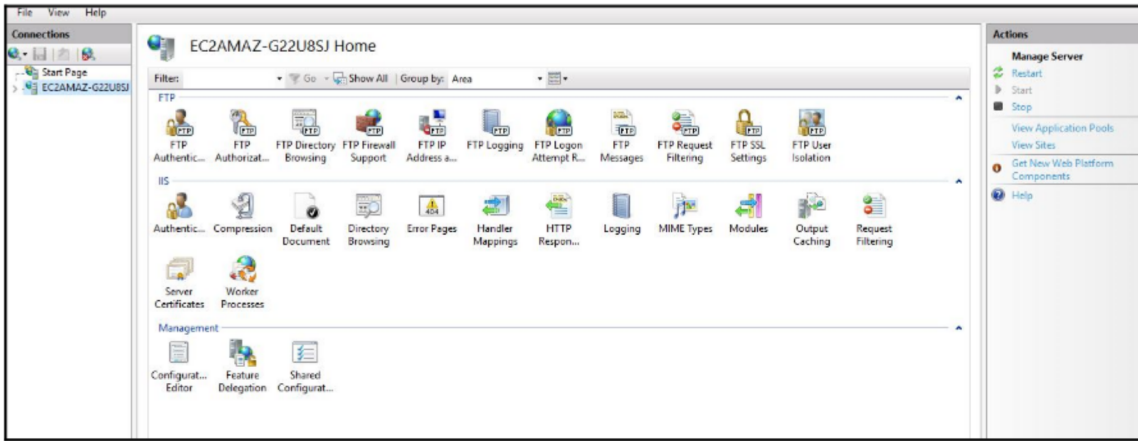
Validating IP 192.168.255.248
Interface has fastethernet0/0 : True
Device is of vendor Cisco: True
Device 192.168.255.248 has passed all validations and eligible for BYOD
```

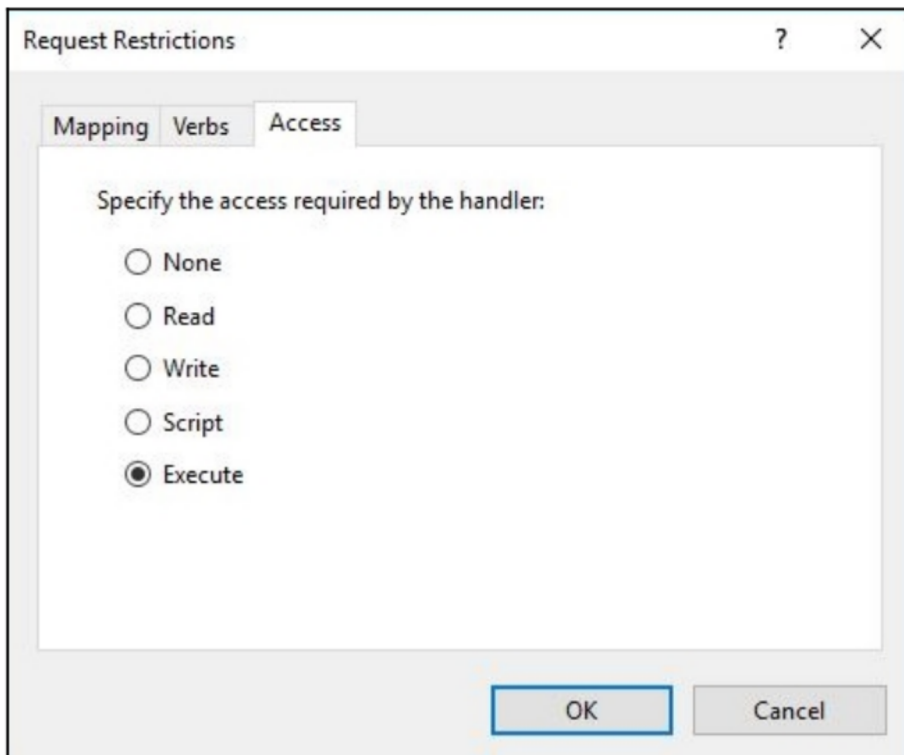
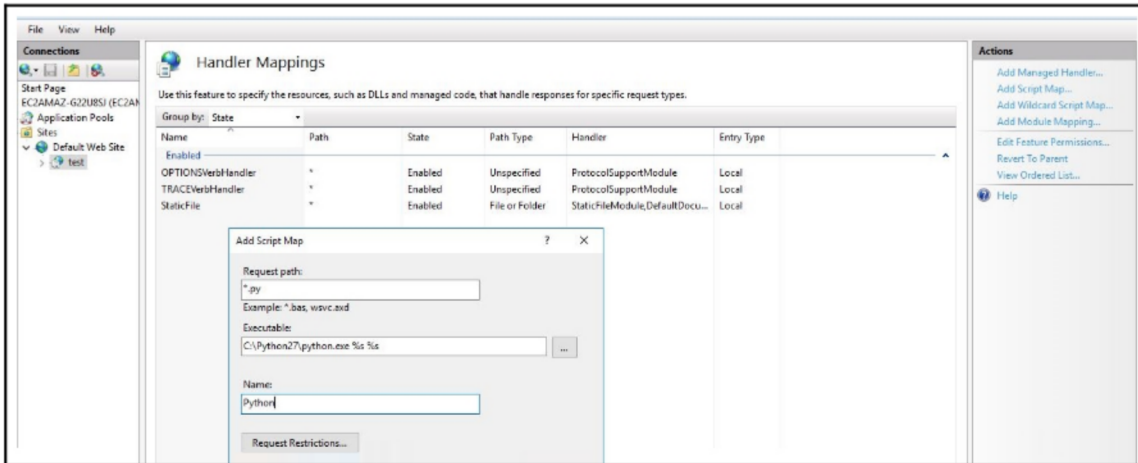
```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)]
on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/a1/checkbyod.py =====
Validating IP 192.168.255.249
Device has No Ethernet only Interface(s) : True
Device is of vendor Cisco: True
Device 192.168.255.249 has passed all validations and eligible for BYOD

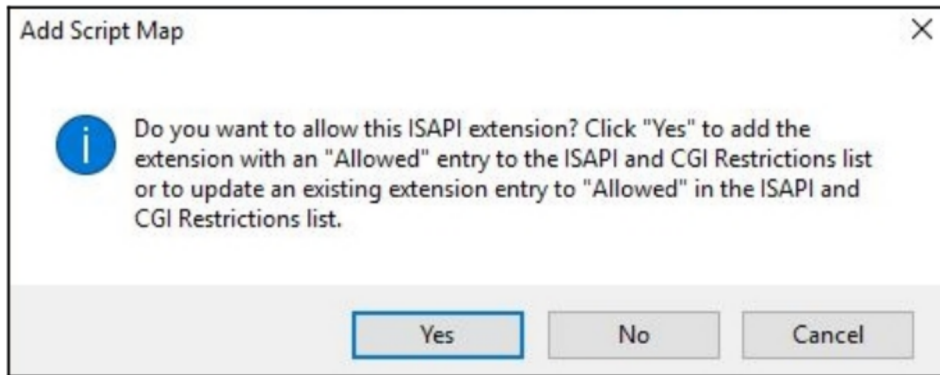
Validating IP 192.168.255.248
Device has No Ethernet only Interface(s) : False
Device is of vendor Cisco: True
Device 192.168.255.248 has failed validations and NOT eligible for BYOD

>>>
```

Chapter 4: Web Framework for Automation Triggers







Handler Mappings

Use this feature to specify the resources, such as DLLs and managed code, that handle responses for specific request types.

Group by: State

Name	Path	State	Path Type	Handler
SimpleHandlerFactory-ISAPI-2.0...	*.ashx	Enabled	Unspecified	IsapiModule
SimpleHandlerFactory-ISAPI-2.0	*.ashx	Enabled	Unspecified	IsapiModule
SimpleHandlerFactory-Integra...	*.ashx	Enabled	Unspecified	System.Web.UI.Sir...
SecurityCertificate	*.cer	Enabled	File	IsapiModule
Python	*.py	Enabled	Unspecified	CgiModule
PageHandlerFactory-ISAPI-2.0...	*.aspx	Enabled	Unspecified	IsapiModule
PageHandlerFactory-ISAPI-2.0	*.aspx	Enabled	Unspecified	IsapiModule
PageHandlerFactory-Integrated	*.aspx	Enabled	Unspecified	System.Web.UI.PageHandlerF...
OPTIONSVerbHandler	*	Enabled	Unspecified	ProtocolSupportModule

Edit Feature Permissions

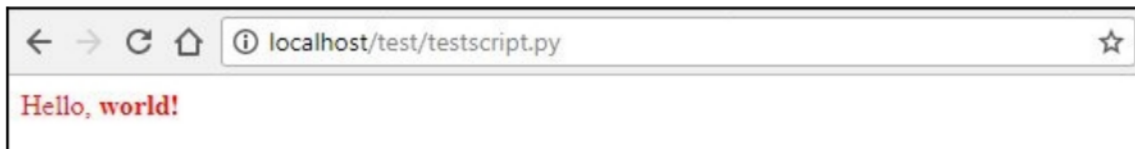
Permissions:

- Read
- Script
- Execute

OK Cancel

Actions

- Add Managed Handler...
- Add Script Map...
- Add Wildcard Script Map...
- Add Module Mapping...
- Edit...
- Rename
- Remove**
- Edit Feature Permissions...
- Revert To Parent
- View Ordered List...
- Help
- Online Help



← → ↻ 🏠 ⓘ localhost/test/testscript.py

Table for 5

5	* 1	=	5
5	* 2	=	10
5	* 3	=	15
5	* 4	=	20
5	* 5	=	25
5	* 6	=	30
5	* 7	=	35
5	* 8	=	40
5	* 9	=	45
5	* 10	=	50

← → ↻ 🏠 ⓘ localhost/test/testscript.py?number=8

Table for 8

8	* 1	=	8
8	* 2	=	16
8	* 3	=	24
8	* 4	=	32
8	* 5	=	40
8	* 6	=	48
8	* 7	=	56
8	* 8	=	64
8	* 9	=	72
8	* 10	=	80

localhost/test/testhtml.html

Enter your name:

Enter your number:

localhost/test/testscript.py?name=python+user&number=10

Hello python user

Your requested output is below:

10	* 1	=	10
10	* 2	=	20
10	* 3	=	30
10	* 4	=	40
10	* 5	=	50
10	* 6	=	60
10	* 7	=	70
10	* 8	=	80
10	* 9	=	90
10	* 10	=	100

← → ↻ 🏠 ⓘ localhost/test/getdeviceoutput.html

Enter device IP address:

Enter command:

← → ↻ 🏠 ⓘ localhost/test/getweboutput.py?ipaddress=192.168.255.249&cmd=show+clock

Device queried for 192.168.255.249

Command: show clock

Output:
*00:25:16.767 UTC Fri Mar 1 2002

← → ↻ 🏠 ⓘ localhost/test/getdeviceoutput.html

Enter device IP address:

Enter command:

```
localhost/test/getweboutput.py?ipaddress=192.168.255.249&cmd=show+version

Device queried for 192.168.255.249

Command: show version

Output:
Cisco IOS Software, 3700 Software (C3745-ADVENTERPRISEK9-M), Version 12.4(15)T14, RELEASE SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2010 by Cisco Systems, Inc.
Compiled Tue 17-Aug-10 12:55 by prod_rel_team

ROM: ROMMON Emulation Microcode
ROM: 3700 Software (C3745-ADVENTERPRISEK9-M), Version 12.4(15)T14, RELEASE SOFTWARE (fc2)

testrouter uptime is 26 minutes
System returned to ROM by unknown reload cause - suspect boot_data[BOOT_COUNT] 0x0, BOOT_COUNT 0, BOOTDATA 19
System image file is "tftp://255.255.255.255/unknown"

This product contains cryptographic features and is subject to United States and local country laws governing import, export, transfer and use. Delivery of Cisco cryptographic products does not imply third-party authority to import, export, distribute or use encryption. Importers, exporters, distributors and users are responsible for compliance with U.S. and local country laws. By using this product you agree to comply with applicable laws and regulations. If you are unable to comply with U.S. and local laws, return this product immediately.

A summary of U.S. laws governing Cisco cryptographic products may be found at:
http://www.cisco.com/wwl/export/crypto/tool/stqrg.html

If you require further assistance please contact us by sending email to
export@cisco.com.

Cisco 3745 (R7000) processor (revision 2.0) with 245760K/16384K bytes of memory.
Processor board ID FTX0945W0MY
R7000 CPU at 350MHz, Implementation 39, Rev 2.1, 256KB L2, 512KB L3 Cache
3 FastEthernet interfaces
1 Serial(sync/async) interface
DRAM configuration is 64 bits wide with parity enabled.
151K bytes of NVRAM.
524288K bytes of ATA System CompactFlash (Read/Write)

Configuration register is 0x2102
```

localhost/test/checksnmp.py

IP address	Model
192.168.255.248	3600 Software (C3660-A3JK9S-M)
192.168.255.249	3700 Software (C3745-ADVENTERPRISEK9-M)

localhost/test/showversion.py?ipaddress=192.168.255.249

Device queried for 192.168.255.249

Output:

Cisco IOS Software, 3700 Software (C3745-ADVENTERPRISEK9-M), Version 12.4(15)T14, RELEASE SOFTWARE (fc2)
Technical Support: <http://www.cisco.com/techsupport>
Copyright (c) 1986-2010 by Cisco Systems, Inc.
Compiled Tue 17-Aug-10 12:55 by prod_rel_team

ROM: ROMMON Emulation Microcode
ROM: 3700 Software (C3745-ADVENTERPRISEK9-M), Version 12.4(15)T14, RELEASE SOFTWARE (fc2)

testrouter uptime is 34 minutes
System returned to ROM by unknown reload cause - suspect boot_data[BOOT_COUNT] 0x0, BOOT_COUNT 0, BOOTDATA 19
System image file is "tftp://255.255.255.255/unknown"

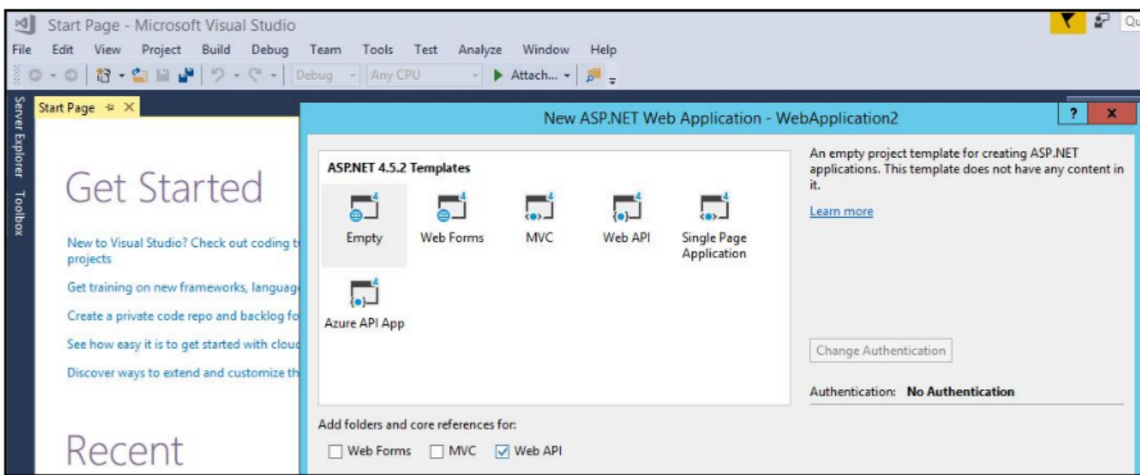
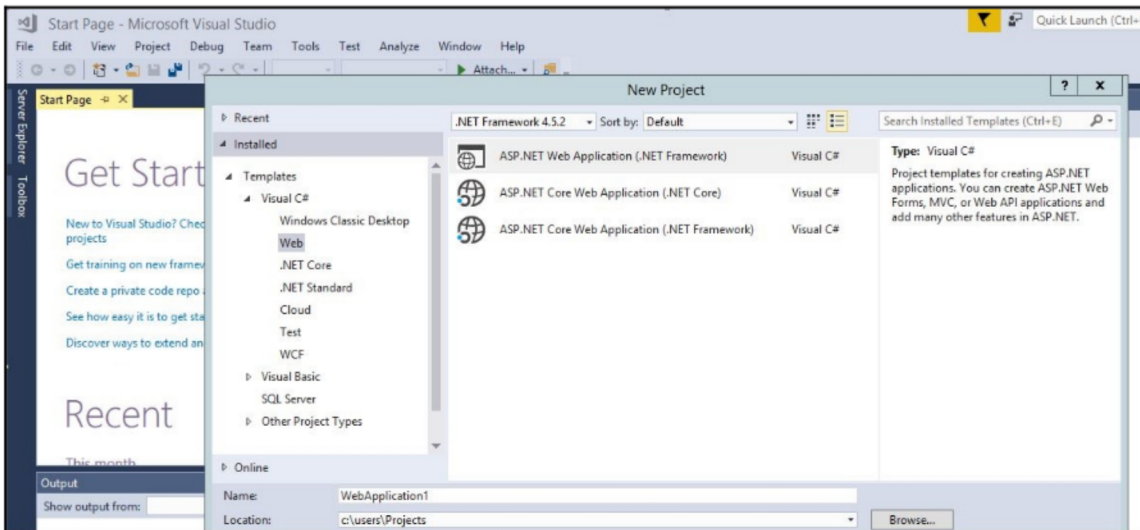
This product contains cryptographic features and is subject to United States and local country laws governing import, export, transfer and use. Delivery of Cisco cryptographic products does not imply third-party authority to import, export, distribute or use encryption. Importers, exporters, distributors and users are responsible for compliance with U.S. and local country laws. By using this product you agree to comply with applicable laws and regulations. If you are unable to comply with U.S. and local laws, return this product immediately.

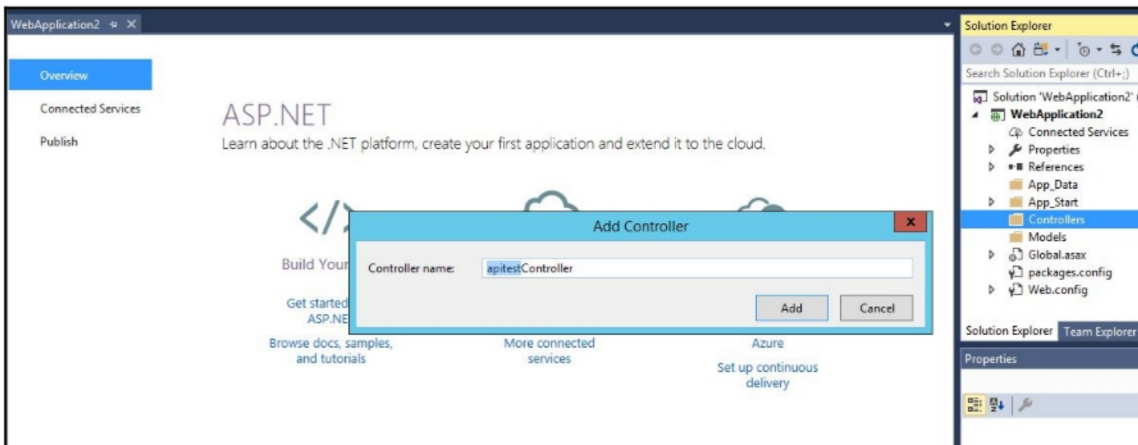
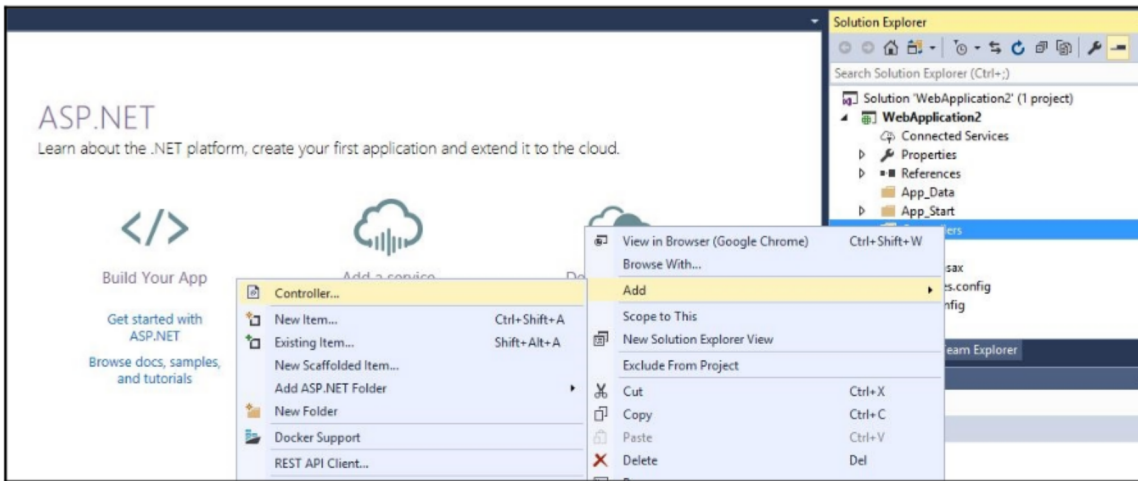
A summary of U.S. laws governing Cisco cryptographic products may be found at:
<http://www.cisco.com/wwl/export/crypto/tool/stqrg.html>

If you require further assistance please contact us by sending email to export@cisco.com.

Cisco 3745 (R7000) processor (revision 2.0) with 245760K/16384K bytes of memory.
Processor board ID FTX0945W0MY
R7000 CPU at 350MHz, Implementation 39, Rev 2.1, 256KB L2, 512KB L3 Cache
3 FastEthernet interfaces
1 Serial(sync/async) interface
DRAM configuration is 64 bits wide with parity enabled.
151K bytes of NVRAM.
524288K bytes of ATA System CompactFlash (Read/Write)

Configuration register is 0x2102





```

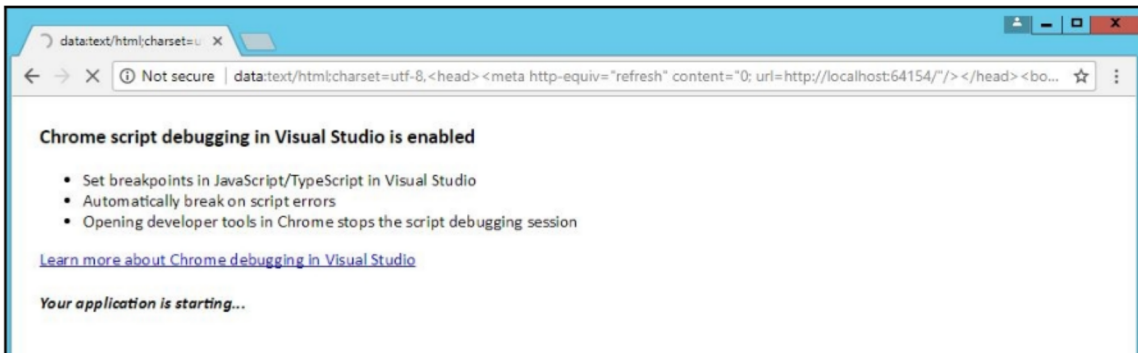
1 using System;
2 using System.Collections.Generic;
3 using System.Linq;
4 using System.Net.Http.Formatting;
5 using System.Web.Http;
6
7 namespace WebApplication2
8 {
9     public static class WebApiConfig
10    {
11        public static void Register(HttpConfiguration config)
12        {
13            // Web API configuration and services
14
15            // Web API routes
16            config.MapHttpAttributeRoutes();
17            config.Formatters.Clear();
18            config.Formatters.Add(new JsonMediaTypeFormatter());
19
20            config.Routes.MapHttpRoute(
21                name: "DefaultApi",
22                routeTemplate: "api/{controller}/{id}",
23                defaults: new { id = RouteParameter.Optional }
24            );
25        }
26    }
27 }

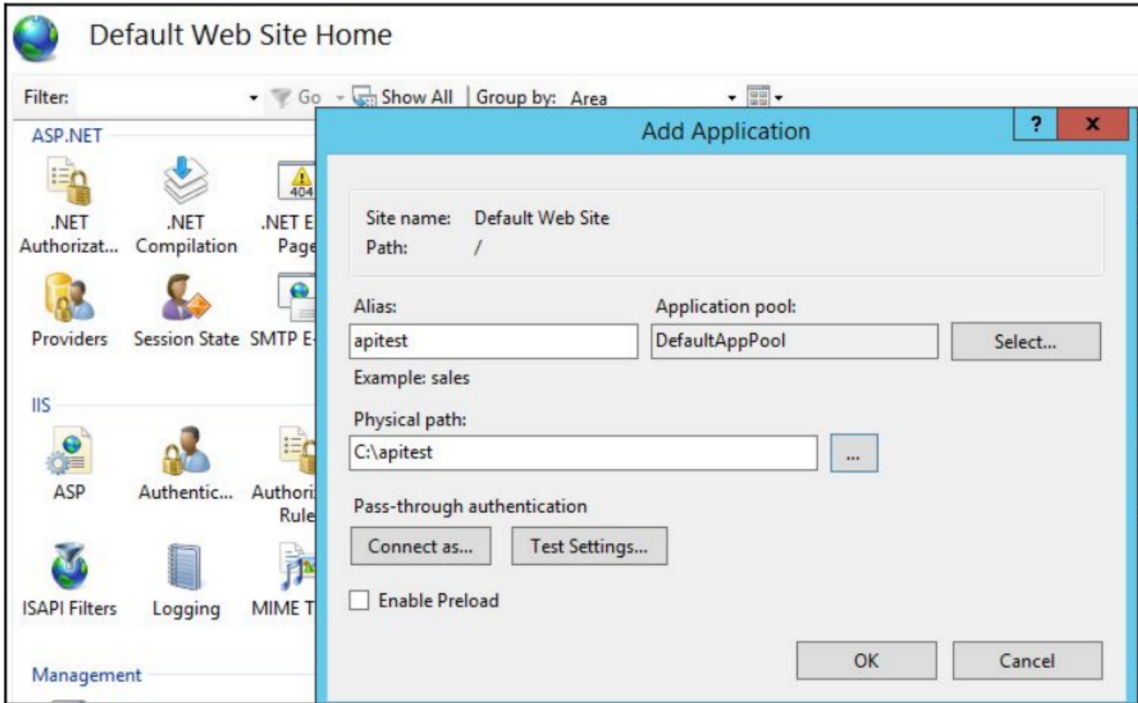
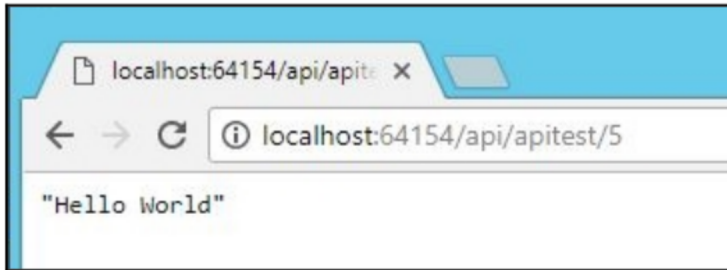
```

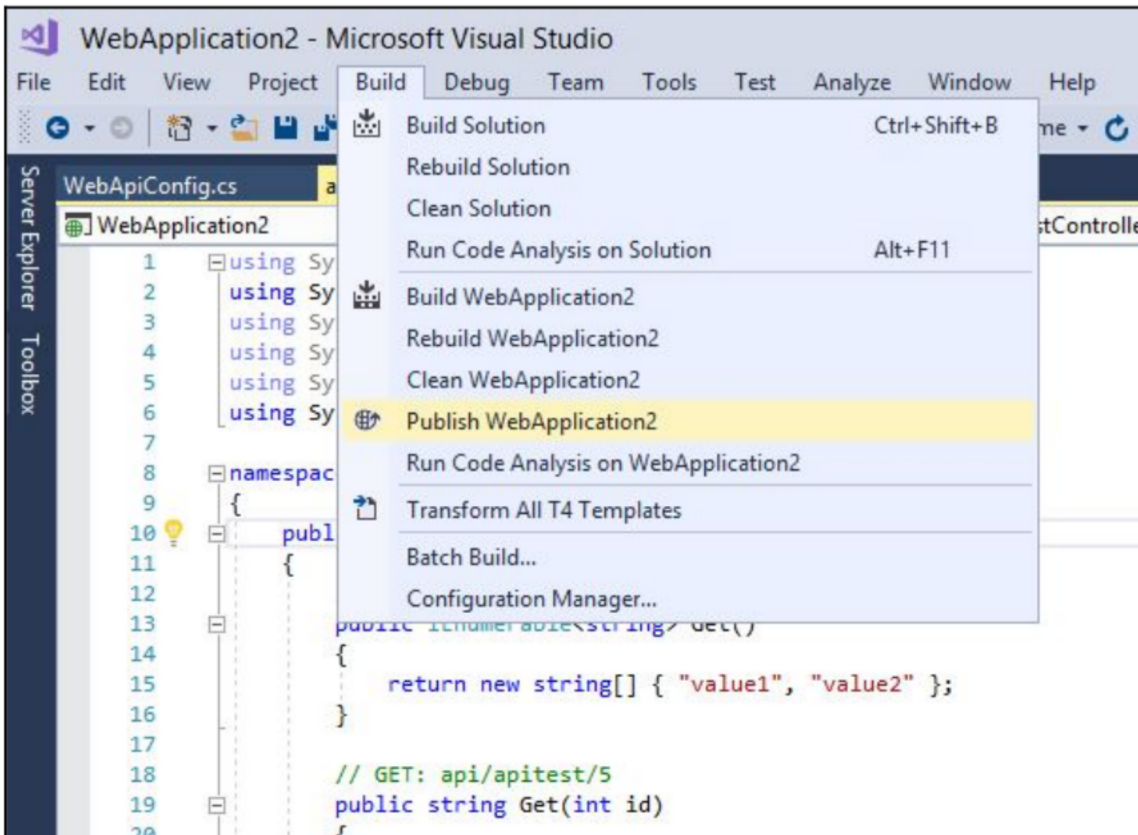
```

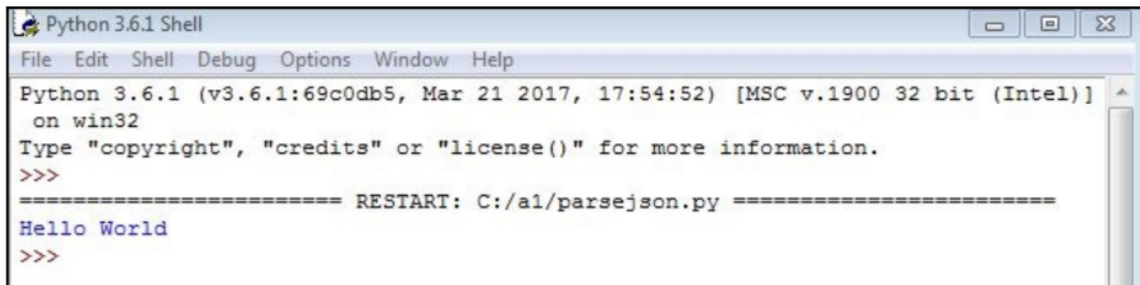
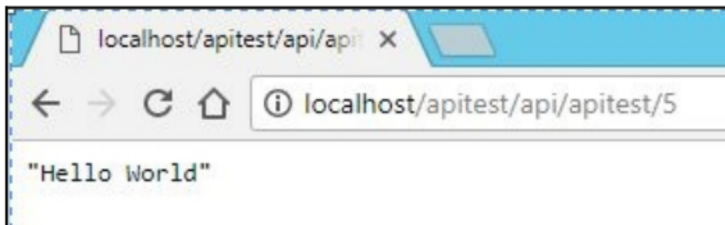
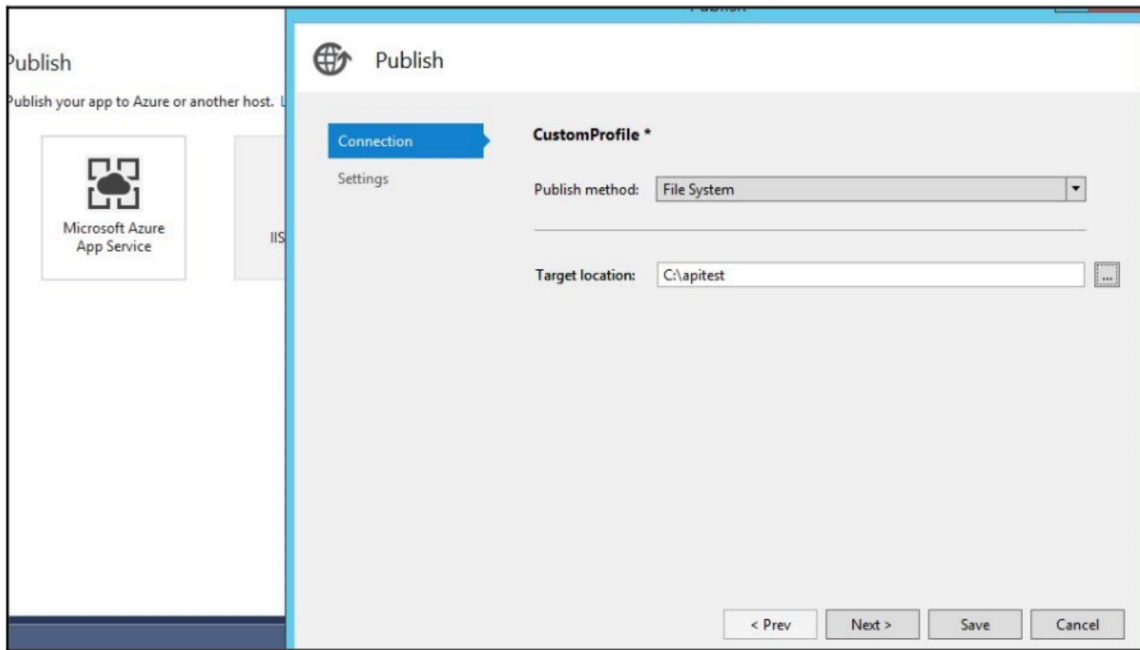
1 using System;
2 using System.Collections.Generic;
3 using System.Linq;
4 using System.Net;
5 using System.Net.Http;
6 using System.Web.Http;
7
8 namespace WebApplication2.Controllers
9 {
10    public class apitestController : ApiController
11    {
12        // GET: api/apitest
13        public IEnumerable<string> Get()
14        {
15            return new string[] { "value1", "value2" };
16        }
17
18        // GET: api/apitest/5
19        public string Get(int id)
20        {
21            return "Hello World";
22        }
23
24        // POST: api/apitest
25        public void Post([FromBody]string value)
26        {
27        }
28    }
29 }

```









```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)]
on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:\a1\parsejson.py =====
{'message': 'Hello there, wayfaring stranger. If you're reading this then you probably didn't see our blog post a couple of years back announcing that this API would go away: http://git.io/17ARog Fear not, you should be able to get what you need from the shiny new Events API instead.', 'documentation_url': 'https://developer.github.com/v3/activity/events/#list-public-events'}

Now printing value of message


Hello there, wayfaring stranger. If you're reading this then you probably didn't see our blog post a couple of years back announcing that this API would go away : http://git.io/17ARog Fear not, you should be able to get what you need from the shiny new Events API instead.

>>>
```

Authentication

Group by: No Grouping

Name	Status	Response Type
Anonymous Authentication	Disabled	
ASP.NET Impersonation	Disabled	
Basic Authentication	Enabled	HTTP 401 Challenge
Forms Authentication	Disabled	HTTP 302 Login/Redirect
Windows Authentication	Disabled	HTTP 401 Challenge

Alerts
 SSL is not enabled for this site and credentials will be sent in clear text over the wire.

Actions
[Disable](#)
[Edit...](#)
[Help](#)

```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900
on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:\a1\parsejson.py =====
<Response [401]>
>>>
```

```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900
on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:\a1\parsejson.py =====
<Response [200]>
Hello World
>>>
```

← → ↻ 🏠 ⓘ localhost/test/main.html

Enter your name:

Enter your password:

← → ↻ 🏠 ⓘ localhost/test/validatecreds.py

Hello wronguser

Not Authorized. Try again!!!!

← → ↻ 🏠 ⓘ localhost/test/main.html

Enter your name:

Enter your password:

← → ↻ 🏠 ⓘ localhost/test/validatecreds.py

Hello Abhishek

Authorized. Please select from list below:

- 192.168.255.248
- 192.168.255.249

← → ↻ 🏠 ⓘ localhost/test/validatecreds.py

Hello Abhishek

Authorized. Please select from list below:

192.168.255.248

192.168.255.249

Select IPAddress

← → ↻ 🏠 ⓘ localhost/test/showoutput.py

Device queried for 192.168.255.249

Output:

Interface	IP-Address	OK?	Method	Status	Protocol
FastEthernet0/0	192.168.255.249	YES	NVRAM	up	up
Serial0/0	unassigned	YES	NVRAM	administratively down	down
FastEthernet0/1	unassigned	YES	NVRAM	administratively down	down
FastEthernet1/0	unassigned	YES	NVRAM	administratively down	down

Chapter 5: Ansible for Network Automation

```
abhishek@ubuntutest: ~  
abhishek@ubuntutest:~$ sudo apt-get install ansible  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
ansible is already the newest version (2.4.0.0-1ppa~xenial).  
0 upgraded, 0 newly installed, 0 to remove and 67 not upgraded.  
abhishek@ubuntutest:~$
```

```
abhishek@ubuntutest: /etc/ansible  
abhishek@ubuntutest:/etc/ansible$ ls -l  
total 32  
-rw-r--r-- 1 root root 19366 Sep 19 17:10 ansible.cfg  
drwxr-xr-x 2 root root 4096 Oct 4 12:59 group_vars  
-rw-r--r-- 1 root root 1131 Oct 12 04:22 hosts  
drwxr-xr-x 2 root root 4096 Sep 19 22:42 roles  
abhishek@ubuntutest:/etc/ansible$
```



```
abhishek@ubuntutest:/etc/ansible$ more /etc/ansible/hosts
# This is the default ansible 'hosts' file.
#
# It should live in /etc/ansible/hosts
#
# - Comments begin with the '#' character
# - Blank lines are ignored
# - Groups of hosts are delimited by [header] elements
# - You can enter hostnames or ip addresses
# - A hostname/ip can be a member of multiple groups
#
# Ex 1: Ungrouped hosts, specify before any group headers.
## green.example.com
## blue.example.com
## 192.168.100.1
## 192.168.100.10
## localhost

127.0.0.1 ansible_connection=ssh ansible_user=abhishek ansible_ssh_pass=abhishek
# Ex 2: A collection of hosts belonging to the 'webservers' group
## [webservers]
## alpha.example.org
## beta.example.org
## 192.168.1.100
## 192.168.1.110
# If you have multiple hosts following a pattern you can specify
# them like this:
## www[001:006].example.com
# Ex 3: A collection of database servers in the 'dbservers' group
## [dbservers]
##
## db01.intranet.mydomain.net
## db02.intranet.mydomain.net
## 10.25.1.56
## 10.25.1.57
# Here's another example of host ranges, this time there are no
# leading 0s:
## db-[99:101]-node.example.com
abhishek@ubuntutest:/etc/ansible$
```

```
abhishek@ubuntutest: /etc/ansible ✖
abhishek@ubuntutest:/etc/ansible$ ansible all -m ping
127.0.0.1 | SUCCESS => {
  "changed": false,
  "failed": false,
  "ping": "pong"
}
abhishek@ubuntutest:/etc/ansible$
abhishek@ubuntutest:/etc/ansible$
abhishek@ubuntutest:/etc/ansible$ ansible all -m ping --ask-pass
SSH password:
127.0.0.1 | SUCCESS => {
  "changed": false,
  "failed": false,
  "ping": "pong"
}
abhishek@ubuntutest:/etc/ansible$
```

```
abhishek@ubuntutest: /etc/ansible ✖
GNU nano 2.5.3 File: /etc/ansible/hosts
# This is the default ansible 'hosts' file.
#
# It should live in /etc/ansible/hosts
#
# - Comments begin with the '#' character
# - Blank lines are ignored
# - Groups of hosts are delimited by [header] elements
# - You can enter hostnames or ip addresses
# - A hostname/ip can be a member of multiple groups
#
# Ex 1: Ungrouped hosts, specify before any group headers.
## green.example.com
## blue.example.com
## 192.168.100.1
## 192.168.100.10
## localhost
127.0.0.1 ansible_connection=ssh ansible_user=abhishek ansible_ssh_pass=abhishek
4.2.2.2
#
# Ex 2: A collection of hosts belonging to the 'webservers' group
## [webservers]
## alpha.example.org
## beta.example.org
## 192.168.1.100
## 192.168.1.110
#
# If you have multiple hosts following a pattern you can specify
# them like this:
## www[001:006].example.com
#
# Ex 3: A collection of database servers in the 'dbservers' group
## [dbservers]
##
## db01.intranet.mydomain.net
## db02.intranet.mydomain.net
## 10.25.1.56
## 10.25.1.57
#
# Here's another example of host ranges, this time there are no
# leading 0s:
## db-[99:101]-node.example.com
```

```
abhishek@ubuntutest:/etc/ansible$ sudo nano /etc/ansible/hosts
abhishek@ubuntutest:/etc/ansible$ ansible all -m ping
127.0.0.1 | SUCCESS => {
  "changed": false,
  "failed": false,
  "ping": "pong"
}
4.2.2.2 | UNREACHABLE! => {
  "changed": false,
  "msg": "Failed to connect to the host via ssh: ssh: connect to host 4.2.2.2 port 22: Connection timed out\r\n",
  "unreachable": true
}
abhishek@ubuntutest:/etc/ansible$ ping 4.2.2.2
PING 4.2.2.2 (4.2.2.2) 56(84) bytes of data:
64 bytes from 4.2.2.2: icmp_seq=1 ttl=48 time=10.6 ms
64 bytes from 4.2.2.2: icmp_seq=2 ttl=48 time=10.6 ms
64 bytes from 4.2.2.2: icmp_seq=3 ttl=48 time=10.6 ms
64 bytes from 4.2.2.2: icmp_seq=4 ttl=48 time=10.6 ms
64 bytes from 4.2.2.2: icmp_seq=5 ttl=48 time=10.6 ms
^C
--- 4.2.2.2 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4007ms
rtt min/avg/max/mdev = 10.603/10.630/10.656/0.094 ms
abhishek@ubuntutest:/etc/ansible$
```

```
abhishek@ubuntutest: ~
# This is the default ansible 'hosts' file.
#
# It should live in /etc/ansible/hosts
#
# - Comments begin with the '#' character
# - Blank lines are ignored
# - Groups of hosts are delimited by [header] elements
# - You can enter hostnames or ip addresses
# - A hostname/ip can be a member of multiple groups
#
# Ex 1: Ungrouped hosts, specify before any group headers.
## green.example.com
## blue.example.com
## 192.168.100.1
## 192.168.100.10
##localhost

[myrouters]
127.0.0.1 ansible_connection=ssh ansible_user=abhishek ansible_ssh_pass=abhishek
4.2.2.2

# Ex 2: A collection of hosts belonging to the 'webservers' group
## [webservers]
## alpha.example.org
## beta.example.org
## 192.168.1.100
## 192.168.1.110

# If you have multiple hosts following a pattern you can specify
# them like this:
--More--(71%)
```

```
abhishek@ubuntutest: ~  
abhishek@ubuntutest:~$ ansible myrouters -m ping  
127.0.0.1 | SUCCESS => {  
  "changed": false,  
  "failed": false,  
  "ping": "pong"  
}  
4.2.2.2 | UNREACHABLE! => {  
  "changed": false,  
  "msg": "Failed to connect to the host via ssh: ssh: connect to host 4.2.2.2 port 22: Connection timed out\r\n",  
  "unreachable": true  
}  
abhishek@ubuntutest:~$
```

```
abhishek@ubuntutest: ~  
abhishek@ubuntutest:~$ ansible  
Usage: ansible <host-pattern> [options]  
  
Define and run a single task 'playbook' against a set of hosts  
  
Options:  
-a MODULE_ARGS, --args=MODULE_ARGS      module arguments  
--ask-vault-pass                          ask for vault password  
-B SECONDS, --background=SECONDS        run asynchronously, failing after X seconds  
                                           (default=N/A)  
-C, --check                               don't make any changes; instead, try to predict some  
                                           of the changes that may occur  
-D, --diff                               when changing (small) files and templates, show the  
                                           differences in those files; works great with --check  
-e EXTRA_VARS, --extra-vars=EXTRA_VARS  set additional variables as key=value or YAML/JSON, if  
                                           filename prepend with @  
-f FORKS, --forks=FORKS                 specify number of parallel processes to use  
                                           (default=5)  
-h, --help                               show this help message and exit  
-i INVENTORY, --inventory=INVENTORY, --inventory-file=INVENTORY  specify inventory host path  
                                           (default=[u'/etc/ansible/hosts']) or comma separated  
                                           host list. --inventory-file is deprecated  
-l SUBSET, --limit=SUBSET                further limit selected hosts to an additional pattern  
--list-hosts                             outputs a list of matching hosts; does not execute  
                                           anything else  
-m MODULE_NAME, --module-name=MODULE_NAME  module name to execute (default=command)  
-M MODULE_PATH, --module-path=MODULE_PATH  prepend colon-separated path(s) to module library  
                                           (default=[u'/home/abhishek/.ansible/plugins/modules',  
                                           u'/usr/share/ansible/plugins/modules'])  
--new-vault-id=NEW_VAULT_ID              the new vault identity to use for rekey  
--new-vault-password-file=NEW_VAULT_PASSWORD_FILE  new vault password file for rekey  
-o, --one-line                            condense output  
-P POLL_INTERVAL, --poll=POLL_INTERVAL  set the poll interval if using -B (default=15)  
--syntax-check                            perform a syntax check on the playbook, but do not  
                                           execute it  
-t TREE, --tree=TREE                     log output to this directory
```

```
abhishek@ubuntutest: ~  
abhishek@ubuntutest:~$ ansible localhost -m setup |more  
127.0.0.1 | SUCCESS => {  
  "ansible_facts": {  
    "ansible_all_ipv4_addresses": [  
      "172.31.33.197"  
    ],  
    "ansible_all_ipv6_addresses": [  
      "fe80::8a8:51ff:fe0b:6f06"  
    ],  
    "ansible_apparmor": {  
      "status": "enabled"  
    },  
    "ansible_architecture": "x86_64",  
    "ansible_bios_date": "02/16/2017",  
    "ansible_bios_version": "4.2.amazon",  
    "ansible_cmdline": {  
      "BOOT_IMAGE": "/boot/vmlinuz-4.4.0-1035-aws",  
      "console": "ttyS0",  
      "ro": true,  
      "root": "UUID=3e13556e-d28d-407b-bcc6-97160eafebe1"  
    },  
    "ansible_date_time": {  
      "date": "2017-10-10",  
      "day": "10",  
      "epoch": "1507611083",  
      "hour": "04",  
      "iso8601": "2017-10-10T04:51:23Z",  
      "iso8601_basic": "20171010T045123181202",  
      "iso8601_basic_short": "20171010T045123",  
      "iso8601_micro": "2017-10-10T04:51:23.181276z",  
      "minute": "51",  
      "month": "10",  
      "second": "23",  
      "time": "04:51:23",  
      "tz": "UTC",  
      "tz_offset": "+0000",  
      "weekday": "Tuesday",  
      "weekday_number": "2",  
      "weeknumber": "41",  
      "year": "2017"  
    },  
    "ansible_default_ipv4": {  
      "address": "172.31.33.197",  
      "alias": "eth0",  
      "broadcast": "172.31.47.255",  
      "gateway": "172.31.32.1",  
      "interface": "eth0",  
      "macaddress": "0a:a8:51:0b:6f:06",  
      "mtu": 9001,  
      "netmask": "255.255.240.0",  
      "network": "172.31.32.0",  
      "type": "ether"  
    },  
    "ansible_default_ipv6": {},  
    "ansible_device_links": {  
      "ids": {},  
      "labels": {  
        "xvda1": [  
          "cloudimg-rootfs"  
        ]  
      }  
    }  
  }  
}
```

```
abhishek@ubuntutest: ~  
abhishek@ubuntutest:~$ ansible-playbook checkme.yml  
PLAY [myrouters] *****  
TASK [Gathering Facts] *****  
ok: [127.0.0.1]  
TASK [test connection] *****  
ok: [127.0.0.1]  
PLAY RECAP *****  
127.0.0.1 : ok=2 changed=0 unreachable=0 failed=0  
abhishek@ubuntutest:~$
```

```
abhishek@ubuntutest: ~  
abhishek@ubuntutest:~$ ansible-playbook showenv.yml  
PLAY [myrouters] *****  
TASK [Gathering Facts] *****  
ok: [127.0.0.1]  
fatal: [4.2.2.2]: UNREACHABLE! => {"changed": false, "msg": "Failed to connect to the host via ssh: ssh: connect to host 4  
TASK [show environment variables] *****  
changed: [127.0.0.1]  
RUNNING HANDLER [show variables] *****  
changed: [127.0.0.1]  
to retry, use: --limit @/home/abhishek/showenv.retry  
PLAY RECAP *****  
127.0.0.1 : ok=3 changed=2 unreachable=0 failed=0  
4.2.2.2 : ok=0 changed=0 unreachable=1 failed=0  
abhishek@ubuntutest:~$
```

```
abhishek@ubuntutest: ~  
abhishek@ubuntutest:~$ ansible-playbook showenv.yml -v  
using /etc/ansible/ansible.cfg as config file  
PLAY [myrouters] *****  
TASK [Gathering Facts] *****  
ok: [127.0.0.1]  
fatal: [4.2.2.2]: UNREACHABLE! => {"changed": false, "msg": "Failed to connect to the host via ssh: ssh: connect to host 4.2.2.2 port 22: connection timed out\r\n"},  
TASK [show environment variables] *****  
changed: [127.0.0.1] => {"changed": true, "cmd": ["echo", "this task will show all environment variables"], "delta": "0:00:00.001743", "end": "2017-10-11 04:12:10.20  
3", "stderr": "", "stderr_lines": [], "stdout": "this task will show all environment variables", "stdout_lines": ["this task will show all environment variables"]}  
RUNNING HANDLER [show variables] *****  
changed: [127.0.0.1] => {"changed": true, "cmd": "uptime", "delta": "0:00:00.002799", "end": "2017-10-11 04:12:10.392302", "failed": false, "rc": 0, "start": "2017-1  
04:12:10 up 2 days, 43 min, 2 users, load average: 0.00, 0.00, 0.00", "stdout_lines": [" 04:12:10 up 2 days, 43 min, 2 users, load average: 0.00, 0.00, 0.00"]}  
to retry, use: --limit @/home/abhishek/showenv.retry  
PLAY RECAP *****  
127.0.0.1 : ok=3 changed=2 unreachable=0 failed=0  
4.2.2.2 : ok=0 changed=0 unreachable=1 failed=0  
abhishek@ubuntutest:~$
```

```
abhishek@ubuntutest: ~  
abhishek@ubuntutest:~$ ansible-playbook showsysname.yml  
PLAY [myrouters] *****  
TASK [Gathering Facts] *****  
ok: [127.0.0.1]  
TASK [debug] *****  
ok: [127.0.0.1] => {  
  "msg": "system 127.0.0.1 has hostname as ubuntutest"  
}  
PLAY RECAP *****  
127.0.0.1 : ok=2 changed=0 unreachable=0 failed=0  
abhishek@ubuntutest:~$
```

```
abhishek@ubuntutest: ~  
abhishek@ubuntutest:~$ ansible-playbook gethosts.yml --extra-vars "hosts=myrouters user=Abhishek"  
[WARNING]: Found variable using reserved name: hosts  
PLAY [myrouters] *****  
TASK [Gathering Facts] *****  
ok: [127.0.0.1]  
TASK [debug] *****  
ok: [127.0.0.1] => {  
  "msg": "Hello Abhishek, system 127.0.0.1 has hostname as ubuntutest"  
}  
PLAY RECAP *****  
127.0.0.1 : ok=2 changed=0 unreachable=0 failed=0  
abhishek@ubuntutest:~$
```

```
abhishek@ubuntutest: ~  
abhishek@ubuntutest:~$ ansible-playbook checkif.yml --extra-vars "clock=clock123"  
PLAY [myrouters] *****  
TASK [Gathering Facts] *****  
ok: [127.0.0.1]  
TASK [command] *****  
changed: [127.0.0.1]  
TASK [debug] *****  
skipping: [127.0.0.1]  
TASK [debug] *****  
ok: [127.0.0.1] => {  
  "msg": "This is NOT a clock condition"  
}  
PLAY RECAP *****  
127.0.0.1 : ok=3  changed=1  unreachable=0  failed=0  
abhishek@ubuntutest:~$
```

```
abhishek@ubuntutest: ~  
abhishek@ubuntutest:~$ ansible-playbook checkif.yml --extra-vars "clock=clock"  
PLAY [myrouters] *****  
TASK [Gathering Facts] *****  
ok: [127.0.0.1]  
TASK [command] *****  
changed: [127.0.0.1]  
TASK [debug] *****  
ok: [127.0.0.1] => {  
  "msg": "This is clock condition"  
}  
TASK [debug] *****  
skipping: [127.0.0.1]  
PLAY RECAP *****  
127.0.0.1 : ok=3  changed=1  unreachable=0  failed=0  
abhishek@ubuntutest:~$
```



```
abhishek@ubuntutest: ~  
abhishek@ubuntutest:~$ ansible-playbook checkloop.yml  
PLAY [all] *****  
TASK [Gathering Facts] *****  
ok: [127.0.0.1]  
TASK [debug] *****  
ok: [127.0.0.1] => (item=0) => {  
  "item": 0,  
  "msg": "Server 0"  
}  
ok: [127.0.0.1] => (item=2) => {  
  "item": 2,  
  "msg": "Server 2"  
}  
ok: [127.0.0.1] => (item=4) => {  
  "item": 4,  
  "msg": "Server 4"  
}  
ok: [127.0.0.1] => (item=6) => {  
  "item": 6,  
  "msg": "Server 6"  
}  
ok: [127.0.0.1] => (item=8) => {  
  "item": 8,  
  "msg": "Server 8"  
}  
ok: [127.0.0.1] => (item=10) => {  
  "item": 10,  
  "msg": "Server 10"  
}  
PLAY RECAP *****  
127.0.0.1 : ok=2  changed=0  unreachable=0  failed=0  
abhishek@ubuntutest:~$
```

```
abhishek@ubuntutest: ~  
abhishek@ubuntutest:~$ python checkx.py  
PLAY [mypythoncheck] *****  
TASK [command] *****  
changed: [127.0.0.1]  
TASK [debug] *****  
ok: [127.0.0.1] => {  
  "msg": "ubuntutest"  
}  
abhishek@ubuntutest:~$
```

```
✓ abhishek@ubuntutest: ~/rtrconfig [x]
abhishek@ubuntutest:~/rtrconfig$ find . -type d
.
./roles
./roles/routers
./roles/routers/templates
./roles/routers/vars
./roles/routers/tasks
abhishek@ubuntutest:~/rtrconfig$
```

```
✓ abhishek@ubuntutest: ~/rtrconfig [x]
abhishek@ubuntutest:~/rtrconfig$ find .
.
./makeconfig.yml
./roles
./roles/routers
./roles/routers/templates
./roles/routers/templates/routers.j2
./roles/routers/vars
./roles/routers/vars/main.yml
./roles/routers/tasks
./roles/routers/tasks/main.yml
abhishek@ubuntutest:~/rtrconfig$
```

```
✓ abhishek@ubuntutest: ~/rtrconfig [x]
abhishek@ubuntutest:~/rtrconfig$ ansible-playbook makeconfig.yml
PLAY [Generate router configuration files] *****
TASK [Gathering Facts] *****
ok: [127.0.0.1]

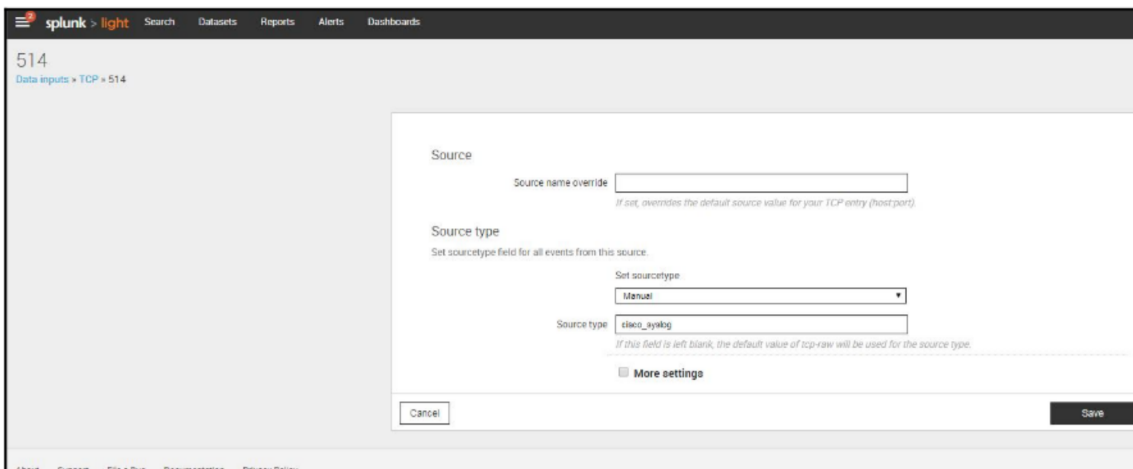
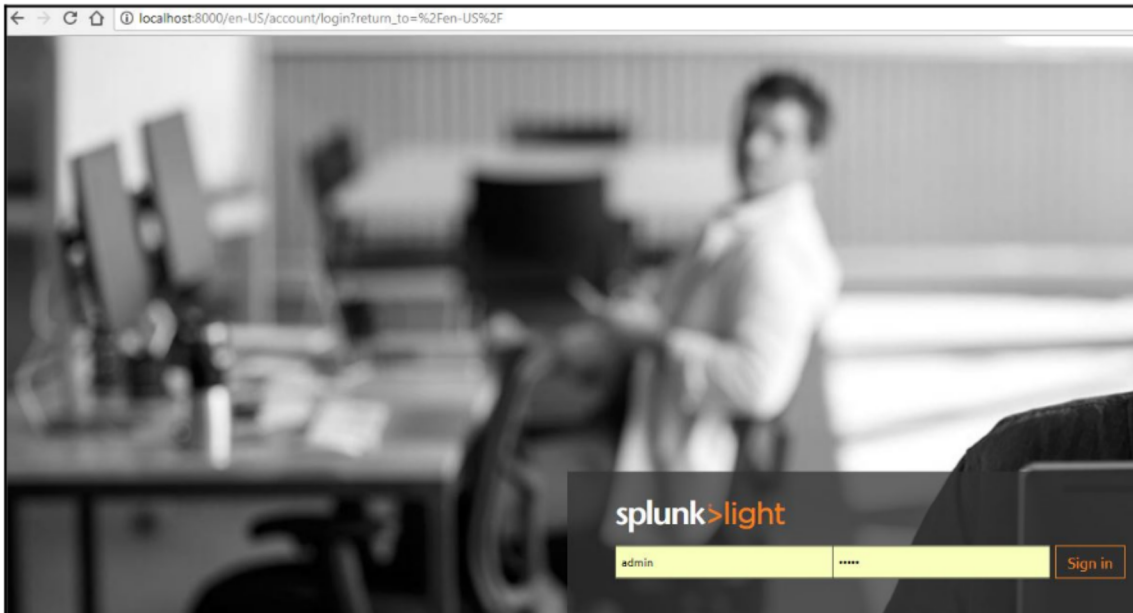
TASK [routers : Generate configuration files] *****
changed: [127.0.0.1] => (item={u'hostname': u'myrouter1'})
changed: [127.0.0.1] => (item={u'hostname': u'myrouter2'})

PLAY RECAP *****
127.0.0.1 : ok=2 changed=1 unreachable=0 failed=0
abhishek@ubuntutest:~/rtrconfig$
```

```
✓ abhishek@ubuntutest: ~ [x]
abhishek@ubuntutest:~$ ls -l my*.txt
-rw-r--r-- 1 abhishek root 250 Oct 24 04:36 myrouter1.txt
-rw-r--r-- 1 abhishek root 250 Oct 24 04:36 myrouter2.txt
abhishek@ubuntutest:~$
```

```
✓ abhishek@ubuntutest: ~ [x]
abhishek@ubuntutest:~$ more myrouter1.txt
no service pad
service tcp-keepalives-in
service tcp-keepalives-out
service password-encryption
username test password test
!
hostname myrouter1
logging server 10.10.10.10
!
logging buffered 32000
no logging console
!
ip domain-lookup enable
!
exit
abhishek@ubuntutest:~$
```

Chapter 6: Continuous Integration for Network Engineers




```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/a1/bgpconfigpush.py =====
config term
Enter configuration commands, one per line. End with CNTL/Z.
testrouter(config)#router bgp 200
testrouter(config-router)# neighbor 192.168.255.248 remote-as 200
testrouter(config-router)#end
testrouter#
Building configuration...
[OK]
Now sleeping for 5 seconds....
Remote IP 192.168.255.248 on local router 192.168.255.249 is in ESTABLISHED state
>>>
```

```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/a1/bgpconfigpush.py =====
config term
Enter configuration commands, one per line. End with CNTL/Z.
testrouter(config)#router bgp 200
testrouter(config-router)# neighbor 192.168.255.248 remote-as 400
testrouter(config-router)#end
testrouter#
Building configuration...
[OK]
Now sleeping for 5 seconds....
Remote IP 192.168.255.248 on local router 192.168.255.249 is NOT IN ESTABLISHED state
>>>
```

```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/a1/bgpipaddressiter.py =====
['Building configuration...', '']
['Current configuration : 1514 bytes']
['version 12.4']
['service timestamps debug datetime msec']
['service timestamps log datetime msec']
['no service password-encryption']
['hostname testrouter']
['boot-start-marker']
['boot-end-marker']
['no aaa new-model']
['no ip icmp rate-limit unreachable']
['ip cef']
['no ip domain lookup']
['ip domain name mycheck.com']
['multilink bundle-name authenticated']
['username test privilege 15 secret 5 $1$TmPCSDCmserSyR7AOyzMMDYPRp.']
['username cisco privilege 15 secret 5 $1$JOrL$9176BjgDfV1Y80AlhJILf1']
['username checkme password 0 checkme']
['archive', ' log config', ' hidekeys']
['ip tcp synwait-time 5']
['ip ssh version 2']
['interface FastEthernet0/0', ' description my test', ' ip address 192.168.255.249 255.255.255.0', ' duplex auto', ' speed auto']
['interface Serial0/0', ' no ip address', ' shutdown', ' clock rate 2000000']
['interface FastEthernet0/1', ' description this is checkme', ' no ip address', ' shutdown', ' duplex auto', ' speed auto']
['interface FastEthernet1/0', ' no ip address', ' shutdown', ' duplex auto', ' speed auto']
['router bgp 200', ' no synchronization', ' bgp log-neighbor-changes', ' neighbor 192.168.255.248 remote-as 200', ' no auto-summary']
['ip forward-protocol nd']
['no ip http server']
['no ip http secure-server']
['snmp-server community public RO']
['no cdp log mismatch duplex']
['control-plane']
['line con 0', ' exec-timeout 0 0', ' privilege level 15', ' logging synchronous']
['line aux 0', ' exec-timeout 0 0', ' privilege level 15', ' logging synchronous']
['line vty 0 4', ' exec-timeout 5 0', ' login local', ' transport input ssh']
['end']
>>>
```

```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/a1/bgpipconfig.py =====
Remote ip: 192.168.255.248
>>>
```

```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)] on
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/a1/bgpwhois.py =====
AS info for hostname :google.com
15169
GOOGLE - Google Inc., US
AS info for IP : 107.155.8.0
3356
LEVEL3 - Level 3 Communications, Inc., US
>>>
```

```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/a1/apvlanpush.py =====
config term
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#interface FastEthernet2/0
R3(config-if)#switchport mode trunk
R3(config-if)#switchport trunk encapsulation dot1q
R3(config-if)#switchport trunk native vlan 10
R3(config-if)#switchport trunk allowed vlan add 10,100,200
R3(config-if)#no shut
R3(config-if)#end
R3#
Name: Fa2/0
Switchport: Enabled
Administrative Mode: trunk
Operational Mode: down
Administrative Trunking Encapsulation: dot1q
Negotiation of Trunking: Disabled
Access Mode VLAN: 0 ((Inactive))
Trunking Native Mode VLAN: 10 ((Inactive))
Trunking VLANs Enabled: ALL
Trunking VLANs Active: none
Priority for untagged frames: 0
Override vlan tag priority: FALSE
Voice VLAN: none
Appliance trust: none
>>>
```



```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/a1/apvlanpush.py =====
config term
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#interface FastEthernet2/0
R3(config-if)#switchport mode trunk
R3(config-if)#switchport trunk encapsulation dot1q
R3(config-if)#switchport trunk native vlan 10
R3(config-if)#switchport trunk allowed vlan add 10,100,200
R3(config-if)#no shut
R3(config-if)#end
R3#

Validating switchport...FastEthernet2/0
Name: Fa2/0
Switchport: Enabled
Administrative Mode: trunk
Operational Mode: down
Administrative Trunking Encapsulation: dot1q
Negotiation of Trunking: Disabled
Access Mode VLAN: 0 ((Inactive))
Trunking Native Mode VLAN: 10 ((Inactive))
Trunking VLANs Enabled: ALL
Trunking VLANs Active: none
Priority for untagged frames: 0
Override vlan tag priority: FALSE
Voice VLAN: none
Appliance trust: none

Now changing native VLAN on switchport FastEthernet2/0
config term
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#interface FastEthernet2/0
R3(config-if)#switchport trunk native vlan 20
R3(config-if)#end
R3#
```

```
Validating switchport....FastEthernet2/0
Name: Fa2/0
Switchport: Enabled
Administrative Mode: trunk
Operational Mode: down
Administrative Trunking Encapsulation: dot1q
Negotiation of Trunking: Disabled
Access Mode VLAN: 0 ((Inactive))
Trunking Native Mode VLAN: 20 ((Inactive))
Trunking VLANs Enabled: ALL
Trunking VLANs Active: none
Priority for untagged frames: 0
Override vlan tag priority: FALSE
Voice VLAN: none
Appliance trust: none
>>>
```

```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/a1/ipphnetpush.py =====
config term
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#interface FastEthernet2/5
R3(config-if)#switchport mode access
R3(config-if)#switchport access vlan 100
R3(config-if)#switchport voice vlan 200
R3(config-if)#spanning-tree portfast
%Warning: portfast should only be enabled on ports connected to a single host.
Connecting hubs, concentrators, switches, bridges, etc.to this interface
when portfast is enabled, can cause temporary spanning tree loops.
Use with CAUTION

%Portfast has been configured on FastEthernet2/5 but will only
have effect when the interface is in a non-trunking mode.
R3(config-if)#no shut
R3(config-if)#end
R3#

Validating switchport....FastEthernet2/5
Name: Fa2/5
Switchport: Enabled
Administrative Mode: static access
Operational Mode: down
Administrative Trunking Encapsulation: dot1q
Negotiation of Trunking: Disabled
Access Mode VLAN: 100 (VLAN0100)
Trunking Native Mode VLAN: 1 (default)
Trunking VLANs Enabled: ALL
Trunking VLANs Active: none
Priority for untagged frames: 0
Override vlan tag priority: FALSE
Voice VLAN: 200
Appliance trust: none
>>>
```

```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/a1/checksolarwindsipam.py =====
My IPAM test:
{'results': [{'Status': 2, 'DisplayName': '10.15.10.2'}]}
Avaliable: 10.15.10.2
>>>
```

localhost/test/prepostch: x

localhost/test/prepostcheck.html

Pre/Post check selection

Host IP: (Multiple IPs seperated by comma)

Commands (Select):

- show version
- show ip int brief
- show interface description
- show clock
- show log (last 100)
- show run
- show ip bgp summary
- show ip route
- show ip route summary
- show ip ospf
- show interfaces status

Maintenance ID:

Pre/Post:

Precheck

Postcheck

localhost/test/prepostch x

localhost/test/prepostcheck.html

Pre/Post check selection

Host IP: (Multiple IPs seperated by comma)

Commands (Select):

- show version
- show ip int brief
- show interface description
- show clock
- show log (last 100)
- show run
- show ip bgp summary
- show ip route
- show ip route summary
- show ip ospf
- show interfaces status

Please fill out this field.

Maintenance ID:

Pre/Post:

Precheck

Postcheck

Submit

localhost/test/prepostch X

localhost/test/prepostcheck.html

Pre/Post check selection

Host IP: (Multiple IPs seperated by comma)

Commands (Select):

- show version
- show ip int brief
- show interface description
- show clock
- show log (last 100)
- show run
- show ip bgp summary
- show ip route
- show ip route summary
- show ip ospf
- show interfaces status

Maintainence ID:

Pre/Post:

Precheck

Postcheck

Please be Patient.... Gathering results!!!

localhost/test/checks.py x

localhost/test/checks.py

192.168.255.249:Success: [mybooktest1_192.168.255.249_pre_2017-10-30_10_53_47.txt](#) Created

Next step: [Click here to compare files](#)

Next step: [Click here to perform pre/post check](#)

localhost/test/checks.py x localhost/test/logs/mybc x

localhost/test/logs/mybooktest1_192.168.255.249_pre_2017-10-30_10_53_47.txt

```
ttestrouter#terminal length 0
ttestrouter#show version
Cisco IOS Software, 3700 Software (C3745-ADVENTERPRISEK9-M), Version 12.4(15)T14, RELEASE SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2010 by Cisco Systems, Inc.
Compiled Tue 17-Aug-10 12:55 by prod_rel_team

ROM: ROMMON Emulation Microcode
ROM: 3700 Software (C3745-ADVENTERPRISEK9-M), Version 12.4(15)T14, RELEASE SOFTWARE (fc2)

ttestrouter uptime is 17 minutes
System returned to ROM by unknown reload cause - suspect boot_data[BOOT_COUNT] 0x0, BOOT_COUNT 0, BOOTDATA 19
System image file is "tftp://255.255.255.255/unknown"

This product contains cryptographic features and is subject to United
States and local country laws governing import, export, transfer and
use. Delivery of Cisco cryptographic products does not imply
```

localhost/test/prepostch: X

localhost/test/prepostcheck.html

Pre/Post check selection

Host IP: (Multiple IPs seperated by comma)

192.168.255.249

Commands (Select):

- show version
- show ip int brief
- show interface description
- show clock
- show log (last 100)
- show run
- show ip bgp summary
- show ip route
- show ip route summary
- show ip ospf
- show interfaces status

Maintainence ID:

Pre/Post:

Precheck

Postcheck

Please be Patient.... Gathering results!!!

localhost/test/checks.py x

localhost/test/checks.py

192.168.255.249:Success: [mybooktest1_192.168.255.249_post_2017-10-30_11_01_46.txt](#) Created

Next step: [Click here to compare files](#)

Next step: [Click here to perform pre/post check](#)

localhost/test/selectfiles: x

localhost/test/selectfiles.aspx

Pre check files (Sorted by Last Modified Date)

- mybooktest1_192.168.255.249_pre_2017.10.30_10_53_17.txt (10/30/2017 10:54:02 AM)

Post check files (Sorted by Last Modified Date)

- mybooktest1_192.168.255.249_post_2017.10.30_11_01_46.txt (10/30/2017 11:02:01 AM)

Submit

localhost/test/selectfiles: x

localhost/test/selectfiles.aspx

Pre check files (Sorted by Last Modified Date)

- mybooktest1_192.168.255.249_pre_2017.10.30_10_53_17.txt (10/30/2017 10:54:02 AM)

Post check files (Sorted by Last Modified Date)

- mybooktest1_192.168.255.249_post_2017.10.30_11_01_46.txt (10/30/2017 11:02:01 AM)

Submit

localhost/test/compare: x

localhost/test/comparefiles.aspx

Context size (optional):

Pre check

```

testrouter#terminal length 0
testrouter#show version
Cisco IOS Software, 3760 Software (C3745-ADVENTERPRISEK9-H), Version 12.4(15)T14, RELEASE SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2010 by Cisco Systems, Inc.
Compiled Tue 17-Aug-10 22:55 by prod_rel_team

ROM: ROMMON Emulation Microcode
ROM: 3760 Software (C3745-ADVENTERPRISEK9-H), Version 12.4(15)T14, RELEASE SOFTWARE (fc2)

```

Post check

```

testrouter#terminal length 0
testrouter#show version
Cisco IOS Software, 3760 Software (C3745-ADVENTERPRISEK9-H), Version 12.4(15)T14, RELEASE SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2010 by Cisco Systems, Inc.
Compiled Tue 17-Aug-10 12:55 by prod_rel_team

ROM: ROMMON Emulation Microcode
ROM: 3760 Software (C3745-ADVENTERPRISEK9-H), Version 12.4(15)T14, RELEASE SOFTWARE (fc2)

```

Side by Side Diff

Base Text	New Text
1	1
2 testrouter#terminal length 0	2 testrouter#terminal length 0
3	3
4 testrouter#show version	4 testrouter#show version
5	5
6 Cisco IOS Software, 3760 Software (C3745-ADVENTERPRISEK9-H), Version 12.4(15)T14, RELEASE SOFTWARE (fc2)	6 Cisco IOS Software, 3760 Software (C3745-ADVENTERPRISEK9-H), Version 12.4(15)T14, RELEASE SOFTWARE (fc2)
7	7
8 Technical Support: http://www.cisco.com/techsupport	8 Technical Support: http://www.cisco.com/techsupport
9	9
10 Copyright (c) 1986-2010 by Cisco Systems, Inc.	10 Copyright (c) 1986-2010 by Cisco Systems, Inc.
11	11
12 Compiled Tue 17-Aug-10 22:55 by prod_rel_team	12 Compiled Tue 17-Aug-10 12:55 by prod_rel_team
13	13
14	14
15	15
16 ROM: ROMMON Emulation Microcode	16 ROM: ROMMON Emulation Microcode
17	17
18 ROM: 3760 Software (C3745-ADVENTERPRISEK9-H), Version 12.4(15)T14, RELEASE SOFTWARE (fc2)	18 ROM: 3760 Software (C3745-ADVENTERPRISEK9-H), Version 12.4(15)T14, RELEASE SOFTWARE (fc2)
19	19
20	20
21	21
22 testrouter uptime is 17 minutes	22 testrouter uptime is 23 minutes
23	23

localhost/compar... x

localhost:8080/comparofloc.aspx

Content view (optional)

Pre check

```
testroutereternal length 0
testroutereternal version
Cisco IOS Software, 3700 Software (C3748-ADVENTERPRISEK9-H), Version 12.4(13)T14, RELEASE SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2009-2010 by Cisco Systems, Inc.
Compiled Tue 17 Aug 10 12:19 by prod_rsl_team

ROM: ROMMON Emulation Microcode
ROM: 3700 Software (C3748-ADVENTERPRISEK9-H), Version 12.4(13)T14, RELEASE SOFTWARE (fc2)
```

Post check

```
testroutereternal length 0
testroutereternal version
Cisco IOS Software, 3700 Software (C3748-ADVENTERPRISEK9-H), Version 12.4(13)T14, RELEASE SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2009-2010 by Cisco Systems, Inc.
Compiled Tue 17 Aug 10 12:19 by prod_rsl_team

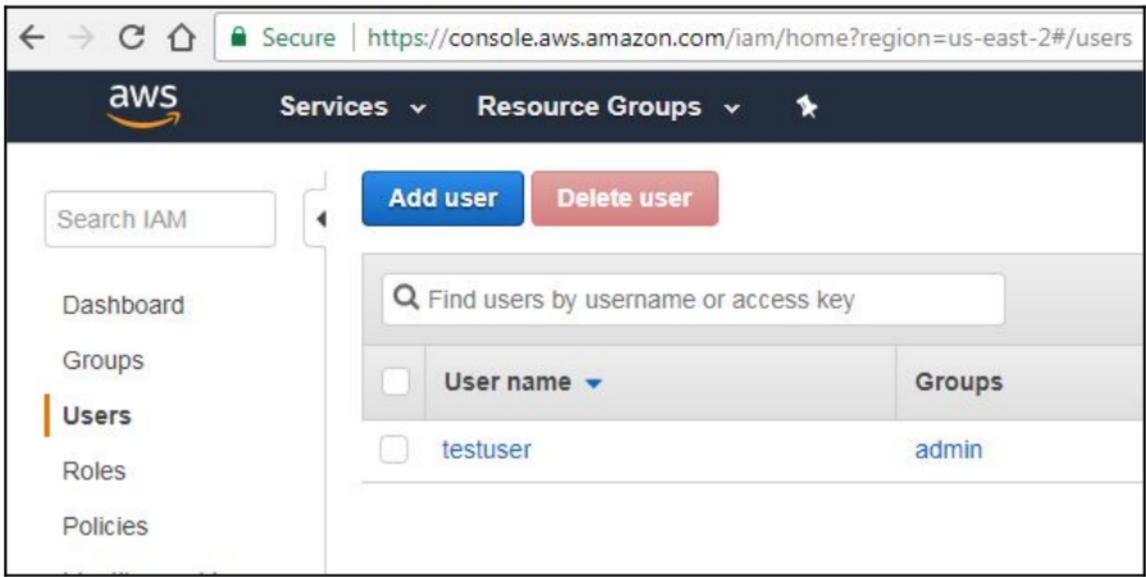
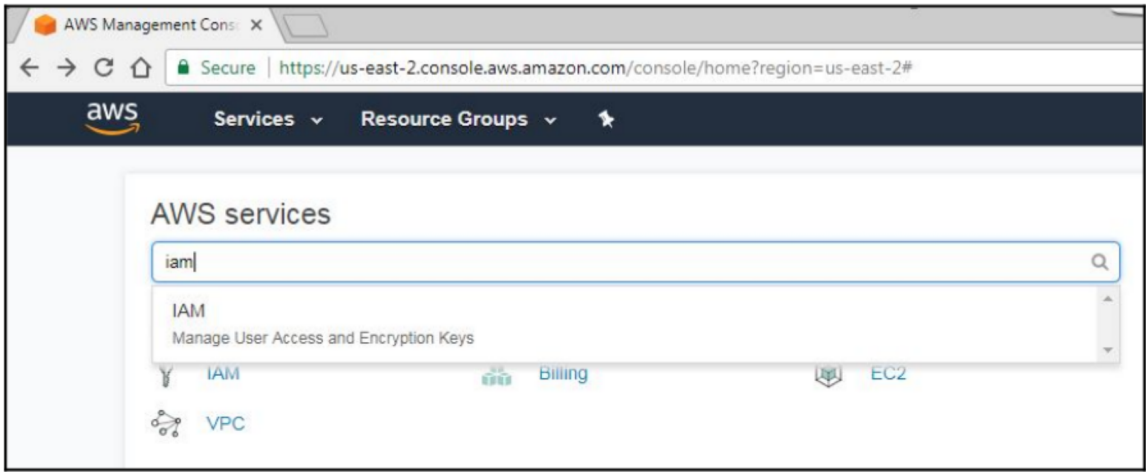
ROM: ROMMON Emulation Microcode
ROM: 3700 Software (C3748-ADVENTERPRISEK9-H), Version 12.4(13)T14, RELEASE SOFTWARE (fc2)
```

Side by Side Diff Inline Diff

How test vs. New test

1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
13	13
14	14
15	15
16	16
17	17
18	18
19	19
20	20
21	21
22	22
23	23

Chapter 7: SDN Concepts in Network Automation



Add user



Details

Set user details

You can add multiple users at once with the same access type and permissions. [Learn more](#)

User name*

[+ Add another user](#)

Select AWS access type

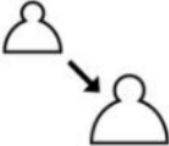
Select how these users will access AWS. Access keys and autogenerated passwords are provided in the last step. [Learn more](#)

- Access type*
- Programmatic access**
Enables an **access key ID** and **secret access key** for the AWS AF
 - AWS Management Console access**
Enables a **password** that allows users to sign-in to the AWS Mana

Set permissions for booktest



Add user to group



Copy permissions from existing user



Attach existing policies directly

Add user to an existing group or create a new one. Using groups is a best-practice way to manage users.

Create group

Refresh

Search

Group	Attached policies
<input checked="" type="checkbox"/> admin	AdministratorAccess

Add user

1 Details
 2 Permissions
3 Review

✔ **Success**

You successfully created the users shown below. You can view and download user security credentials. You can also email users instructions for signing in to the AWS Console. This is the last time these credentials will be available to download. However, you can create new credentials at any time.

Users with AWS Management Console access can sign-in at: <https://425388426042.signin.aws.amazon.com/console>

Download .csv

	User	Access key ID	Secret access key
▶	✔ booktest		***** Show

```

C:\Windows\system32\cmd.exe
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Users\abhishek.ratan>aws configure
AWS Access Key ID [*****GC4A]:
AWS Secret Access Key [*****UmSm]:
Default region name [us-east-2]:
Default output format [json]:

C:\Users\abhishek.ratan>
  
```

```

Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.190
on win32
Type "copyright", "credits" or "license()" for more information
>>>
===== RESTART: C:\a1\checkaws.py =====
ec2.Instance(id='i-036213d00a2891480')
i-036213d00a2891480 {'Code': 16, 'Name': 'running'}
ec2.Instance(id='i-04e997e0366f01090')
i-04e997e0366f01090 {'Code': 16, 'Name': 'running'}
>>>
  
```

```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit
  on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:\a1\checkaws.py =====
i-036213d00a2891480 172.31.47.84
i-04e997e0366f01090 172.31.33.197
>>>
```

Secure | https://us-east-2.console.aws.amazon.com/ec2/v2/home?region=us-east-2#LaunchInstanceWizard

Services Resource Groups

Abhishek Ratan Ohio Support

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review




Step 1: Choose an Amazon Machine Image (AMI)

Cancel and Exit

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. You can select an AMI provided by AWS, our user community, or the AWS Marketplace; or you can select one of your own AMIs.

Quick Start < 1 to 34 of 34 AMIs >

- My AMIs**
- AWS Marketplace**
- Community AMIs**
- Free tier only**

 Amazon Linux Free tier eligible	Amazon Linux AMI 2017.09.0 (HVM), SSD Volume Type - ami-c5062ba0 The Amazon Linux AMI is an EBS-backed, AWS-supported image. The default image includes AWS command line tools, Python, Ruby, Perl, and Java. The repositories include Docker, PHP, MySQL, PostgreSQL, and other packages. Root device type: ebs Virtualization type: hvm	Select 64-bit
 Red Hat Free tier eligible	Red Hat Enterprise Linux 7.4 (HVM), SSD Volume Type - ami-cfdafaaa Red Hat Enterprise Linux version 7.4 (HVM), EBS General Purpose (SSD) Volume Type Root device type: ebs Virtualization type: hvm	Select 64-bit
 SUSE Linux Free tier eligible	SUSE Linux Enterprise Server 12 SP3 (HVM), SSD Volume Type - ami-1e785a7b SUSE Linux Enterprise Server 12 Service Pack 3 (HVM), EBS General Purpose (SSD) Volume Type. Public Cloud, Advanced Systems Management, Web and Scripting, and Legacy modules enabled.	Select 64-bit

ARISTA Command API Explorer Overview Command Documentation

Request

```

{
  "jsonrpc": "2.0",
  "method": "runCmds",
  "params": {
    "version": 1,
    "cmds": [
      "show version",
      "show hostname"
    ],
    "format": "json",
    "timestamps": false,
  },
  "id": "CapiExplorer-123"
}

```

Submit POST request

Response

```

{
  "jsonrpc": "2.0",
  "result": [
    {
      "modelName": "VEOS",
      "internalVersion": "4.14.5F-2208015.4145F",
      "systemMacAddress": "08:00:27:0e:bf:31",
      "serialNumber": "",
      "memTotal": 2028800,
      "bootupTimestamp": 1418722057.28,
      "memFree": 264300,
      "version": "4.14.5F",
      "architecture": "i386",
      "internalBuildId": "34f48cf0-e8b0-4c86-96ce-f032ddccdd0",
      "hardwareRevision": ""
    },
    {
      "fqdn": "myswitch",
      "hostname": "myswitch"
    }
  ],
  "id": "CapiExplorer-123"
}

```

ARISTA Command API Explorer Overview Command Documentation

Search Commands

SHOW COMMANDS

- aaa
- aaa counters
- aliases
- arp [vrf <vrfName>] [resolve] [...]
- arp [vrf <vrfName>] [resolve] [...] summary
- arp monitor [vrf <vrfName>]
- arp monitor summary
- banner login
- banner motd
- boot-config
- boot-extensions
- class-map [type qos] [<cmName>]
- class-map type control-plane [<cmName>]
- class-map type pbr [<cmName>]
- cvx
- cvx connections
- cvx connections all
- cvx connections brief
- cvx connections client <hostname>
- cvx connections client <macAddr>

Command Response Documentation

All commands are guaranteed to have structured response format, documented here. If an attribute is marked as *optional*, its presence is not guaranteed in the resulting JSON responses.

show boot-config

BootConfig

abootPassword	string	Encrypted aboot password.
consoleSpeed	integer - optional	Baud rate of console.
memTestIterations	integer	Iterations of Memtest to perform at boot time.
softwareImage	string	Location of software image.

Admin > Node Management > Add Node

Add Node

DEFINE NODE > CHOOSE RESOURCES > ADD APPLICATION MONITORS > ADD POLLERS > ADD UDT PORTS > CHANGE PROPERTIES >

Define Node

Specify the node you want to add by completing the fields below. [Are you adding a large number of nodes? Try the Network Discovery.](#)

Polling Hostname or IP Address: IPv4 and IPv6 formats are both valid

Dynamic IP Address (DHCP or BOOTP)

Polling Method: [Help me choose a polling method](#)

- External Node: No Status
No data is collected for this node. Useful for monitoring a hosted application or other element on the node but not the node itself.
- Status Only: ICMP
Limited data (status, response time, and packet loss) is collected using ICMP (ping). Useful for devices which do not support SNMP or WMI.
- Most Devices: SNMP and ICMP
Standard polling method for network devices such as switches and routers, as well as Linux and Unix servers.

SNMP Version: SNMPv2c is used, by default, when SNMPv3 is neither required nor supported.

SNMP Port:

Allow 64 bit counters

Community String: Press down arrow to view all

Read/Write Community String:

Configuration Management

CONFIG MANAGEMENT | TRANSFER STATUS | INVENTORY STATUS | SCRIPT MANAGEMENT

GROUP BY: [No grouping]

DOWNLOAD | COMPARE NODE(S) CONFIGS | UPLOAD | EXECUTE SCRIPT | EDIT PROPERTIES | UPDATE INVENTORY

There is no selected node(s)

Page 1 of 15 | Page size 25

Name	IP Address	Last	Last action date	Error
10.0.252.1	10.0.252.1			
10.120.252.1	10.120.252.1			

HOME	▶	CONFIGS	
NETWORK	▶	Config Summary	Configuration Management
APPLICATIONS	▶		
CONFIGS	▶	Config Change Templates	Reports
IP ADDRESSES	▶		Compliance
VOIP & NETWORK QUALITY	▶	Jobs	End of Support
WEB	▶	Firmware Upgrades	
NETFLOW	▶		
DEVICE TRACKER	▶		

CONFIG MANAGEMENT TRANSFER STATUS INVENTORY STATUS **SCRIPT MANAGEMENT**

A script is a string of text you can save to the NCM database for re-use - either in direct uploading/executing to one node or a group, or in editing an existing config file.

📍 Arrange your scripts by Name, Creation Time, or Modified Time (when script was last changed).

⊕ ADD NEW SCRIPT | ✎ EDIT SCRIPT | 🗑 DELETE show running

Script name	Creation Time	Modified Time	Comments
show running config	11/4/2017 11:38 pm	11/4/2017 11:38 pm	

Create New Job

CREATE JOB > CHOOSE NODES > ENTER NOTIFICATION DETAILS > ADD JOB SPECIFIC DETAILS > REVIEW >

New Job Details

Name of Job

Job Type

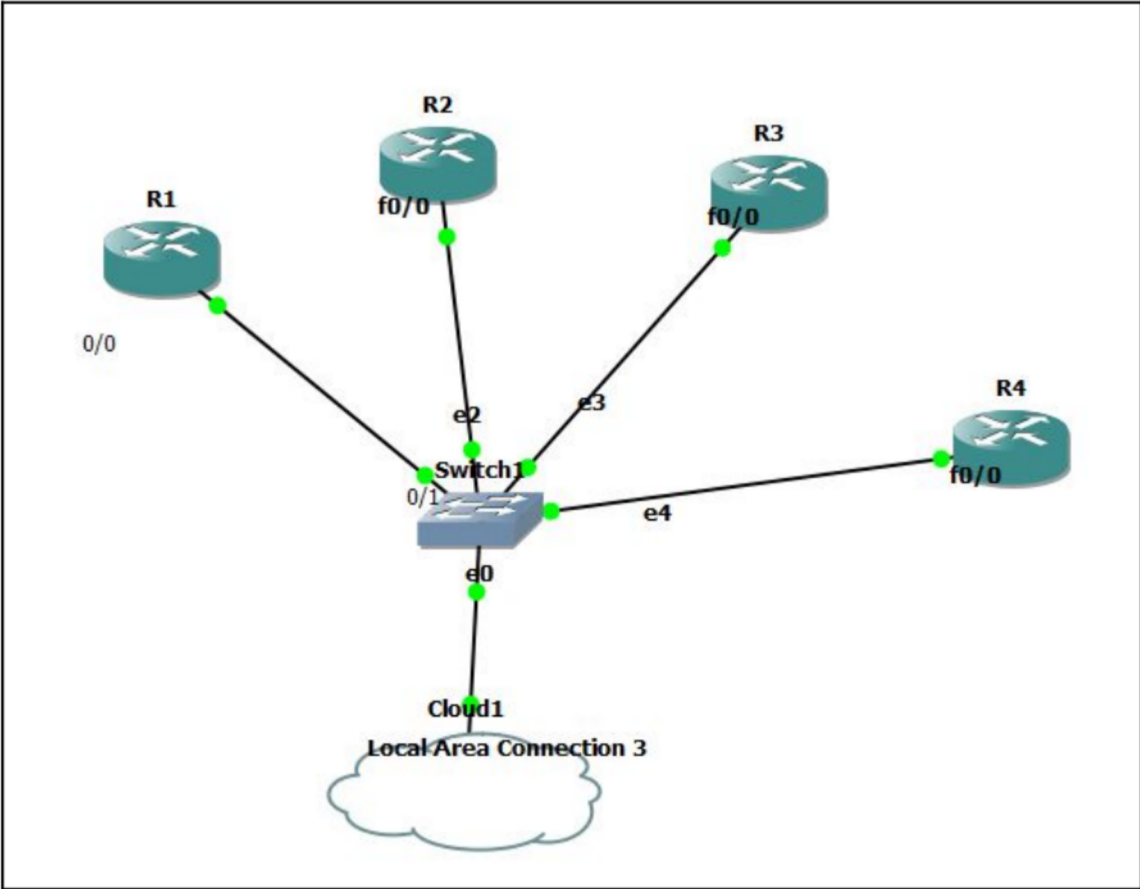
- Download Configs from Devices ▾
- Execute Command Script on Devices
- Upload Changes to Devices
- Export Configs
- Perform Routine Database and Archive Maintenance
- Update Inventory
- Generate a Config Change Report
- Generate a Policy Report
- Purge Old Configs from Database
- Download Configs from Devices
- Reboot Selected Devices
- Baseline Entire Network

» Help me decide

Start time: Enter time values from 00:00 through 24:00. Use HH:MM format (NCM Server time: 11:09 UTC -7)

Starting On: 

Ending On: 



```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)]
on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:\pingmesh\getmeshvalue2.py =====
checking for.....192.168.255.240
checking for.....192.168.255.245
checking for.....192.168.255.248
checking for.....192.168.255.249
checking for.....4.2.2.2
Error connecting to ...4.2.2.2
[('192.168.255.240:192.168.255.240', 'True'), ('192.168.255.240:192.168.255.245',
'True'), ('192.168.255.240:192.168.255.248', 'True'), ('192.168.255.240:192.16
8.255.249', 'True'), ('192.168.255.240:4.2.2.2', 'False'), ('192.168.255.245:192
.168.255.240', 'True'), ('192.168.255.245:192.168.255.245', 'True'), ('192.168.2
55.245:192.168.255.248', 'True'), ('192.168.255.245:192.168.255.249', 'True'), (
'192.168.255.245:4.2.2.2', 'False'), ('192.168.255.248:192.168.255.240', 'True')
, ('192.168.255.248:192.168.255.245', 'True'), ('192.168.255.248:192.168.255.248
', 'True'), ('192.168.255.248:192.168.255.249', 'True'), ('192.168.255.248:4.2.2
.2', 'False'), ('192.168.255.249:192.168.255.240', 'True'), ('192.168.255.249:19
2.168.255.245', 'True'), ('192.168.255.249:192.168.255.248', 'True'), ('192.168.
255.249:192.168.255.249', 'True'), ('192.168.255.249:4.2.2.2', 'False'), ('4.2.2
.2:192.168.255.240', 'False'), ('4.2.2.2:192.168.255.245', 'False'), ('4.2.2.2:1
92.168.255.248', 'False'), ('4.2.2.2:192.168.255.249', 'False'), ('4.2.2.2:4.2.2
.2', 'False')]
>>>
```

```
Python 3.6.1 Shell
File Edit Shell Debug Options Window Help
Python 3.6.1 (v3.6.1:69c0db5, Mar 21 2017, 17:54:52) [MSC v.1900 32 bit (Intel)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:\pingmesh\pingmesh.py =====
checking for.....192.168.255.240
checking for.....192.168.255.245
checking for.....192.168.255.248
checking for.....192.168.255.249
checking for.....4.2.2.2
Error connecting to ...4.2.2.2
All done!!!!
>>>
```

localhost/test/pingmesh: X

localhost/test/pingmesh.html

Network Health Dashboard Last Modified: Sun Nov 05 2017 13:26:21 GMT+0530

Ping Matrix

Devices	R1	R2	R3	R4	Random
R1	True	True	True	True	False
R2	True	True	True	True	False
R3	True	True	True	True	False
R4	True	True	True	True	False
Random	False	False	False	False	False

Ping Matrix

Devices	R1	R2	R3	R4	Random
R1	True	True	True	True	False
R2	True	True	True	True	False
R3	True	True	True	True	False
R4	True	True	192.168.255.248:192.168.255.248		
Random	False	False	False	False	False

Ping Matrix

Devices	R1	R2	R3	R4	Random
R1	True	False	True	True	False
R2	False	False	False	False	False
R3	True	False	True	True	False
R4	True	False	True	True	False
Random	False	False	False	False	False

Ping Matrix

Devices	R1	R2	R3	R4	Random
R1	True	True	True	True	False
R2	True	True	True	False	False
R3	True	True	True	True	False
R4	True	False	True	True	False
Random	False	False	192.168.255.249:192.168.255.245		