

The background is a dark purple grid with various icons like code symbols, cloud shapes, and robot heads. Large, colorful abstract shapes in orange, blue, green, and pink are scattered around the edges.

DEVNET

Create

Automation gone wrong

Lessons learned from screwing up your network automation

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@squ4rks



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Starting to program at the age of 10 Marcel now works with Cisco's big customers and partners in EMEAR on everything related to APIs & Programmability.

He loves NetDevOps and has recently written a book on using python for network automation.



Guest Networks

Firewall upgrade

Wireless RF change New VLANs

Remove networks

Lifecycle

Change site names Route change Update DNS

RMA device

Change ports

Plug and Play

Remove site

Switch Upgrade Clean up

Remove old ISP

Network Compliance

Third-party vendor support

SDWAN

Export data to stake holders

New features

Integrations

Add new ISP

New business use-case

Rollback

Changes
happen rarely

Change seen
as failure

All changes
are big and
complex

Problem
occurs during
change

The team isn't
practiced

Change is (seen as)
high risk

Changes
happen often

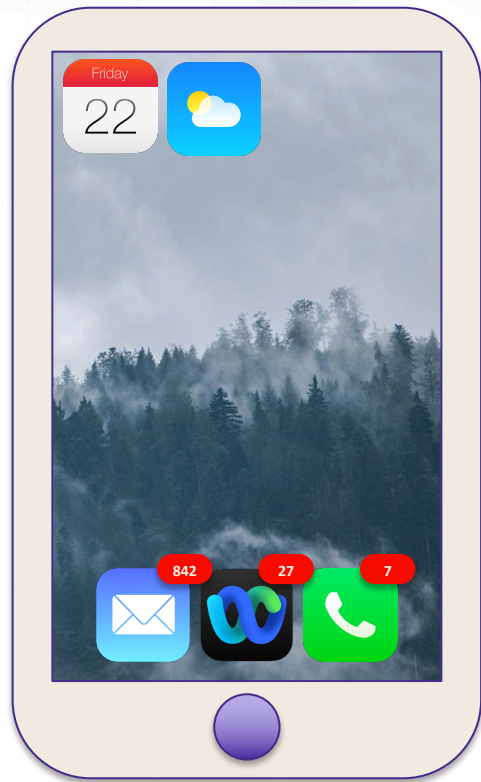
Problems are
identified and
resolved fast

All changes
are small

Problem
occurs during
change

The team is well
practiced

Change is low risk



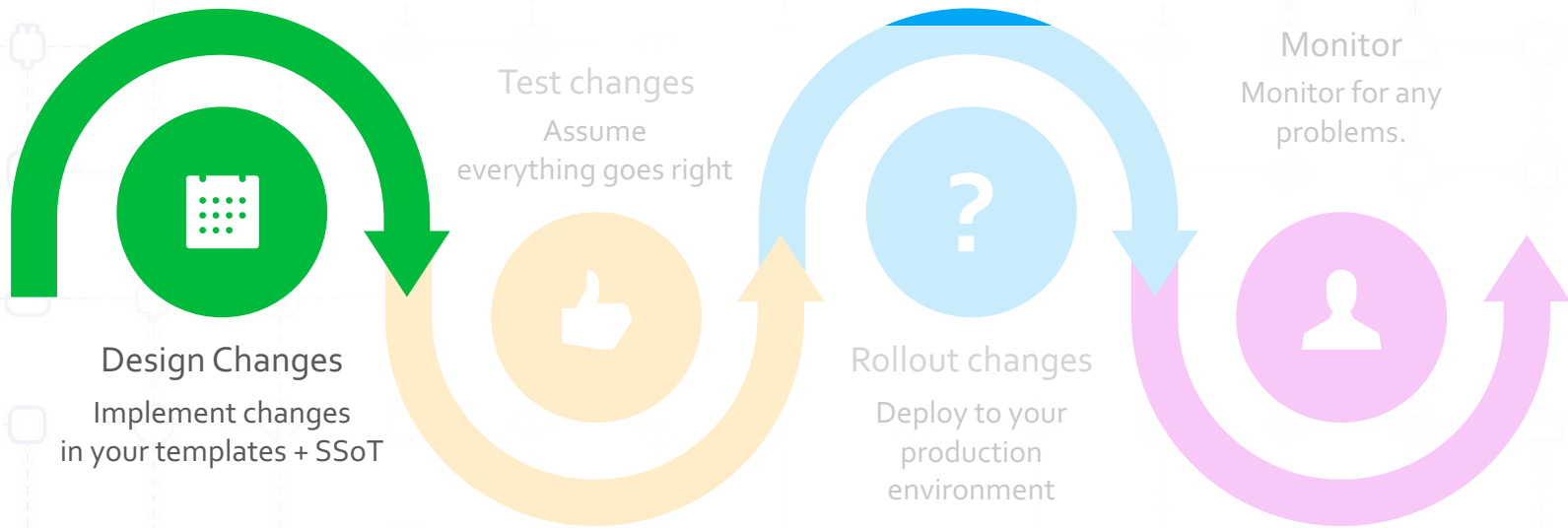


The **first** rule of technology used in a business is that **automation** applied to an **efficient operation** will **magnify the efficiency**.

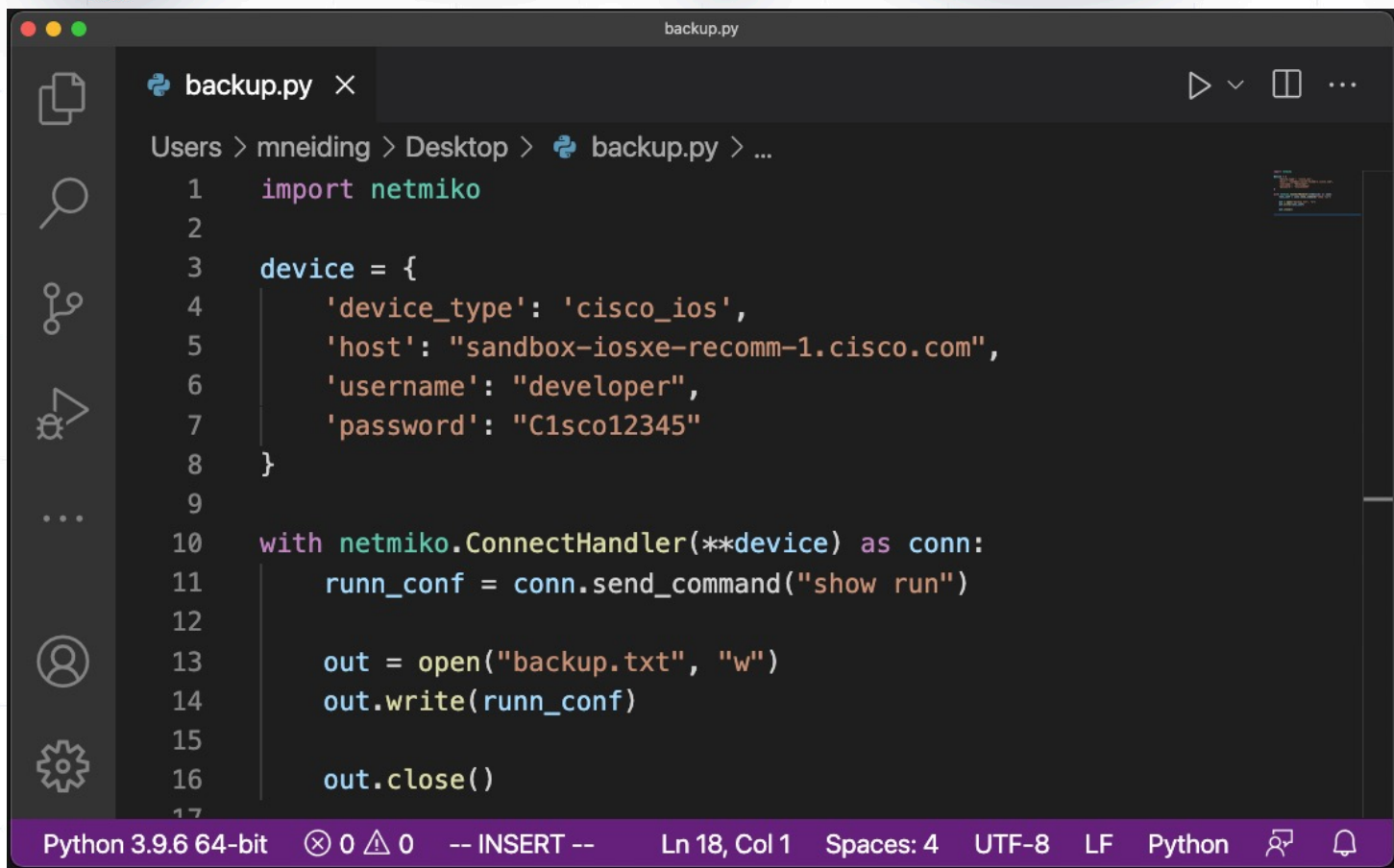
The **second** is that **automation** applied to an **inefficient operation** will **magnify the inefficiency**.

- Bill Gates

Steps of a NetDevOps Pipeline

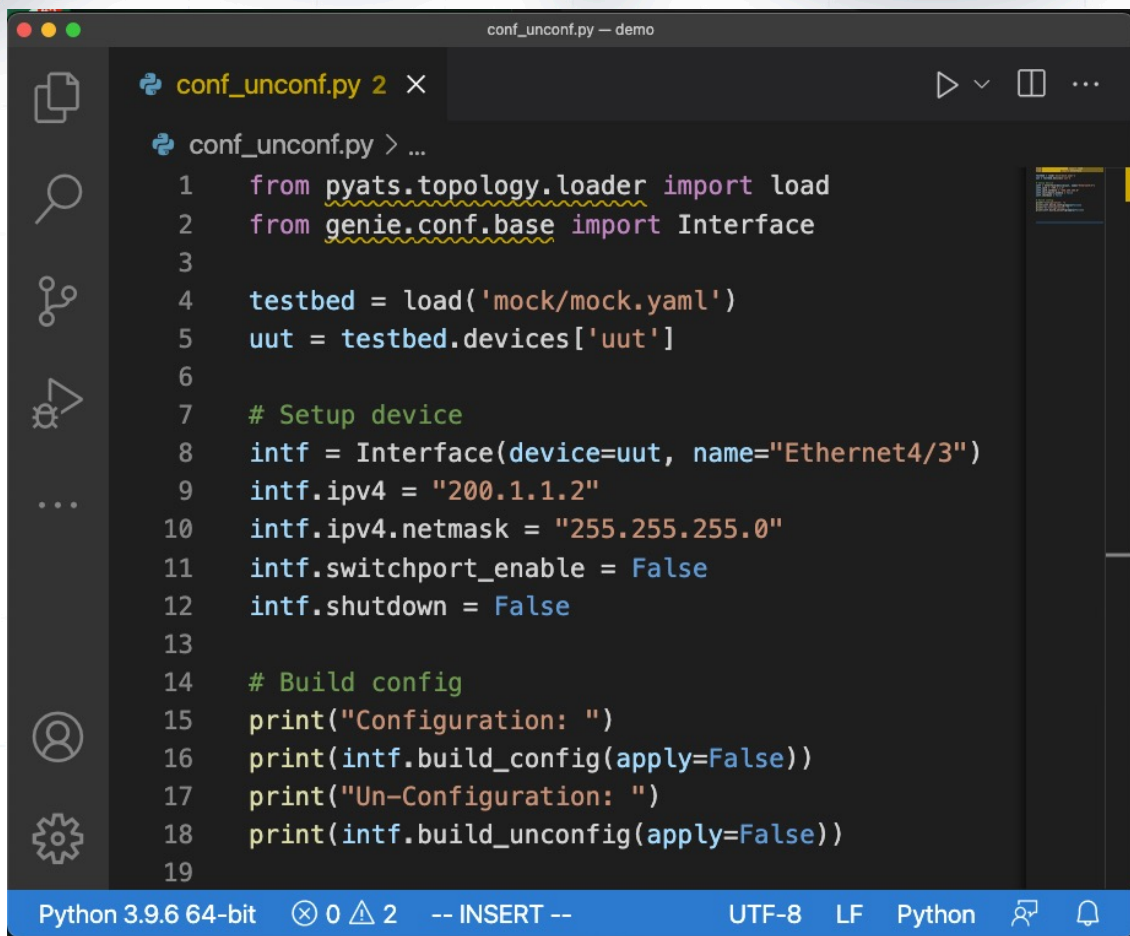


DESIGN CHANGES WITH ROLLBACK IN MIND



```
backup.py
Users > mneiding > Desktop > backup.py > ...
1  import netmiko
2
3  device = {
4      'device_type': 'cisco_ios',
5      'host': "sandbox-iosxe-recomm-1.cisco.com",
6      'username': "developer",
7      'password': "C1sco12345"
8  }
9
10 with netmiko.ConnectHandler(**device) as conn:
11     runn_conf = conn.send_command("show run")
12
13     out = open("backup.txt", "w")
14     out.write(runn_conf)
15
16     out.close()
17
```

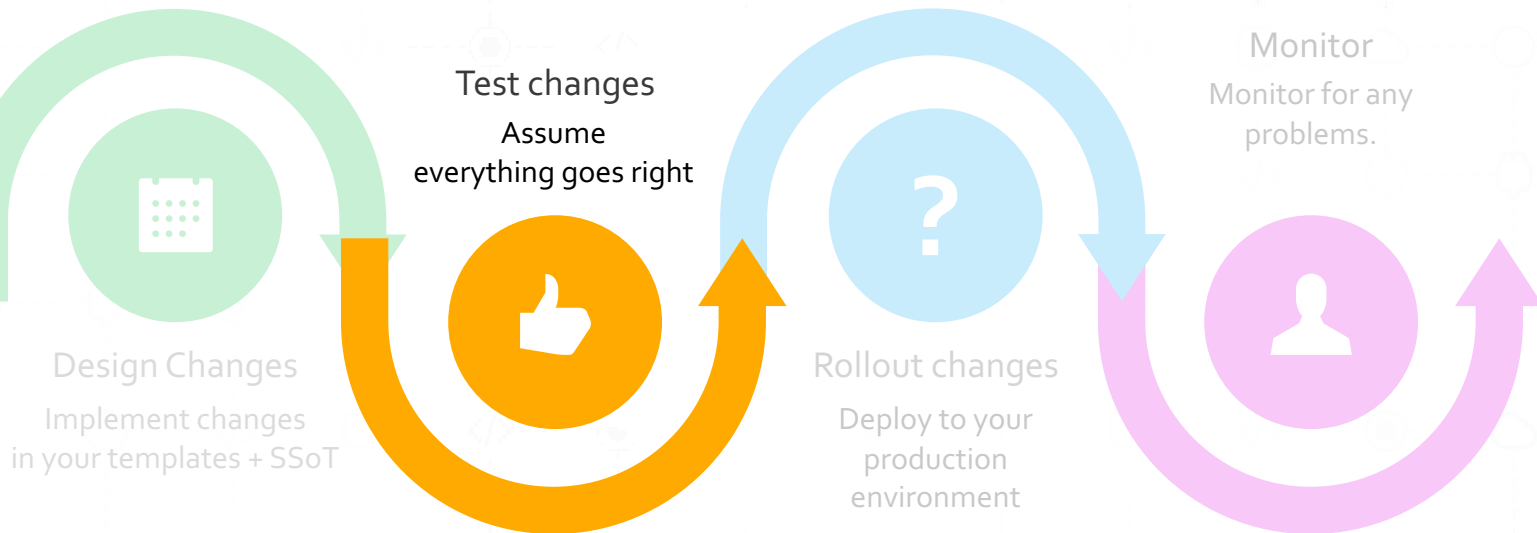
Python 3.9.6 64-bit 0 0 -- INSERT -- Ln 18, Col 1 Spaces: 4 UTF-8 LF Python



```
conf_unconf.py 2 x
conf_unconf.py > ...
1  from pyats.topology.loader import load
2  from genie.conf.base import Interface
3
4  testbed = load('mock/mock.yaml')
5  uut = testbed.devices['uut']
6
7  # Setup device
8  intf = Interface(device=uut, name="Ethernet4/3")
9  intf.ipv4 = "200.1.1.2"
10  intf.ipv4.netmask = "255.255.255.0"
11  intf.switchport_enable = False
12  intf.shutdown = False
13
14  # Build config
15  print("Configuration: ")
16  print(intf.build_config(apply=False))
17  print("Un-Configuration: ")
18  print(intf.build_unconfig(apply=False))
19
```

Python 3.9.6 64-bit 0 2 -- INSERT -- UTF-8 LF Python

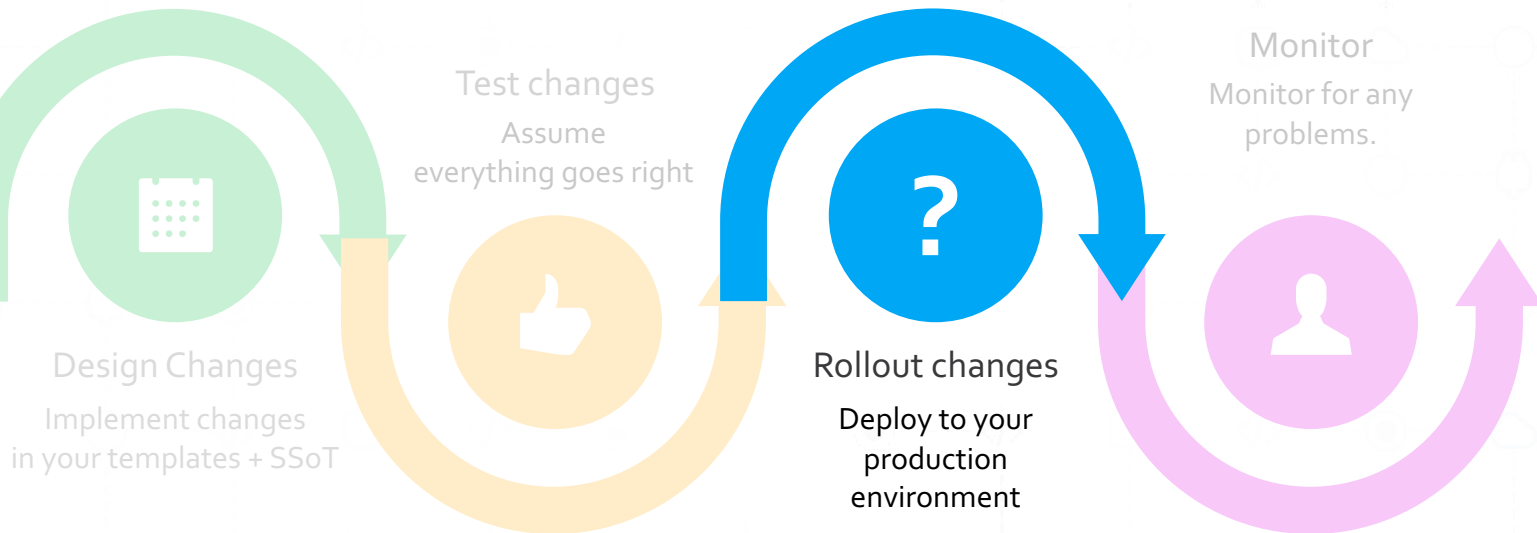
Steps of a NetDevOps Pipeline



The background is a solid orange color. Overlaid on this is a grid of small, faint orange icons. These icons include code symbols like angle brackets with a dot (<>.), a cloud, a circle with a dot inside, a square with a dot inside, and a robot head. The grid is composed of dashed lines. Additionally, there are several large, abstract, organic shapes in various shades of orange scattered across the background.

MAKE SURE YOU ARE ACTUALLY TESTING

Steps of a NetDevOps Pipeline



The background is a dark blue gradient. It features a grid of light blue icons, including code symbols (</>), GitHub Octocat logos, and cloud shapes, connected by dashed lines. Large, organic, light blue shapes are positioned in the corners and along the edges.

OPTIMIZE FOR SPEED

```
interface Ethernet4/3  
no shutdown  
no switchport
```

```
Host: switch01.switches  
Username: admin  
Password: 0dfkj04kj2$
```

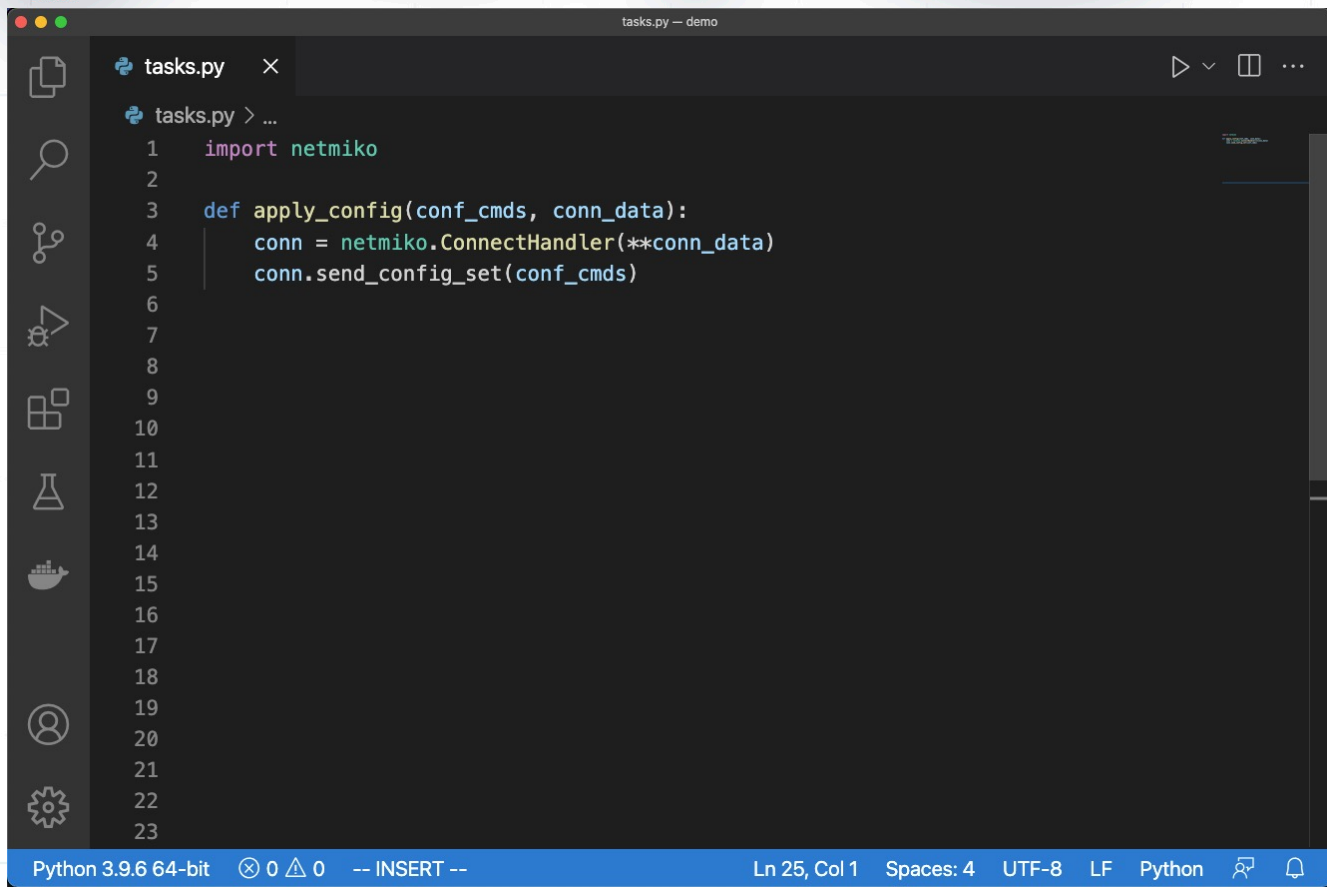
```
apply_config()
```

Queue:



switch01

Worker
#1

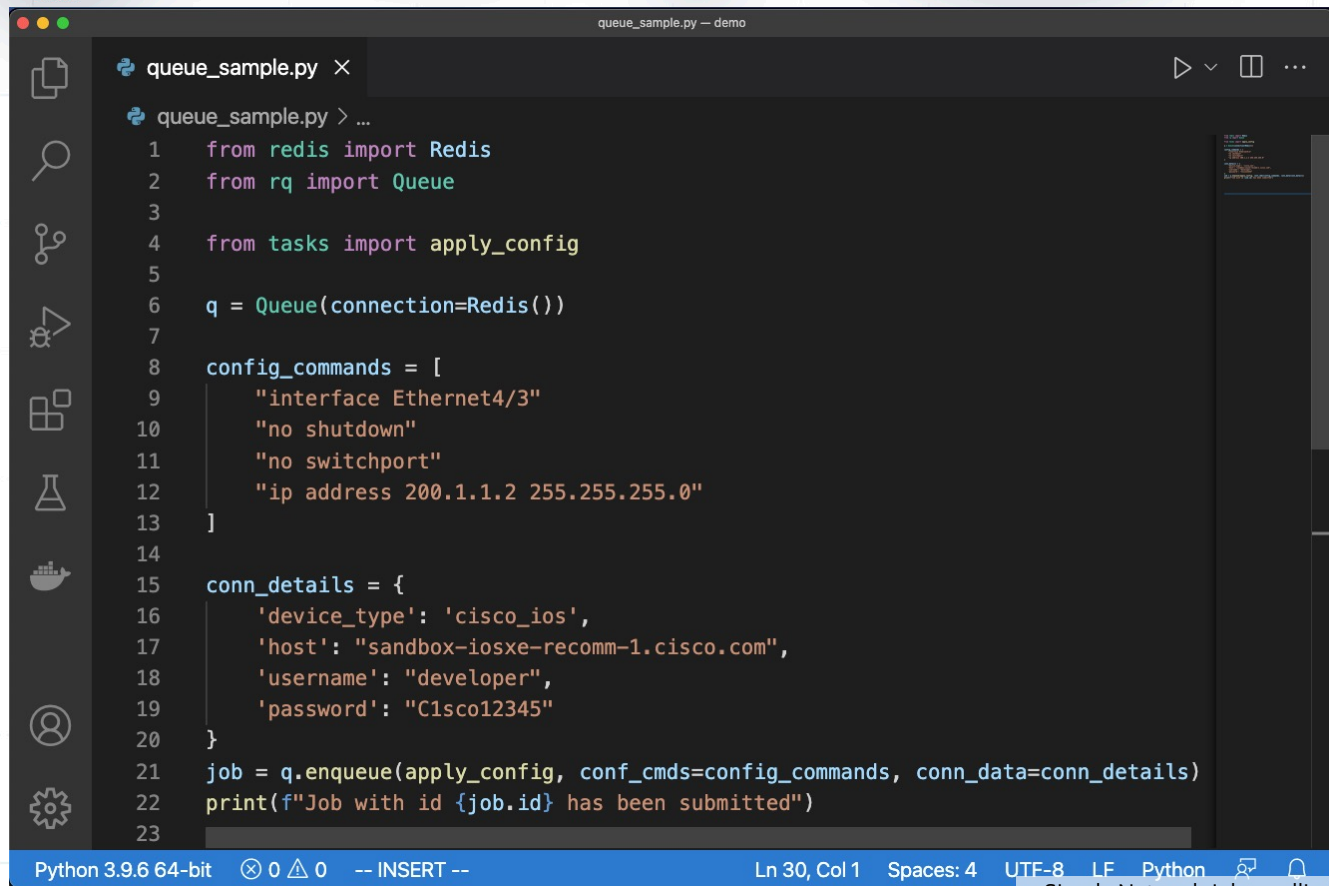


The image shows a Visual Studio Code editor window titled "tasks.py -- demo". The editor is displaying a Python file named "tasks.py" with the following code:

```
1  import netmiko
2
3  def apply_config(conf_cmds, conn_data):
4      conn = netmiko.ConnectHandler(**conn_data)
5      conn.send_config_set(conf_cmds)
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
```

The status bar at the bottom indicates the following information:

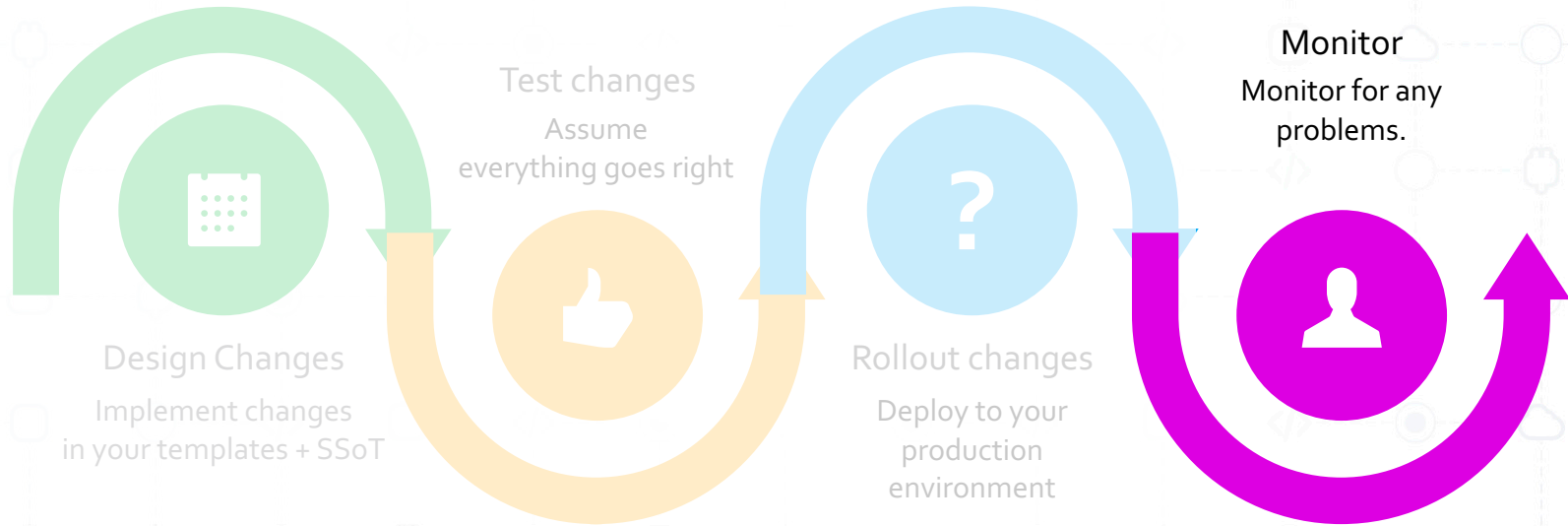
- Python 3.9.6 64-bit
- 0 errors, 0 warnings
- INSERT --
- Ln 25, Col 1
- Spaces: 4
- UTF-8
- LF
- Python
- Search icon
- Refresh icon



```
queue_sample.py ×
queue_sample.py > ...
1  from redis import Redis
2  from rq import Queue
3
4  from tasks import apply_config
5
6  q = Queue(connection=Redis())
7
8  config_commands = [
9      "interface Ethernet4/3"
10     "no shutdown"
11     "no switchport"
12     "ip address 200.1.1.2 255.255.255.0"
13 ]
14
15 conn_details = {
16     'device_type': 'cisco_ios',
17     'host': "sandbox-iosxe-recomm-1.cisco.com",
18     'username': "developer",
19     'password': "C1sco12345"
20 }
21 job = q.enqueue(apply_config, conf_cmds=config_commands, conn_data=conn_details)
22 print(f"Job with id {job.id} has been submitted")
23
```

Python 3.9.6 64-bit 0 0 -- INSERT -- Ln 30, Col 1 Spaces: 4 UTF-8 LF Python

Steps of a NetDevOps Pipeline



The background is a dark purple color. It features a grid of small, light purple icons connected by dashed lines. The icons include a circle with a dot, a square, a cloud, and a code symbol (</>). There are also several large, abstract, wavy shapes in a lighter shade of purple scattered across the background.

BUILD A MONITORING SOLUTION THAT CAPTURES EVERYTHING



SOURCE All NAME All VRF All

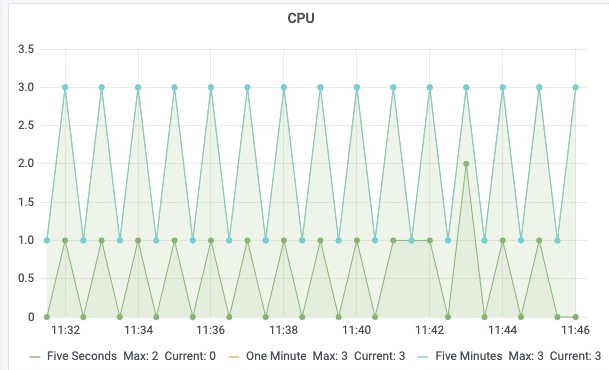
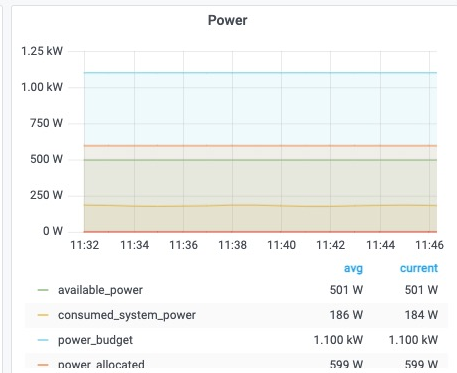
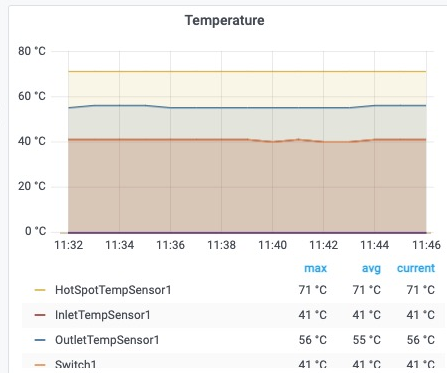
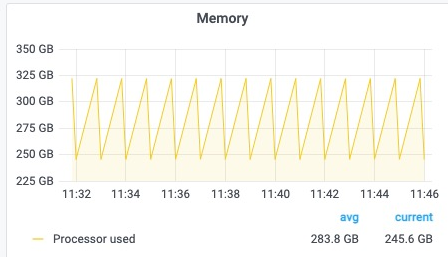
Health

Version

17.3

Last Boot

2021-02-16
12:42:13



CDP

device_name	ip_address	local_intf_name	mgmt_address	port_id	platform_name
APD478.9B49.26E8	10.1.1.1	TwoGigabitEthernet1/0/3	10.1.1.1	GigabitEthernet0	cisco C9115AXI-B
SKYHAWK	202.54.22.54	TwoGigabitEthernet1/0/1	202.54.22.54	GigabitEthernet0/0/1	cisco ISR4321/K9
RACK3-CAT38-14-Cloud	202.54.22.57	GigabitEthernet0/0/0	202.54.22.57	TenGigabitEthernet1/0/16	cisco WS-C3850-24XS
APD478.9B49.26E8	10.1.1.1	TwoGigabitEthernet1/0/3	10.1.1.1	GigabitEthernet0	cisco C9115AXI-B
SKYHAWK	202.54.22.54	TwoGigabitEthernet1/0/1	202.54.22.54	GigabitEthernet0/0/1	cisco ISR4321/K9
RACK3-CAT38-14-Cloud	202.54.22.57	GigabitEthernet0/0/0	202.54.22.57	TenGigabitEthernet1/0/16	cisco WS-C3850-24XS
APD478.9B49.26E8	10.1.1.1	TwoGigabitEthernet1/0/3	10.1.1.1	GigabitEthernet0	cisco C9115AXI-B
SKYHAWK	202.54.22.54	TwoGigabitEthernet1/0/1	202.54.22.54	GigabitEthernet0/0/1	cisco ISR4321/K9
RACK3-CAT38-14-Cloud	202.54.22.57	GigabitEthernet0/0/0	202.54.22.57	TenGigabitEthernet1/0/16	cisco WS-C3850-24XS

> IP MAC ARP - Client Health (2 panels)

> gRPC MDT Details (1 panel)

> Interface - Cisco Native - Charts (4 panels)

> Interfaces - Cisco Native - Data Table (1 panel)

> IETF Interfaces (3 panels)



DEVNET

Create

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