Hands-on Activity 9.1: Playbook for Building a CA with SSL	
Name: Torrecampo, Juan Piolo	Date: March 30, 2023
Course/Section: CPE 234 - CPE32S3	Instructor: Engr. Taylar

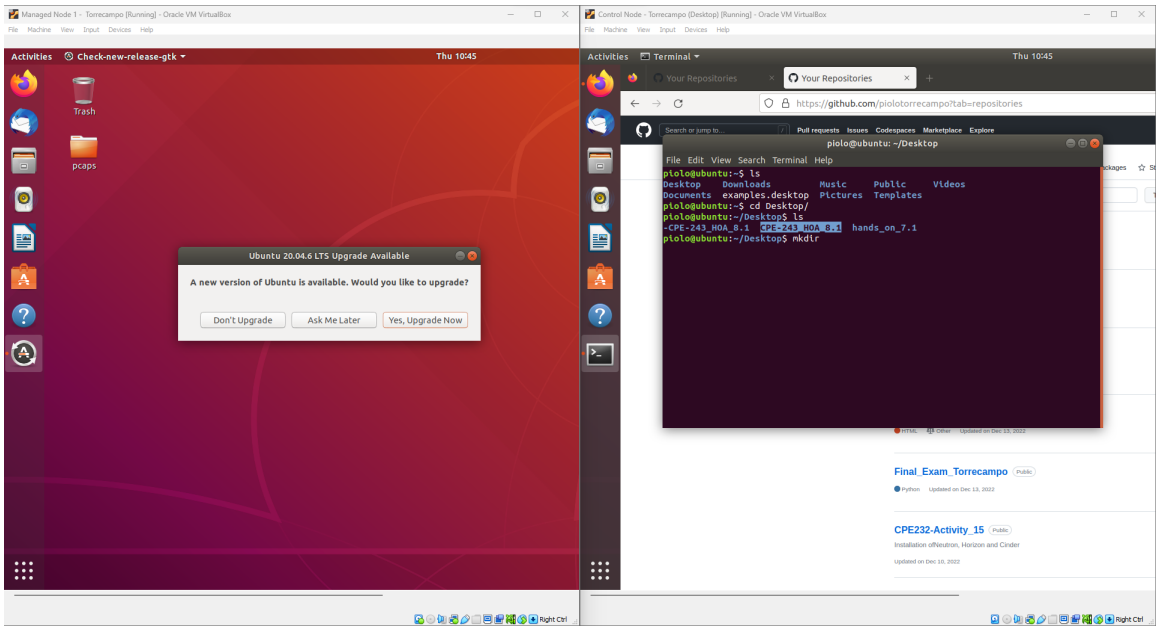
Procedure

Objectives:

- Create a Manage node and Control node (Choose Ubuntu or CentOS)
- Implement network using SSH-key-based authentication
- Create a playbook that allows the Manage node to build a CA with SSL in the Control Node
- Show input (codes), process (successful run), and output (evidence that CA with SSL was built)

Output

1. Creating managed node and control node.



2. Ensuring SSH-key-based authentication is implemented in the connection between two nodes.

```
piolo@ubuntu:~/Desktop$ ssh managed_node_one@managed_node_one
Welcome to Ubuntu 18.04.6 LTS (GNU/Linux 5.4.0-144-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage

 * Introducing Expanded Security Maintenance for Applications.
   Receive updates to over 25,000 software packages with your
   Ubuntu Pro subscription. Free for personal use.

     https://ubuntu.com/pro

Expanded Security Maintenance for Applications is not enabled.

20 updates can be applied immediately.
20 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

5 additional security updates can be applied with ESM Apps.
Learn more about enabling ESM Apps service at https://ubuntu.com/esm

Your Hardware Enablement Stack (HWE) is supported until April 2023.
Last login: Thu Mar 23 12:58:58 2023 from 192.168.56.103
managed_node_one@ubuntu:~$
```

3. Create a playbook that allows the Manage node to build a CA with SSL in the Control Node.

```
piolo@ubuntu:~/Desktop/CPE-243_HOA_9.1$ ansible all -m ping
[WARNING]: Found both group and host with same name: managed_node_one
managed_node_one | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3"
    },
    "changed": false,
    "ping": "pong"
}
```

```
piolo@ubuntu:~/Desktop/CPE-243_HOA_9.1$ tree
.
├── ansible.cfg
├── inventory
├── playbook.yml
└── roles
    └── ubuntu
        └── tasks
            └── main.yml

3 directories, 4 files
```

File Name	Content

inventory	`piolo@ubuntu:~/Desktop/CPE-243_HOA_9.1$ cat inventory`
	`[managed_node_one]`
	`managed_node_one ansible_user=managed_node_one`

ansible.cfg	`piolo@ubuntu:~/Desktop/CPE-243_HOA_9.1$ cat ansible.cfg`
	`[defaults]`
	`inventory = inventory`
	`host_key_checking = False`
	`deprecation_warnings = False`
	`private_key_file = ~/.ssh/id_rsa`

playbook.yml	`piolo@ubuntu:~/Desktop/CPE-243_HOA_9.1$ cat playbook.yml`
	`- hosts: all`
	`  become: true`
	`  pre_tasks:`
	`  - name: Dpkg fixing in ubuntu servers`
	`    shell: |`
	`      dpkg --configure -a`
	`    when: ansible_distribution == "Ubuntu"`
	`  - name: Updating Ubuntu`
	`    apt:`
	`      update_cache: yes`
	`    when: ansible_distribution == "Ubuntu"`
	`- hosts: managed_node_one`
	`  become: true`
	`  roles:`
	`     - role: ubuntu`

roles/ubuntu/tasks/main.yml	

```yaml
- name: Installing openssl
  apt:
    name: openssl

- name: Creating folder for CA
  file:
    path: "/{{ item }}"
    state: directory
  with_items:
    - ca
    - ca/certs
    - ca/newcerts
    - ca/private

- name: Creating index.txt
  shell: touch /ca/index.txt

- name: Duplicating openssl.cnf
  copy:
    src: /etc/ssl/openssl.cnf
    dest: /ca/openssl.ca.cnf

- name: Generating private key
  community.crypto.openssl_privatekey:
    path: /ca/private/ca.key
    size: 2048
    type: RSA

- name: Generating certificate signing request
  openssl_certificate:
    path: /ca/ca.csr
    privatekey_path: /ca/private/ca.key
    provider: selfsigned

- name: Generating selfsigned certificate
  openssl_certificate:
    provider: selfsigned
    path: /ca/certs/cert.crt
    privatekey_path: /ca/private/ca.key
    selfsigned_not_after: "+3650d"
    mode: 0644
```

4. Showing input (codes), process (successful run), and output (evidence that CA with SSL was built).

```
piolo@ubuntu:~/Desktop/CPE-243_HOA_9.1$ ansible-playbook -K playbook.yml
BECOME password:
[WARNING]: Found both group and host with same name: managed_node_one

PLAY [all] *********************************************************************************************************

TASK [Gathering Facts] *********************************************************************************************
ok: [managed_node_one]

TASK [Dpkg fixing in ubuntu servers] *******************************************************************************
changed: [managed_node_one]

TASK [Updating Ubuntu] *********************************************************************************************
changed: [managed_node_one]

PLAY [managed_node_one] ********************************************************************************************

TASK [Gathering Facts] *********************************************************************************************
ok: [managed_node_one]

TASK [ubuntu : Installing openssl] *********************************************************************************
ok: [managed_node_one]

TASK [ubuntu : Creating folder for CA] *****************************************************************************
changed: [managed_node_one] => (item=ca)
changed: [managed_node_one] => (item=ca/certs)
changed: [managed_node_one] => (item=ca/newcerts)
changed: [managed_node_one] => (item=ca/private)

TASK [ubuntu : Creating index.txt] *********************************************************************************
changed: [managed_node_one]

TASK [ubuntu : Duplicating openssl.cnf] ****************************************************************************
changed: [managed_node_one]

TASK [ubuntu : Generating private key] *****************************************************************************
changed: [managed_node_one]

TASK [ubuntu : Generating certificate signing request] *************************************************************
changed: [managed_node_one]

TASK [ubuntu : Generating selfsigned certificate] ******************************************************************
changed: [managed_node_one]

PLAY RECAP *********************************************************************************************************
managed_node_one           : ok=11   changed=8    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
```

```
managed_node_one@ubuntu:~$ tree /ca
/ca
├── ca.csr
├── certs
│   └── cert.crt
├── index.txt
├── newcerts
├── openssl.ca.cnf
└── private
    └── ca.key
```

File Name	Content

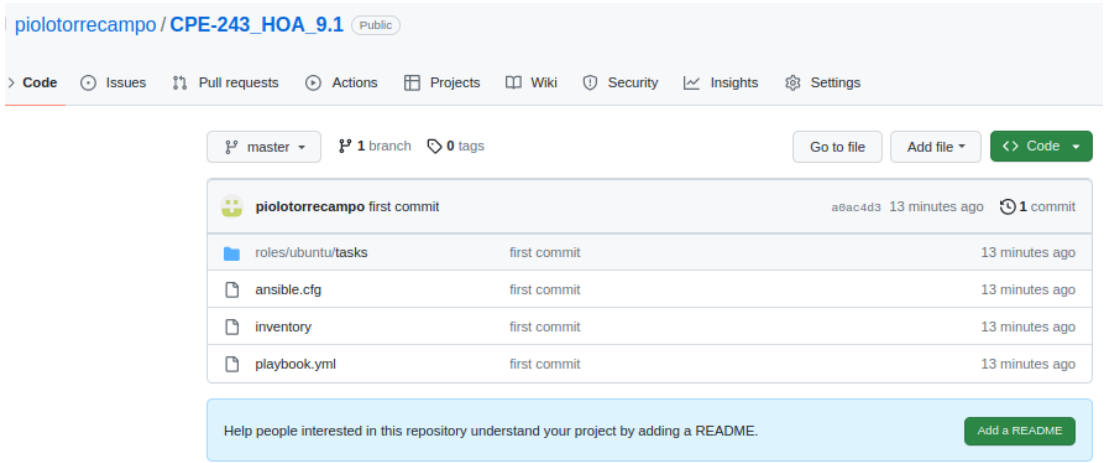
ca/private/ca.key	managed_node_one@ubuntu:~$ sudo cat /ca/private/ca.key -----BEGIN RSA PRIVATE KEY----- MIIEpQIBAAKCAQEA3SZnSVngEjOHyY7Peh+abzxTNKkBKX1nI+42VRXz/7rAribc kng4J07yJp+V3R1vnwn6V+D6RLbwOlmYdano8SrAJJwC9AkV9zfDSvKcy17uLNvS oWtRzMhkdo5qoCcPGoeRzhzworJCFUah33lef/Bg4IP+pawk3rMTFkrennmvy1WV PfoFEJ4/bjhbZ7RLBsbIXYSsUfVCNyCMcJ3X7P6b5/w5wxiH133SvUCjf03D8ZUU Ukb7tDsyqAOPywuJx6Gnn49DFb0hwFC+xuuJK5YMAf2ciGfiLxHGCd+lSBBmPoEG Vx08X3hFy7kj3zF7h1jxHZqlsaLTdoQuYYE7FQIDAQABAoIBAQCH3xVsWpyxchmG O4i7hnkyyIRygTdmj1Z0G+IjypYb01iYZuXz04rkk7txAXFo5bHzq4S0w1PgLelQ YEWsXRTyPwrIM1YZKw/k0Mza2k59ILkCtJgndrFOOPyIXp2iAf1kllB9qwgpXY3+ VmQT0hS+VCihKFem4CnS7YDXnG5EPGjl9r2dOJUkRQJDZKmqmJNtbIxOkfWsaMI2 YVzvEdpflgST61FdHcx+ImUSzL3omIyF7xMTNvgvX0l5D+6P+MS9BLBXDPtiWwV+ nSupgvI++i15LrgjKw/DnElP8zrcmswSA7BDE4jCIIGKoh6ew24LqowsKjJgrRHC hNSlVc3hAoGBAO6YCtwp5XnaJEeba83PzMojnJmMwaQ/HzFvUq1f41qgh1Glk3hz P408RoDO8uvoDT1Z4s6GFFa/zir3XGJFIBKYXvWhCc28/MykL1B48qtY9RXsVGwM XLGNFWEjqjodidV9XQbRg75EVSdiSpJ4VRbQCLJzu/AkF6raw0J1RuVpAoGBAO1I lJKJhzFww7dQV5l7IIOw8az+QdM+Xaf1DlAUi2gSxAdUlkg3i/ZKLETLVH8a8944 Wy6vVtFx7wy15u5ACCkXlmG76GP8zrPEr7suAdhppq/ViLr6m9aoe7yRCPpt47kg 0MWQoBy5en2qKeN4VQDsFIA1cS9WwUFK1UdI0JbNAoGBAMZsbcOxmCVhdICU0e/k 3DRTr33HoJce46syILkNIMAS9tbA88bdWcH0mdGvyjjE0JXwNf55ZVrLwwLamtsj D8xHKdnvJn8Sp87s0GiFXZOAtLqZw4/kLAaBBYG2rnAMdr+0tXPhNEY8//Bz/v6W 0nTZaBI4y9inu4Mc0fxoGiDZAoGBAOM2A+aJwKYMB60qRqeWKl1P+yue0CNabc4d rxXphlAi4Ajw63K9lc1B20AIv6FyiqB4sH90sJqgEbrHGBl9wRKwHnT5vR65fqjP J0MCXAwBpvZqb6IzxTP4Y3v+GW3L+ipUjPURdu/qf6uDXNcPa74VUdAu3HHrDeTa pn268NnlAoGAHBp23aT7O7XzHiwqEe5FuyMt5htwimgfF5+fuaKNweyecMyv2Kj8 zi11v7jFOVrRtn8bY9tDaUTKvEgg4CfUiUojEcCGveyNXc5PBAApVGrjVO0uSBHQ 0rDpipGjmxNw+dTvvn9NBclYgUrTFnhLG7iPQ643JmlS7X+4ZiDmxyE= -----END RSA PRIVATE KEY-----
ca/ca.csr	managed_node_one@ubuntu:~$ cat /ca/ca.csr -----BEGIN CERTIFICATE----- MIICrzCCAZegAwIBAgIULD7s2G8AkqiOqUfaIcDtARRNbGgwDQYJKoZIhvcNAQEL BQAwADAeFw0yMzAzMzAwNDI5NThaFw0zMzAzMjcwNDI5NThaMAAwggEiMA0GCSqG SIb3DQEBAQUAA4IBDwAwggEKAoIBAQDdJmdJWeASM4fJjs96H5pvPFM0qQEpfWcj 7jZVFfP/usCuJtySeDgnTvImn5XdHW+fCfpX4PpEtvA6WZh1qejxKsAknAL0CRX3 N8NK8pzLXu4s29Kha1HMyGR2jmqgJw8ah5HOHPCiskIVRqHfeV5/8GDgg/6lrCTe sxMWSt6eea/LVZU9+gUQnj9uOFtntEsGxshdhKxR9UI3IIxwndfs/pvn/DnDGIfX fdK9QKN/TcPxlRRSRvu0OzKoA4/LC4nHoaefj0MVvSHAUL7G64krlgwB/ZyIZ+Iv EcYJ36VIEGY+gQZXHTxfeEXLuSPfMXuHWPEdmqWxotN2hC5hgTsVAgMBAAGjITAf MB0GA1UdDgQWBBRL2p+a4M+k3JsF85YzlqyLPSYa/TANBgkqhkiG9w0BAQsFAAOC AQEAVn6VwZ+FqX/cMc2WDHszfcYVtjuttffjHkwbmaKWS4gxuCh3IXKsMmFZ0HvF 0pesacZGU/Caf1cbXBGNYumPy0vmhpGlHyUxKpQ4i8iRQJxmTgeC+KBj+oGUETlA PdSdiRb1QdgXB98ah8yiYNGp9guexhJXBLKvpigvTRVbGV10MkYTGu9XPn59fhE0 6T3mdIIwXQT/UfjJzxmpgPTRefXkC4VBY3tSAtIhvikMc+4ULSFxNN0CRyAFdypz pMtBZk+1jF7mjgTRw7zr9/L4Zab47MjvjMngVVF8+V0zGgC34rn9YDxDVUZyaiYx qAkkqSv10CE69NZG/gKNoZCqmA== -----END CERTIFICATE-----

ca/certs/ca.crt	managed_node_one@ubuntu:~$ sudo cat /ca/certs/cert.crt -----BEGIN CERTIFICATE----- MIICrzCCAZegAwIBAgIUKF9UtHYZxQ+aVdxOlkSTY6n/JaowDQYJKoZIhvcNAQEL BQAwADAeFw0yMzAzMzAwNDI5NTlaFw0zMzAzMjcwNDI5NTlaMAAwggEiMA0GCSqG SIb3DQEBAQUAA4IBDwAwggEKAoIBAQDdJmdJWeASM4fJjs96H5pvPFM0qQEpfWcj 7jZVFfP/usCuJtySeDgnTvImn5XdHW+fCfpX4PpEtvA6WZh1qejxKsAknAL0CRX3 N8NK8pzLXu4s29Kha1HMyGR2jmqgJw8ah5HOHPCiskIVRqHfeV5/8GDgg/6lrCTe sxMWSt6eea/LVZU9+gUQnj9uOFtntEsGxshdhKxR9UI3IIxwndfs/pvn/DnDGIfX fdK9QKN/TcPxlRRSRvu0OzKoA4/LC4nHoaefj0MVvSHAUL7G64krlgwB/ZyIZ+Iv EcYJ36VIEGY+gQZXHTxfeEXLuSPfMXuHWPEdmqWxotN2hC5hgTsVAgMBAAGjITAf MB0GA1UdDgQWBBRL2p+a4M+k3JsF85YzlqyLPSYa/TANBgkqhkiG9w0BAQsFAAOC AQEAPf4iAJrk0z0Yodnk4wSWhVJ8C9uvpTywBiLi+tOMEVBVH8vJGraOkqTuKGHq VTtTS3j1lcZa4UsR9fdTfA1MGlrFITNGzX32ZRvWxW6kD+Ye/z7yJhXI28TzmsPP Hbhqba0bjQNEdvHvrwFkjYEyvxnExO0ZlWWP8ynHazaqba/H5wCoCQPN5moHKBlJ Dj+tGq5VF7GWXMS8zPGWlCQ++ysK6iAC9rTK8Dbp+25lMuQ0UPn4JyyXTRwMX0t7 +ryGbU3FFt//WH9petTFn3KglQsT02+1CEgR7wE3U7oV1/X7kCLQDo3jZqDHRjhH tGOCsMNWljL9MvQzIr5EJj/y8Q== -----END CERTIFICATE-----

5. Pushing to the Github repository.

```
piolo@ubuntu:~/Desktop/CPE-243_HOA_9.1$ git add *
```

```
piolo@ubuntu:~/Desktop/CPE-243_HOA_9.1$ git commit -m "first commit"
[master (root-commit) a0ac4d3] first commit
 5 files changed, 70 insertions(+)
 create mode 100644 ansible.cfg
 create mode 100644 inventory
 create mode 100644 playbook.yml
 create mode 100644 roles/ubuntu/tasks/.main.yml.swp
 create mode 100644 roles/ubuntu/tasks/main.yml
piolo@ubuntu:~/Desktop/CPE-243_HOA_9.1$ git push
Warning: Permanently added the ECDSA host key for IP address '140.82.112.3' to the list of known hosts.
Counting objects: 10, done.
Delta compression using up to 2 threads.
Compressing objects: 100% (8/8), done.
Writing objects: 100% (10/10), 1.84 KiB | 1.84 MiB/s, done.
Total 10 (delta 0), reused 0 (delta 0)
To github.com:piolotorrecampo/CPE-243_HOA_9.1.git
 * [new branch]      master -> master
```



Conclusion

In summary, using SSL in creating and building a CA is crucial for establishing a secure and reliable certificate infrastructure. SSL provides encryption for communication between clients and the CA, authenticates clients, and enhances overall security. Proper implementation of SSL includes selecting a secure protocol, configuring SSL, and managing SSL certificates. The result is a trustworthy CA that issues secure certificates and enables safe digital communication.