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300-535

Automating Cisco Service Provider Solutions



Sections

1. 1.0 Network Programmability Foundation
2. 2.0 Automation APIs and Protocols
3. 3.0 Network Device Programmability
4. Automation and Orchestration Platforms

Exam A

QUESTION 1

DRAG DROP

Drag and drop the steps from the left into the correct order on the right to deploy an already created service into NSO. Not all options are used.

Select and Place:

Correct Answer:

Section: 1.0 Network Programmability Foundation

Explanation

Explanation/Reference:

Reference: <https://www.ciscolive.com/c/dam/r/ciscolive/emea/docs/2019/pdf/LABSPG-2442.pdf>

QUESTION 2

What tool is used to perform a “what if” failure analysis in a service provider network that is running Segment Routing?

- A. Cisco WAN Automation Engine
- B. Cisco Evolved Programmable Network Manager
- C. Cisco Network Services Orchestrator
- D. Cisco Segment Routing Path Computation Element

Correct Answer: A

Section: 1.0 Network Programmability Foundation

Explanation

Explanation/Reference:

Reference: <https://www.cisco.com/c/en/us/products/routers/wan-automation-engine/index.html>



QUESTION 3

```
curl --request DELETE --url http://10.1.1.1:8080/srpolicy-install --header 'cache-control: no-cache' --
header 'content-type: application/json'
--data '{"source": "1.1.1.2", "end-point": "2001:4860::1:1:1:1", "color": 99, "route-distinguisher": 2}'
<!DOCTYPE html>
<html>
<head>
<title>404 Not Found</title>
</head>
<body>
<h1>Not Found</h1>
<hr>
<address> Server at localhost:8080 </address>
</body>
</html>
```

Refer to the exhibit. An engineer implements an automation with Cisco XTC. Which problem results in the 404 Not Found error code on the REST call?

- A. The resource that you are trying to delete does not exist.
- B. Port 8080 is not enabled on XTC.
- C. XTC does not offer any APIs.

D. You must change the request method.

Correct Answer: B

Section: 1.0 Network Programmability Foundation

Explanation

Explanation/Reference:

QUESTION 4

Which two Python libraries are used to write a script to retrieve network device information using RESTCONF? (Choose two.)

- A. PySNMP
- B. requests
- C. ncclient
- D. YANG
- E. json

Correct Answer: BE

Section: 1.0 Network Programmability Foundation

Explanation

Explanation/Reference:

QUESTION 5 Which command configures the remote peer when the Cisco IOS XR Traffic Controller is used?

- A. **peer-sync ipv4 192.168.0.3**
- B. **state ipv4 192.168.0.3**
- C. **peer ipv4 192.168.0.3**
- D. **state-sync ipv4 192.168.0.3**



Correct Answer: D

Section: 1.0 Network Programmability Foundation

Explanation

Explanation/Reference:

Reference: https://www.cisco.com/c/en/us/td/docs/routers/asr9000/software/asr9k-r6-2/segment-routing/configuration/guide/b-segment-routing-cg-asr9000-62x/b-seg-routing-cg-asr9000-62x_chapter_01001.html

QUESTION 6

An automation engineer is trying to configure a destination group to use dial-out telemetry with gRPC on a Cisco IOS XR platform. The template created is failing to apply. Which parameters must be configured?

- A. source IP address, source port, encoding, and sampling interval
- B. source IP address, source port, encoding, and protocol
- C. destination IP address, destination port, encoding, and sensor path
- D. destination IP address, destination port, encoding, and protocol

Correct Answer: D

Section: 1.0 Network Programmability Foundation

Explanation

Explanation/Reference:

Reference: https://www.cisco.com/c/en/us/td/docs/iosxr/asr9000/telemetry/b-telemetry-cg-asr9000-61x/b-telemetry-cg-asr9000-61x_chapter_010.html

QUESTION 7 Which two use cases are valid for Cisco WAN Automation Engine?

(Choose two.)

- A. deployment of SR policies
- B. integration with Cisco XTC
- C. what-if analysis
- D. device manager
- E. network controller

Correct Answer: AB

Section: 2.0 Automation APIs and Protocols

Explanation

Explanation/Reference:

Reference: <https://www.ciscolive.com/c/dam/r/ciscolive/apjc/docs/2018/pdf/BRKSPG-2008.pdf> Slide 16

QUESTION 8

```
- name: configure global bgp as 65000
  iosxr_bgp:
    bgp_as: 65000
    router_id: 1.1.1.1
    neighbors:
      - neighbor: 182.168.10.1
        remote_as: 500
        description: PEER_1
      - neighbor: 192.168.20.1
        remote_as: 500
        update_source: GigabitEthernet 0/0/0/0
  address_family:
    - name: ipv4
      cast: unicast
      networks:
        - network: 192.168.2.0/23
        - network: 10.0.0.0/8
      redistribute:
        - protocol: ospf
          id: 400
          metric: 110
```



Refer to the exhibit. What is the result of the Ansible task?

- A. It configures a Cisco IOS XR router with BGP AS65000 with two neighbors and redistributes OSPF into BGP.
- B. It validates the BGP configuration on a Cisco IOS XR router, but it is a read-only module and cannot modify the configuration on the router.
- C. It validates the BGP configuration on a Cisco IOS XE router, but it is a check mode-only network module and cannot modify the configuration on the router.
- D. It configures a Cisco IOS router with BGP on AS500 and redistributes OSPF into BGP.

Correct Answer: A

Section: 2.0 Automation APIs and Protocols

Explanation

Explanation/Reference:

Reference: https://docs.ansible.com/ansible/latest/modules/iosxr_bgp_module.html

QUESTION 9

Which schema allows device configuration elements to be enclosed within a remote procedure call message when NETCONF is implemented?

- A. JSON-RPC
- B. XML
- C. YAML
- D. JSON

Correct Answer: B

Section: 2.0 Automation APIs and Protocols

Explanation

Explanation/Reference:

Reference: <https://books.google.com/books?id=jWVsAQAAQBAJ&pg=PA21&lpg=PA21&dq=schema+allows+device+configuration+elements+to+be+enclosed+within+a+remote+procedure+call+message+when+NETCONF+is+implemented&source=bl&ots=mcS25iO8ec&sig=ACfU3U08SQUN0Y7L2-An37GjHRqBzLGFUA&hl=en&sa=X&ved=2ahUKEwir16OF4dbpAhV7GjQIHc64B5kQ6AEwAHoECAoQAQ#v=onepage&q=schema%20allows%20device%20configuration%20elements%20to%20be%20enclosed%20within%20a%20remote%20procedure%20call%20message%20when%20NETCONF%20is%20implemented&f=false>

QUESTION 10 What is a key feature of YANG?

- A. use identification
- B. error prediction
- C. JAVA compatibility
- D. reusable types and groupings

Correct Answer: D

Section: 2.0 Automation APIs and Protocols

Explanation

Explanation/Reference:

Reference: https://www.cisco.com/c/en/us/td/docs/optical/ncs1000/60x/b_Datamodels_cg_ncs1000/b_Datamodels_cg_ncs1000_chapter_00.html

QUESTION 11 What are two characteristics of the NFV architecture approach? (Choose two.)

- A. It decouples the network functions from proprietary hardware appliances.
- B. It provides 70% more efficiency of network infrastructure.
- C. It is specially designed for Internet providers.
- D. It is specially designed for telecommunications service providers.
- E. It typically includes a hypervisor.

Correct Answer: AE

Section: 2.0 Automation APIs and Protocols

Explanation

Explanation/Reference:

Reference: <https://www.ciscolive.com/c/dam/r/ciscolive/us/docs/2016/pdf/LTRSPM-2022.pdf>

QUESTION 12 A Cisco NSO service has just been deployed. Which Cisco NSO CLI command is used to inspect the resulting device configuration changes before the changes are pushed to the network?

- A. **show service impact**
- B. **commit dry-run outformat native**
- C. **pseudo-commit**
- D. **show dry-run output**

Correct Answer: B

Section: 2.0 Automation APIs and Protocols**Explanation****Explanation/Reference:****QUESTION 13**

```
RP/0/RP0/CPU0:XR_CORE666#conf t
Fri May 19 10:45:31.136 UTC
RP/0/RP0/CPU0:XR_CORE666(config)#pce
RP/0/RP0/CPU0:XR_CORE666(config-pce)#address ipv4 10.10.0.15
RP/0/RP0/CPU0:XR_CORE666(config-pce)#commit
```

Refer to the exhibit. XTC has been configured by an engineer. What does the IPv4 address represent on the snippet?

- A. local address of the router on which it listens for PCEP
- B. configured for the local peer for state synchronization
- C. destination address of the router on which it listens for PCEP
- D. configured for the remote peer for state synchronization

Correct Answer: A

Section: 2.0 Automation APIs and Protocols**Explanation****Explanation/Reference:**

Reference: <http://ipnetworkgeek.blogspot.com/2017/05/path-disjointness-with-ios-xr-traffic.html>

QUESTION 14 An engineer is deploying a Python script to manage network devices through SSH. Which library based on Paramiko is used?

- A. sshmiko
- B. paramiko.agent
- C. libssh2
- D. netmiko

Correct Answer: D

Section: 2.0 Automation APIs and Protocols**Explanation****Explanation/Reference:**

Reference: <https://pynet.twb-tech.com/blog/automation/netmiko.html>

QUESTION 15


```
from ydk.services import CRUDService
from ydk.providers import NetconfServiceProvider
from ydk.models.cisco_ios_xr import Cisco_IOS_XR_shellutil_oper \
    as xr_shellutil_oper
from datetime import timedelta

if __name__ == "__main__":
    """Main execution path"""
    provider = NetconfServiceProvider(address="10.0.0.1",
                                     port=830,
                                     username = "admin",
                                     password = "admin",
                                     protocol = "ssh")

    crud = CRUDService()
    system_time = xr_shellutil_oper.SystemTime()
    system_time = crud.read(provider, system_time)
    print("System uptime is" +
          str(timedelta(seconds=system_time.uptime.uptime)))
    exit()
```

Refer to the exhibit. Regarding the Python script using YDK, what is the result for a device that is running Cisco IOS XR Software?

- A. retrieves the system time
- B. configures the system time
- C. prints the uptime of the CRUDService
- D. prints the system uptime

Correct Answer: D

Section: 2.0 Automation APIs and Protocols

Explanation

Explanation/Reference:

QUESTION 16 What is a benefit of Ansible for automating IOS XE or IOS XR platforms?

- A. Playbooks can be written in XML format.
- B. It has agent support
- C. It supports asynchronous orchestration.
- D. It offers native orchestration support for Cisco platforms.

Correct Answer: D

Section: 2.0 Automation APIs and Protocols

Explanation

Explanation/Reference:

QUESTION 17

An engineer must change from using NETCONF for streaming telemetry to telemetry data using gRPC framework because NETCONF uses XML for message and payload encoding. Which two messages and payload encodings does gNMI use? (Choose two.)

- A. gNMI notifications with XML
- B. protobuf notifications with XML
- C. protobuf payload
- D. JSON payload
- E. gNMI notifications with JSON

Correct Answer: CE

Section: 2.0 Automation APIs and Protocols

Explanation

Explanation/Reference:

Reference: https://books.google.com/books?id=4AqXDwAAQBAJ&pg=PT131&lpg=PT131&dq=messages+and+payload+encodings+does+gNMI+use&source=bl&ots=81hpFjIZ_9&sig=ACfU3U1EAEwjRMBnCiHNESBwFLHvZDHkBW&hl=en&sa=X&ved=2ahUKEwjirNeZptfpAhXDoFsKHeqMBFsQ6AEwBHoECAsQAQ#v=onepage&q=messages%20and%20payload%20encodings%20does%20gNMI%20use&f=false

QUESTION 18 Which two commands generate a template using Cisco NSO to build a service package? (Choose two.)

- A. **show running-config devices device ce-ios config ios:interface Loopback 0 | display template.xml**
- B. **show running-config devices device ce-ios config ios:interface Loopback 0 | display xml | save template.xml**
- C. **request running-config devices device ce-ios config ios:interface Loopback 0 | display xml**
- D. **show running-config devices device ce-ios config ios:interface Loopback 0**
- E. **show running-config devices device ce-ios config ios:interface Loopback 0 | display xml**

Correct Answer: AC

Section: 2.0 Automation APIs and Protocols

Explanation

Explanation/Reference:

QUESTION 19

When using Cisco YDK, which syntax configures the BGP ASN using OpenConfig BGP?

- A. **bgp.config.as_ = 65000**
- B. **bgp.global_.config.as = 65000**
- C. **bgp.global.config.as_ = 65000**
- D. **bgp.global_.config.as_ = 65000**

Correct Answer: D

Section: 2.0 Automation APIs and Protocols

Explanation

Explanation/Reference:

Reference: <https://www.ciscolive.com/c/dam/r/ciscolive/emea/docs/2019/pdf/BRKNMS-2032.pdf>

QUESTION 20

An engineer wants to replace the BLOCK_BAD ACL on the Cisco IOS XE router with this new content. The engineer wants to use RESTCONF for this and constructs a PUT request to the **resource/restconf/data/native/ip/access-list/Cisco-IOS-XE-acl:extended=BLOCK_BAD**. What must the body look like to achieve the Cisco IOS XE configuration?

Desired configuration:




```
ip access-list extended BLOCK_BAD
permit ip any host 192.168.20.1
deny ip any any
```

```
{
  "ip": {
    "access-list": {
      "Cisco-IOS-XE-acl:extended": {
        "name": "BLOCK_BAD",
        "access-list-seq-rule": [{
          "sequence": "10",
          "ace-rule": {
            "action": "permit",
            "protocol": "ip",
            "any": [
              null
            ],
            "dst-host": "192.168.20.1"
          }
        },
        {
          "sequence": "20",
          "ace-rule": {
            "action": "deny",
            "protocol": "ip",
            "any": [
              null
            ],
            "dst-any": [
              null
            ]
          }
        }
      ]
    }
  }
}
```

A.

B.

```
{
  "name": "BLOCK_BAD",
  "access-list-seq-rule": [
    {
      "sequence": "10",
      "ace-rule": {
        "action": "permit",
        "protocol": "ip",
        "any": [
          null
        ],
        "dst-host": "192.168.20.1"
      }
    },
    {
      "sequence": "20",
      "ace-rule": {
        "action": "deny",
        "protocol": "ip",
        "any": [
          null
        ],
        "dst-any": [
          null
        ]
      }
    }
  ]
}
```



C.

```
{
  "Cisco-IOS-XE-acl:extended": {
    "name": "BLOCK_BAD",
    "access-list-seq-rule": [
      {
        "sequence": "10",
        "ace-rule": {
          "action": "permit",
          "protocol": "ip",
          "any": [
            null
          ],
          "dst-host": "192.168.20.1"
        }
      },
      {
        "sequence": "20",
        "ace-rule": {
          "action": "deny",
          "protocol": "ip",
          "any": [
            null
          ],
          "dst-any": [
            null
          ]
        }
      }
    ]
  }
}
```



D.

```
{
  "Cisco-IOS-XE-acl:extended": {
    (
      "name": "BLOCK_BAD",
      "access-list-seq-rule": [
        {
          "sequence": "10",
          "ace-rule": {
            "action": "permit",
            "protocol": "ip",
            "any": [
              null
            ],
            "dst-host": "192.168.20.1"
          }
        },
        {
          "sequence": "20",
          "ace-rule": {
            "action": "deny",
            "protocol": "ip",
            "any": [
              null
            ],
            "dst-any": [
              null
            ]
          }
        }
      ]
    )
  }
}
```



Correct Answer: D

Section: 2.0 Automation APIs and Protocols

Explanation

Explanation/Reference:

QUESTION 21

```
RP/0/RP0/CPU0:iosxrv-1#show telemetry model-driven subscription
Fri Aug 23 20:39:44.122 UTC
Subscription:          Interface          State: NA
-----
Sensor groups:
Id                    Interval(ms)      State
Interface-Counters    30000            Resolved

Destination Groups:
Id                    Encoding          Transport  State Port  Vrf  IP
DEST1                self-describing-gpb  grpc      NA   5432  Mgmt-intf 172.16.1.12
TLS :                172.16.1.12
```

Refer to the exhibit. What is the cause of the status of the interface subscription?

- A. The router cannot establish a gRPC connection with the collector.
- B. The sensor-group "Interface-Counters" does not contain a valid YANG path.
- C. The router is waiting for a collector to dial in.
- D. This is the expected state of an active subscription.

Correct Answer: B

Section: 2.0 Automation APIs and Protocols Explanation

Explanation/Reference:



QUESTION 22

```
tasks:
- name: run show version on remote devices
  iosxr_command:
    commands: show version
```

Refer to the exhibit. What must be added after the last line of the Ansible playbook to check if the output contains "IOS-XR"?

- A. **wait_for: result[1] contains "IOS-XR"**
- B. **wait_for: result[0] contains IOS-XR**
- C. **notify: "IOS-XR"** D. **wait_for_connection:**

Correct Answer: B

Section: 2.0 Automation APIs and Protocols Explanation

Explanation/Reference:

QUESTION 23

```
"request": {  
  "url": "http://{{server}}:{{port}}/restconf/data/l3vpn:vpn/l3vpn=test",  
  "method": "POST",  
<snip>
```

Refer to the exhibit. An automation engineer has created a RESTCONF POST to configure network devices. Which two tasks are accomplished when the code is executed? (Choose two.)

- A. If the specified configuration is already in the running configuration, the command is replaced by this request.
- B. If the specified configuration is already in the running configuration, the command is not replaced by this request.
- C. If the specified configuration is already executed in the running configuration, the command is merged with this request.
- D. If the specified configuration is already in the running configuration, the command updates this request.
- E. If the specified configuration is not on the device, the POST request creates it.

Correct Answer: DE

Section: 2.0 Automation APIs and Protocols Explanation

Explanation/Reference:

QUESTION 24


```
def configure_ip_address(interface, ip, length):
    url = BASE_URL + "/data/ietf-interfaces:intefaces/interface={i}".format(
        i = interface
    )
    data = OrderedDict(
        [
            (
                "ietf-interfaces:interface",
                OrderedDict(
                    [
                        ("name", interface),
                        ("type", "iana-if-type:ethernetCsmacd"),
                        (
                            "ietf-ip:ipv6",
                            OrderedDict(
                                [
                                    (
                                        "address",
                                        [OrderedDict([("ip", ip), ("prefix-length", length)])],
                                    )
                                ]
                            )
                        )
                    ]
                )
            ),
        ]
    )

    response = requests.put(
        url, auth=(USERNAME, PASSWORD), headers=HEADERS, verify=False, json=data
    )

    print(response.status_code)

configure_ip_address("GigabitEthernet2", "2001:db8:636c:6179:2063:7572:7469:7300", "64")
```



Refer to the exhibit. What is the effect of the script on the device?

- A. All interfaces except GigabitEthernet2 are reset to their default configurations.
- B. It replaces the entire configuration for GigabitEthernet2 on the device using RESTCONF.
- C. It merges the new configuration with the existing configuration on the device using RESTCONF.
- D. It compares the configuration to the device. If it matches, the device sends back an HTTP 204 status code.

Correct Answer: C

Section: 2.0 Automation APIs and Protocols Explanation

Explanation/Reference:

QUESTION 25 What are two benefits of using Cisco NSO? (Choose two.)

- A. It abstracts the device adapter and complex device logic from the service logic.

- B. It uses load balancing services for better traffic distribution.
- C. It easily integrates into northbound systems and APIs.
- D. It can replace the CI/CD pipeline tools.
- E. It automatically discovers all deployed services.

Correct Answer: AC

Section: 3.0 Network Device Programmability

Explanation

Explanation/Reference:

Reference: <https://www.ciscolive.com/c/dam/r/ciscolive/us/docs/2018/pdf/BRKDCN-2498.pdf>

QUESTION 26 After a configuration request is sent using NETCONF, which call releases any locks and resources associated with the session?

- A. <exit-operation>
- B. <close-activity>
- C. <close-session>
- D. <boot-app>

Correct Answer: C

Section: 3.0 Network Device Programmability

Explanation

Explanation/Reference:

Reference: <https://tools.ietf.org/html/rfc6241>

QUESTION 27

```
<edit-config xmlns= "urn:ietf:params:xml:ns:netconf:base:1.0">
  <target>
    <candidate/>
  </target>
<config>
  <host-names xmlns= "http://cisco.com/ns/yang/Cisco-IOS-XR-shellutil-cfg">
    <host-name>IOS-XR-SJC-19</host-name>
  </host-names>
</config>
</edit-config>
```

Refer to the exhibit. After this operation, what else is needed to change the hostname of the router to IOS-XR-SJC-19?

- A. <confirm>
- B. <close-session>
- C. <get-config>
- D. <commit>

Correct Answer: D

Section: 3.0 Network Device Programmability

Explanation

Explanation/Reference:

QUESTION 28

```
<?xml version= "1.0" encoding= "UTF-8" ?>
<employees>
  <employee>
    <id>1</id>
    <firstName>Jane</firstName>
    <firstName>Doe</lastName>
  </employee>
  <employee>
    <id>2</id>
    <firstName>Tim</firstName>
    <lastName>Public</lastName>
  </employee>
  <employee>
    <id>3</id>
    <firstName>John</firstName>
    <lastName>Doe</latName>
  </employee>
</employees>
```

Refer to the exhibit. Using the provided XML snippet, which Xpath expression prints "Jane"?

- A. //employee[1]/firstName/value()
- B. //employee[0]/firstName/value()
- C. //employee[1]/firstName/text()
- D. //employee[0]/firstName/text()



Correct Answer: D

Section: 3.0 Network Device Programmability

Explanation

Explanation/Reference:

QUESTION 29 Which data format should be used to serialize structured data in the most compact way?

- A. protobufs
- B. YAML
- C. JSON
- D. XML

Correct Answer: B

Section: 3.0 Network Device Programmability

Explanation

Explanation/Reference:

Reference: <https://www.sitepoint.com/data-serialization-comparison-json-yaml-bson-messagepack/>

QUESTION 30

```
module: Cisco-IOS-XR-isis-cfg
  +--rw isis
    +--rw instances
      +--rw instance* [instance-name]
        +--rw nets
          +--rw net* [net-name]
            +--rw net-name      xr:Osi-net
```

Refer to the exhibit. Which XML output is a valid instantiation of the YANG model? A.

```
<isis>
  <instances>
    <instance>
      <instance-name>1</instance-name>
      <nets>
        <net>
          <net-name>49.0010.0100.1001.00</net-name>
        </net>
      <nets>
    </instance>
  </instances>
</isis>
```

```
<isis>
  <instances>
    <instance>1</instance>
    <nets>
      <net>xr:Osi-net 49.0100.1001.00</net>
    <nets>
  </instances>
</isis>
```

B.

```
<isis>
  <instances>
    <instance>
      <instance-name>
        <nets>
          <net>
            <net-name>
              1, 49.0010.0100.1001.00
            </net-name>
          </net>
        </nets>
      </instance-name>
    </instance>
  </instances>
</isis>
```

```
<isis>
  <instances>
    <instance>
      <instance-name>1</instance-name>
      <nets>
        <net>
          <net-name>[49.0010.0100.1001.00]</net-name>
        </net>
      </nets>
    </instance>
  </instances>
</isis>
```



C.

D.

Correct Answer: A

Section: 3.0 Network Device Programmability

Explanation

Explanation/Reference:

QUESTION 31

DRAG DROP

Drag and drop the components of Cisco Network Services Orchestrator from the left onto the correct definitions on the right.

Select and Place:

Correct Answer:

Section: 3.0 Network Device Programmability

Explanation

Explanation/Reference:

QUESTION 32

`<operation> /<api-entry>/<path>?<query>#<fragment>`

Refer to the exhibit. Which two URI entries are optional and functional in this RESTCONF URI structure? (Choose two.)

- A. fragment
- B. query
- C. operation
- D. api-entry
- E. path



Correct Answer: BE

Section: 3.0 Network Device Programmability

Explanation

Explanation/Reference:

Reference: <https://www.ciscolive.com/c/dam/r/ciscolive/apjc/docs/2016/pdf/DEVNET-1081.pdf> page 25

QUESTION 33

The Netmiko BaseConnection class contains a method called “send_config_set()”. Which two actions does this method perform on the device? (Choose two.)

- A. It takes a filename parameter that executes commands contained in that file on the device.
- B. It requires the user to explicitly send **configure terminal** and **exit** commands to the device to enter and exit configuration mode.
- C. It automatically enters and exits configuration mode on the device.
- D. It takes a Python iterable, such as a list of commands, and executes them in order on the device.
- E. It saves the running configuration to the startup configuration after executing the configuration commands on the device.

Correct Answer: CD

Section: 3.0 Network Device Programmability

Explanation

Explanation/Reference:

QUESTION 34 How does using the Python **with** statement in conjunction with ncclient manager improve an existing NETCONF automation script?

- A. It allows the NETCONF connection to the device to be gracefully closed without having to explicitly code this action.
- B. It manages the running configuration of the device by comparing it to the new configuration applied using NETCONF.
- C. The **with** statement tries to connect to the device using TCP port 830 first but also tries to connect via TCP port 22.
- D. Use of the **with** statement catches any exceptions when trying to connect to a device using NETCONF.

Correct Answer: D

Section: 3.0 Network Device Programmability

Explanation

Explanation/Reference:

QUESTION 35

```
a = 11
b = 22
c = 33
d = 44

def swap1(a, b) :
    if a == b:
        return 2 * a, b
    else:
        a, b = b, a
        return a, b

def swap2(c, d) :
    if c < d:
        print(d, 2 * c)
    else:
        print(44, 22)
```



Refer to the exhibit. Which command prints out (44, 22) when this code is run on Python 3?

- A. `print(swap1(d, b))`
- B. `print(swap2(a, b))`
- C. `print(swap1(b, d))`
- D. `print(swap2(22, 44))`

Correct Answer: C

Section: 3.0 Network Device Programmability

Explanation

Explanation/Reference:

QUESTION 36

```
<config-template xmlns= "http://tail-f.com/ns/config/1.0"
  servicepoint= "acl_lab">
  <devices xmlns= "http://tail-f.com/ns/ncs">
    <device foreach= "{/devices}">
      <name>{/device_name}</name>
      <config>
        <vlan xmlns= "urn:ios">
          <vlan-list>
            <id>{/vlan-number}</id>
            <name>{/name}</name>
          </vlan-list>
        </vlan>
      </config>
    </device>
  </devices>
</config-template>
```

Refer to the exhibit. An engineer updated the skeleton template. How can a device be entered into the YANG Model?

- A. Modify the device instance of the device by referencing the acl_lab variable from our YANG model.
- B. Deploy a service instance that configures a VLAN of all of the devices present in Cisco NSO.
- C. Deploy a service instance that configures a VLAN of a list of devices referenced to the service YANG model.
- D. Modify the device instance by referencing the device variable from our YANG model.

Correct Answer: D

Section: 3.0 Network Device Programmability

Explanation

Explanation/Reference:

QUESTION 37

```
#!/user/bin/env python

import json
import requests

NE = {
    "device":{
        "name": "ios-device",
        "address": "192.168.0.1",
        "port":22,
        "state":{
            "admin-state": "unlocked"
        },
        "authgroup": "default",
        "device-type":{
            "cli":{
                "ned-id": "tailf-ned-cisco-ios-id:cisco-ios"
            }
        }
    }
}

def main():
    baseUri = "http://localhost:8080/restconf/data"
    auth = ('john', 'suoer123')
    headers = {'Content-Type': 'application/yang-data+json'}
    response = requests.put(baseUri + '/devices/device=ios-device', auth=auth, headers=headers,
                           data=json.dumps(NE))
    print(response)

    baseUriOperation = "http://localhost:8080/restconf/operations"
    
    response = requests.post(baseUriOperation + "/devices/device=ios3/sync-from. auth=auth, headers=headers)
    print(response)

if __name__ == "__main__":|
    main()
```

Refer to the exhibit. A Python script is created to add a new device on Cisco NSO using RESTCONF API. The device is added successfully, but a 405 Method Not Allowed RESTCONF error code has received as the line to fetch SSH keys runs. Which code is missing to complete the script?

- A. `response = requests.put(baseUriOperation + "/devices/device=ios-device/ssh/fetch-host-keys", auth=auth, headers=headers)`
- B. `response = requests.post(baseUriOperation + "/devices/device=ios-device/ssh/fetch-host-keys", auth=auth, headers=headers)`
- C. `response = requests.post(baseUriOperation + "/devices/device=ios-device/ssh/request-host-keys", auth=auth, headers=headers)`
- D. `response = requests.put(baseUriOperation + "/devices/device=ios-device/ssh/request-host-keys", auth=auth, headers=headers)`

Correct Answer: C

Section: 3.0 Network Device Programmability

Explanation

Explanation/Reference:

QUESTION 38

```
pyang -f tree family.yang

module: family
augment /ncs:services:
+-----rw family* [father]
| +-----x check-sync
| | +-----w input
| | | +-----w outformat?          outformat4
| | | +-----w (depth)?
| | | | +----: (deep)
| | | | | +-----w deep?          empty
| | | | +-----: (shallow)
```

Refer to the exhibit. What is the significance of "*" before the "father" leaf that is shown in the pyang tree output?

- A. It is a node list in a leaf type node.
- B. The father leaf is a key in the family list type.
- C. The leaf father is read-write in the family list.
- D. The node father is read-only in the family list.



Correct Answer: C

Section: 3.0 Network Device Programmability

Explanation

Explanation/Reference:

QUESTION 39 An engineer needs to configure network devices in an automated way. Which two ways are used to create structured data using YANG to provide REST-like APIs to enable programmability access? (Choose two.)

- A. YAML
- B. JSON
- C. GPB
- D. JSON-RPC
- E. XML

Correct Answer: BE

Section: 3.0 Network Device Programmability

Explanation

Explanation/Reference:

Reference: https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/prog/configuration/166/b_166_programmability_cg/restconf_prog_int.pdf

QUESTION 40 Which two data formats are human readable? (Choose two.)

- A. YAML
- B. Apache Arrow
- C. gRPC
- D. binary
- E. JSON

Correct Answer: AE

Section: 3.0 Network Device Programmability

Explanation

Explanation/Reference:

QUESTION 41

A user is debugging a problem with model-driven dial-in/out streams with gRPC for a Cisco IOS XR implementation. There is no streaming data and the path is not resolved when the **show telemetry model-driven subscription** command is issued on the router. What is the cause of the problem?

- A. The emsd process is not running.
- B. There are polling interval problems.
- C. SNMP is not enabled.
- D. There is no support for IOS XR 64-bit.

Correct Answer: A

Section: 3.0 Network Device Programmability

Explanation

Explanation/Reference:

Reference: <https://community.cisco.com/t5/service-providers-documents/implementing-grpc-telemetry-on-xr-devices/ta-p/3393966>

QUESTION 42

```

module abc_service {
  namespace "http://com/abc/service";
  prefix abc_service;

  import ietf-inet-types { prefix inet; }
  import tailf-ncs { prefix ncs; }
  imports tailf-common { prefix tailf; }
  import tailf-ned-cisco-ios { prefix ios; }

  augment "/ncs:services" {

    list abc_service {
      key "name";
      ncs:servicepoint "abc_service";

      leaf name {
        mandatory true;
        type string;
      }
      list link {
        key "router_name";

        leaf router_name {
          mandatory true;
          type leafref {
            path "/ncs:devices/ncs:device/ncs:name";
          }
        }
      }
    }
  }
}

```



Refer to the exhibit. Based on the YANG presented, what is the correct xpath to retrieve the router named "ios-device" under the "CustomerA" service name?

- A. /ncs:abc_service/CustomerA/ios-device
- B. /abc_service/CustomerA/"ios-device"
- C. /ncs:service/abc_service/"CustomerA"/ios-device
- D. /ncs:services/abc_service/CustomerA/ios-device

Correct Answer: D

Section: 3.0 Network Device Programmability

Explanation

Explanation/Reference:

QUESTION 43

What are two fundamental design constraints of a RESTful API? (Choose two.)

- A. It includes a series of interactions to the API that are dependent on one another.
- B. It is dependent on the communication protocol being HTTP.
- C. It exposes procedures or functions for a client call.
- D. Each interaction is independent from all others on the server side.
- E. It is a client-server communication model where the client and the server are independent of one another.

Correct Answer: DE

Section: Automation and Orchestration Platforms

Explanation

Explanation/Reference:

QUESTION 44 Which two operations must be used to allow a network engineer to use NETCONF to configure and manage networking devices? (Choose two.)

- A. <get-config>
- B. <open-session>
- C. <close-session>
- D. <remove-config>
- E. <put>

Correct Answer: AC

Section: Automation and Orchestration Platforms

Explanation

Explanation/Reference:



QUESTION 45

FILL BLANK

Fill in the blank to complete the statement about NETCONF and Python libraries.

_____ is a Python library that facilitates client-side scripting and deploying changes to the network using the NETCONF protocol.

Correct Answer: Ncclient

Section: Automation and Orchestration Platforms

Explanation

Explanation/Reference:

Reference:

<https://pypi.org/project/ncclient/>

QUESTION 46

```
module: Cisco-IOS-XR-telemetry-model-driven-cfg
  x--rw telemetry-model-driven
    +--rw sensor-groups
      +--rw sensor-group* [sensor-group-identifier]
        +--rw sensor-paths
          |   +--rw sensor-path* [telemetry-sensor-path]
          |   +--rw telemetry-sensor-path string
          +--rw sensor-group-identifier xr:Cisco-ios-xr-string
```

Refer to the exhibit. Which JSON output is a valid instantiation of the YANG model?

```
(Cisco-IOS-XR-telemetry-model-drive-cfg:telemetry-model-driven": {
  "sensor-groups": {
    "sensor-group": [{
      "sensor-paths": {
        "sensor-path": [
          ("telemetry-sensor-path": "openconfig-interfaces:interfaces"),
          ("telemetry-sensor-path": "openconfig-platform:components"),
        ]
      },
      "sensor-group-identifier": "Interface-Counters",
    }]
  }
})
```

```
{
  "Cisco-IOS-XR-telemetry-model-drive-cfg:telemetry-model-driven": {
    "sensor-groups": {
      "sensor-group-identifier": "Interface-Counters",
      "sensor-paths": {
        {"telemetry-sensor-path": "openconfig-interfaces:interfaces"},
        {"telemetry-sensor-path": "openconfig-platform:components"},
      }
    }
  }
}
```

```
{Cisco-IOS-XR-telemetry-model-drive-cfg:telemetry-model-driven": {
  "sensor-groups": {
    "sensor-group": [{
      "sensor-group-identifier": "Interface-Counters",
      "sensor-paths": {
        "sensor-path": [
          {"telemetry-sensor-path": "openconfig-interfaces:interfaces"},
          {"telemetry-sensor-path": "openconfig-platform:components"},
        ]
      }
    }]
  }
}}
```

A.

B. C.

```
(
  "Cisco-IOS-XR-telemetry-model-drive-cfg:telemetry-model-driven": (
    "sensor-groups": (
      "sensor-group": [(
        "sensor-group-identifier": "Interface-Counters",
        "sensor-paths": (
          "sensor-path": [
            ("telemetry-sensor-path": "openconfig-interfaces:interfaces"),
            ("telemetry-sensor-path": "openconfig-platform:components"),
          ]
        )
      )]
    )
  )
)
```

D.



Correct Answer: D

Section: Automation and Orchestration Platforms

Explanation

Explanation/Reference:

QUESTION 47

```
#!/usr/bin/env python

from ydk.models.openconfig.openconfig_interfaces import Interfaces
from ydk.errors import YError

def read_interfaces(crud_service, provider):

    intf_f = Interfaces()

    try:
        interfaces = crud_service.read(provider, intf_f)
        for interface in interfaces.interface:
            print(interface.name)
    except YError:
        print('An error occurred.')
```

Refer to the exhibit. When YDK is used to interact with Cisco routers, what is the purpose of passing `intf_f` into the `crud_service.read()` method?

- A. The **Interfaces()** class acts as a NETCONF filter, which limits the data returned to that of the openconfig:interfaces YANG model.
- B. It provides the data types of the openconfig:interfaces model to the router for dynamic configuration of the interfaces.
- C. It locks the interfaces from modification by other active NETCONF sessions.
- D. It passes default values into the **crud_service**, which reconfigures all interfaces to their default configurations.

Correct Answer: D

Section: Automation and Orchestration Platforms

Explanation

Explanation/Reference:

QUESTION 48

You create a simple service package skeleton in Cisco NSO using `ncs-make-package --service-skeleton template vlan`. Which two steps must be performed to complete the service? (Choose two.)

- A. Create the VLAN service template in XML.
- B. Modify the VLAN FastMap algorithm.
- C. Start the VLAN Python VM.
- D. Create the VLAN service model in YANG.
- E. Compile the VLAN NED.

Correct Answer: DE

Section: Automation and Orchestration Platforms

Explanation

Explanation/Reference:

QUESTION 49 Which NETCONF datastore is locked while the network device configuration is edited?



- A. running
- B. common
- C. startup
- D. working

Correct Answer: A

Section: Automation and Orchestration Platforms

Explanation

Explanation/Reference:

QUESTION 50

Which Git command is needed to stage the file `network-deploy.py` to then commit the changes to the revision history?

- A. `git init network-deploy.py`
- B. `git add network-deploy.py`
- C. `git merge network-deploy.py`
- D. `git commit network-deploy.py`

Correct Answer: B

Section: Automation and Orchestration Platforms

Explanation

Explanation/Reference:

QUESTION 51

```
curl -u john:password http://192.168.10.20
```

Refer to the exhibit. Which HTTP authentication mechanism is being used?

- A. simple
- B. basic
- C. OAuth
- D. token

Correct Answer: B

Section: Automation and Orchestration Platforms

Explanation

Explanation/Reference:

QUESTION 52 Which statement describes the Cisco ESC core engine component?

- A. It interacts with the top orchestration layer using the REST and NETCONF/YANG NB APIs.
- B. It can be configured for high availability and cluster mode.
- C. It performs monitoring based on several monitoring methods.
- D. It manages transactions, validations, policies, workflows, VM state machines, and rollbacks.

Correct Answer: D

Section: Automation and Orchestration Platforms

Explanation

Explanation/Reference:

**QUESTION 53**

```
def main():
    """
    Main method that prints netconf capabilities of device.
    """
    device = {"ip": "10.2.101.11", "port": "830", "platform":
"csr",}
    with manager.connect(host=device['ip'],
port=device['port'], username='admin',
                        password= 'cisco.123',
hostkey_verify=False,
                        device_params={'name':
device['platform']},
                        look_for_keys=False,
allow_agent=False) as m:
        rpc = ' ' ' '
                <config>
                    <native
xmlns= "http://cisco.com/ns/yang/Cisco-IOS-XE-native">
                        <router>
                            <ospf
xmlns= "http://cisco.com/ns/yang/Cisco-IOS-XE-ospf">
                                <id>100</id>
                                <router-id>1.1.1.1</router-id>
                                <network>
                                    <ip>10.1.1.0</ip>
                                    <mask>0.0.0.3</mask>
                                    <area>0</area>
                                </network>
                            </ospf>
                        </router>
                    </native>
                </config>
                . . .
        reply = m.edit_config(rpc, target= 'running')
        print(reply)
if __name__ == '__main__':
    main()
```



Refer to the exhibit. The ncclient Python script is captured from the ncclient import manager. Which configuration on the Cisco IOS XE device is the script used to enable?

- A. router ospf 100 router-id 1.1.1.1 network 10.1.1.0 0.0.0.3 area 0
- B. router ospf 100 network 10.1.1.0 0.0.0.3 area 0
- C. router ospf 100 router-id 10.1.1.0 network 1.1.1.1 0.0.0.3 area 0
- D. router ospf 100 router-id 1.1.1.1

Correct Answer: A

Section: Automation and Orchestration Platforms

Explanation

Explanation/Reference:

QUESTION 54

An engineer just completed the installation of Cisco NSO and all of its components. During testing, some of the services are not working properly. To resolve the issue, the engineer started undeploying service instances. What can this cause?

- A. It removes the service configuration from the network device only.
- B. It removes the service configuration from the network and NSO.
- C. It removes the service configuration from NSO only.
- D. It runs the service code again when the device is out of sync.

Correct Answer: B

Section: Automation and Orchestration Platforms

Explanation

Explanation/Reference:

QUESTION 55

What is an interior YANG data node that exists in at most one instance in the data tree and has no value?

- A. listing node
- B. tree node
- C. container node
- D. leaf node

Correct Answer: C

Section: Automation and Orchestration Platforms

Explanation



Explanation/Reference:

QUESTION 56

Which statement describes an asynchronous API communication?

- A. Asynchronous communication waits for a response.
- B. Synchronous communication is with a central orchestrator.
- C. It is not necessary to wait for availability of a resource.
- D. An application can freeze if there is no response from a request.

Correct Answer: C

Section: Automation and Orchestration Platforms

Explanation

Explanation/Reference:

QUESTION 57

```

module: openconfig-interfaces
+- --rw interfaces
+- --rw interface* [name]
+- --rw name                -> . ./config/name
+- --rw config
|   +- --rw type            identityref
|   +- --rw mtu?            uint16
|   +- --rw name?           string
|   +- --rw description?    string
|   +- --rw enabled?        boolean
+- --ro state
|   +- --ro type            identityref
|   +- --ro mtu?            uint16
|   +- --ro name?           string
|   +- --ro description?    string
|   +- --ro enabled?        boolean
|   +- --ro ifindex?        uint32
|   +- --ro admin-status    enumeration
|   +- --ro oper-status     enumeration
|   +- --ro last change?    yang:timeticks
|   +- --ro counters
|       +- --ro in-octets?    yang:counter64
|       +- --ro in-unicast-pkts? yang:counter64
|       +- --ro in-broadcast-pkts? yang:counter64

```



Refer to the exhibit. Which two configuration leaves in this YANG model are optional? (Choose two.)

- A. last-change
- B. oper-status
- C. type
- D. enabled
- E. mtu

Correct Answer: AE

Section: Automation and Orchestration Platforms

Explanation

Explanation/Reference:

QUESTION 58 Which is a format used for the YANG JSON content-type header?

- A. application/vnd yang.data+json
- B. application/vnd.yang.data+json
- C. application/yang.data.json
- D. application/vnd.yang.data json

Correct Answer: B

Section: Automation and Orchestration Platforms

Explanation

Explanation/Reference:

QUESTION 59

```
"request": {  
  "url": "http://{{server}}:{{port}}/restconf/data/l3vpn:vpn/l3vpn=test",  
  "method": "POST",  
<snip>
```

Refer to the exhibit. What are the two outcomes when the RESTCONF POST code is implemented? (Choose two.)

- A. A new VPN endpoint to a VPN is added.
- B. An L3VPN endpoint to a VPN is replaced.
- C. An L3VPN endpoint to a VPN is merged.
- D. A new L3VPN endpoint to a VPN is added.
- E. An L3VPN endpoint to a VPN is updated.

Correct Answer: DE

Section: Automation and Orchestration Platforms

Explanation

Explanation/Reference:

QUESTION 60 What are two advantages of using Python virtual environments? (Choose two.)

- A. They allow for multiple Python projects to use different versions of the same dependency without conflict.
- B. They allow multiple Python applications to share virtual memory between subprocesses.
- C. They allow for isolated environments where each can use a different version of Python.
- D. They allow for all Python projects to utilize the same set of shared dependencies.
- E. They allow for multiple virtual machines to share a single Python environment.

Correct Answer: AC

Section: Automation and Orchestration Platforms

Explanation

Explanation/Reference: