Configuration instructions for **Module C** infrastructure

Updated: 30.08.2023.

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Radius node configuration (Ubuntu node in CML)

1. Connect VM to External Conncetor in NAT mode.

2. Change root password (if needed) according to TP:
   `sudo su`
   `passwd root`
   Enter password - *Passw0rd!*

3. Install freeradius service
   `apt update`
   `apt install freeradius`

4. Remove VM from External Conncetor and connect the VM back to the `usw0`.

5. Configure IP address:
   `nano /etc/netplan/50-cloud-init.yaml`
   Change configuration to (changes are marked with yellow):

```
network:

    ethernets:
        ens2:
            dhcp4: false
            addresses: [172.16.40.101/24]
            routes:
                - to: default
                  via: 172.16.40.254
            nameservers:
                addresses:
                - 87.250.250.1
            match:
                macaddress: 52:54:00:00:8b:3a
            set-name: ens2
    version: 2
```

   Save and close (Ctrl+X Y Enter)
   `netplan generate`
   `netplan apply`

6. Verify IP configuration changes:
   `ip a`
   Should show configured IP address on ens2
   `ip route`
   Should show:
   `default via 172.16.40.254 dev ens2 proto static`

7. Configure freeradius service users:

   NB! Possibly up to competitor to configure as TP states:
   "For LODZ1 and LODZ2 user super should automatically land in privileged mode. User regular lands in user exec mode. Both users should be created in the ~~TFTP~~ Radius server. Use local authentication in case remote authentication server is not available."

   ```
   nano /etc/freeradius/3.0/users
   ```

   Add users at the top of the file:

   ```
   regular Cleartext-Password := "Passw0rd!"
           Service-Type = NAS-Prompt-User,
           Cisco-AVPair = "shell:priv-lvl=1"

   super Cleartext-Password := "Passw0rd!"
           Service-Type = NAS-Prompt-User,
           Cisco-AVPair = "shell:priv-lvl=15"
   ```

   Save and close (Ctrl+X Y Enter)

8. Configure freeradius authorized device list (clients):

   ```
   nano /etc/freeradius/3.0/clients.conf
   ```

   Add devices to clients list at the end of the file:

   ```
   client 172.16.40.1{
           secret = Passw0rd!
           nastype = cisco
           shortname = LODZ1
   }

   client 172.16.40.2{
           secret = Passw0rd!
           nastype = cisco
           shortname = LODZ2
   }
   ```

   Save and close (Ctrl+X Y Enter)

9. Restart freeradius service:

   ```
   service freeradius restart
   ```

CASrv node configuration (Ubuntu node in CML)

1. Change root password (if needed) according to TP:
   ```
   sudo su
   passwd root
   Enter password - Passw0rd!
   ```

2. Configure IP address:
   ```
   nano /etc/netplan/50-cloud-init.yaml
   Change configuration to (changes are marked with yellow):
   network:

       ethernets:
           ens2:
               dhcp4: false
               addresses: [172.16.40.102/24]
               routes:
                   - to: default
                     via: 172.16.40.254
               nameservers:
                   addresses:
                   - 87.250.250.1
               match:
                   macaddress: 52:54:00:00:8b:3a
               set-name: ens2
       version: 2
   Save and close (Ctrl+X Y Enter)
   netplan generate
   netplan apply
   ```

3. Verify IP configuration changes:
   ```
   ip a
   Should show configured IP address on ens2
   ip route
   Should show:
   default via 172.16.40.254 dev ens2 proto static
   ```

4. Create CA dir `/ca`
   ```
   mkdir /ca
   ```

5. Create subdirectories within `/ca folder`:
   ```
   cd /ca
   mkdir newcerts certs private requests
   ```

6. Create index and serial files and insert first serial number:
   ```
   touch /ca/index.txt
   ```

```
touch /ca/serial
echo 01 > /ca/serial
```

7. Copy default OpenSSL configuration file to /ca directory:
   `cp /etc/ssl/openssl.cnf /ca/`

8. Edit configuration:
   `nano /ca/openssl.cnf`

   Go to the configuration block [CA_default] and change directory of CA
   (changes are marked with yellow):

   ```
   dir             = /ca             # Where everything is kept
   ```

   Save and close (Ctrl+X Y Enter)

9. Generate the private key for CA:

   ```
   openssl genrsa -out /ca/private/cakey.pem 4096
   ```

10. Create CA certificate:

    ```
    openssl req -new -x509 -config /ca/openssl.cnf -key
    /ca/private/cakey.pem -out /ca/cacert.pem
    ```

11. Fill in the form with data:

    ```
    Country Name (2 letter code) [AU]: PL
    State or Province Name (full name) [Some-State]: Poland
    Locality Name (eg, city) []: Lodz
    Organization Name (eg, company) [Internet Widgits Pty Ltd]:
    EuroSkills
    Organizational Unit Name (eg, section) []: Lodz
    Common Name (e.g. server FQDN or YOUR name) []: EuroSkills Root CA
    Email Address []: ca@lodz.pl
    ```

For easier filling of the form, you can just paste these rows of text (it’s the same input as above):

```
PL

Poland

Lodz

EuroSkills

Lodz

EuroSkills Root CA

ca@lodz.pl
```

12. Verify Root CA certificate

```
openssl x509 -in /ca/cacert.pem -noout -text | less
```

Should contain provided data, flagged as CA:TRUE and be valid for 10 years.

Monitor node configuration (Ubuntu node in CML)

This instruction is valid for Debian VMs too, but instead of netplan we need to use **/etc/network/interfaces**

Configuration for interfaces file:

```
auto lo
iface lo inet loopback

allow-hotplug ens2
auto ens2
iface ens2 inet static
  address 172.16.40.103
  netmask 255.255.255.0
  gateway 172.16.40.254
  dns-nameservers 87.250.250.1
```

and
“`sudo su`” should be replaced with “`su -`” unless sudoers is installed and configured.
“`sudo`” then can be omitted, just elevate to root and do tasks.

1. Connect VM to External Conncetor in NAT mode.

2. Change root password (if needed) according to TP:
   ```
   sudo su
   passwd root
   Enter password - Passw0rd!
   ```

3. Download Observium installer
   ```
   apt update
   wget http://www.observium.org/observium_installscript.sh
   ```

4. Make installer script executable
   ```
   chmod +x observium_installscript.sh
   ```

5. Install Observium
   ```
   ./observium_installscript.sh
   ```

   a) Select **“1. Observium Community Edition”**
   b) Enter MySQL password - **Passw0rd!**
   c) Press **“Enter”** to start MySQL install
   d) Press **“Enter”** to add necessary repositories for installation
   e) Accept installation by entering **“Y”** and pressing **“Enter”**
   f) Press **“Tab”** and **“Enter”** to allow restart of services
   g) Provide first user data - **root** / **Passw0rd!**

h) Press “n” and “Enter” - we don’t need to monitor Observium itself
i) Press “n” and “Enter” - we don’t need UNIX agent on this machine

6. Install TFTP server for Cisco configuration backups:
   `apt install tftpd-hpa`

7. Modify configuration to fit TP needs:
   `nano /etc/default/tftpd-hpa`
   Modify configuration (marked with yellow):
   `# /etc/default/tftpd-hpa`

   `TFTP_USERNAME="tftp"`
   `TFTP_DIRECTORY="/tftp"`
   `TFTP_ADDRESS="0.0.0.0:69"`
   `TFTP_OPTIONS="--secure --create -v"`
   Save and close (Ctrl+X Y Enter)

8. Create TFTP root directory:
   `mkdir /tftp`

9. Grant all permissions for root directory:
   `chmod -R 777 /tftp`

10. Restart the TFTP service:
    `service tftpd-hpa restart`

11. Remove VM from External Conncetor and connect the VM back to the `usw0`.

12. Configure IP address (For Ubuntu Nodes):
    `nano /etc/netplan/50-cloud-init.yaml`
    Change configuration to (changes are marked with yellow):

```
network:

    ethernets:
        ens2:
            dhcp4: false
            addresses: [172.16.40.103/24]
            routes:
                - to: default
                  via: 172.16.40.254
            nameservers:
                addresses:
                - 87.250.250.1
            match:
```

```
                macaddress: 52:54:00:00:8b:3a
            set-name: ens2
    version: 2
```
Save and close (Ctrl+X Y Enter)
```
netplan generate
netplan apply
```

13. Verify IP configuration changes:
    ```
    ip a
    ```
    Should show configured IP address on ens2
    ```
    ip route
    ```
    Should show:
    ```
    default via 172.16.40.254 dev ens2 proto static
    ```

14. Add **monitor.lodz.pl** ServerName to server configuration:
    ```
    nano /etc/apache2/sites-available/000-default.conf
    ```
    Add line after ServerAdmin line:
    ```
    ServerName monitor.lodz.pl
    ```
    Save and close (Ctrl+X Y Enter)

15. Add another website - **lodz.pl**:
    ```
    nano /etc/apache2/sites-available/lodz.pl.conf
    ```
    Add lines:
    ```
    <VirtualHost *:80>
        DocumentRoot "/var/www/html"
        ServerName lodz.pl
    </VirtualHost>
    ```

16. Enable Apache2 site **lodz.pl**:
    a2ensite lodz.pl.conf

17. Customize WEB page lodz.pl with simple `<h1>` tag:
    rm /var/www/html/index.html
    nano /var/www/html/index.html
    Add line:
    ```
    <h1> This is lodz.pl website! </h1>
    ```
    Save and close (Ctrl+X Y Enter)

18. Restart apache2 service
    ```
    service apache2 restart
    ```

PUBWEBDNS node configuration (Ubuntu node in CML)

NB! This node is very likely to be at least partially (DNS part) left for competitors to configure due to requirements in test project:

“

Road Warrior

Connects to the network via Cisco AnyConnect VPN client. You decide the single, or multi, entry point and configure the DNS server in PUBWEBDNS with the appropriate entries to resolve vpn.ict.pl. The possible entry points are Warsaw, Krakow, or Gdansk and depending on which option is chosen the CMS extension will be 103, 203 or 303.

”

1. Connect VM to External Conncetor in NAT mode.

2. Change root password (if needed) according to TP:
   ```
   sudo su
   passwd root
   Enter password - Passw0rd!
   ```

3. Install BIND9 DNS service:
   ```
   apt update
   apt install bind9
   ```

4. Install Apache2 WEB server:
   ```
   apt install apache2
   ```

5. Remove VM from External Conncetor and connect the VM back to the `ISP (Interface GigabitEthernet 0/7)`.

6. Configure IP address (For Ubuntu Nodes):
   ```
   nano /etc/netplan/50-cloud-init.yaml
   Change configuration to (changes are marked with yellow):
   network:

       ethernets:
           ens2:
               dhcp4: false
               addresses: [87.250.250.1/24]
               routes:
                   - to: default
                     via: 87.250.250.254
               nameservers:
                   addresses:
                   - 127.0.0.1
   ```

```
                - 87.250.250.1
            match:
                macaddress: 52:54:00:00:8b:3a
            set-name: ens2
    version: 2
```
Save and close (Ctrl+X Y Enter)
```
netplan generate
netplan apply
```

7. Verify IP configuration changes:
```
ip a
```
Should show configured IP address on ens2
```
ip route
```
Should show:
```
default via 87.250.250.254 dev ens2 proto static
```

8. Configure `000-default.conf` site to work with euroskills.pl name:
```
nano /etc/apache2/sites-available/000-default.conf
```
Edit ServerName to this:
```
ServerName euroskills.pl
```
Save and close (Ctrl+X Y Enter)

9. Customize WEB page with simple `<h1>` tag:
```
rm /var/www/html/index.html
nano /var/www/html/index.html
```
Add line:
```
<h1> This is EuroSkills.pl website! </h1>
```
Save and close (Ctrl+X Y Enter)

10. Restart apache2 service
```
service apache2 restart
```

11. Configure DNS
    A) Add zones to service:
```
nano /etc/bind/named.conf.local
```

Add lines:
```
zone "euroskills.pl" {
        type primary;
        file "/etc/bind/db.euroskills";
};

zone "lodz.pl" {
        type primary;
        file "/etc/bind/db.lodz";
};
```

```
zone "ict.pl" {
        type primary;
        file "/etc/bind/db.ict";
};
```
Save and close (Ctrl+X Y Enter)

B) Create files for zones:
cd /etc/bind
touch db.euroskills db.lodz db.ict

C) Edit zones
nano /etc/bind/db.euroskills

Paste:
```
$TTL  86400
@     IN    SOA   euroskills.pl. root.euroskills.pl. (
                        1           ; Serial
                   604800           ; Refresh
                    86400           ; Retry
                  2419200           ; Expire
                    86400 )   ; Negative Cache TTL
;
@     IN    NS    euroskills.pl.
@     IN    A     87.250.250.1
```
Save and close (Ctrl+X Y Enter)

nano /etc/bind/db.lodz

Paste:
```
$TTL  86400
@     IN    SOA   lodz.pl. root.lodz.pl. (
                        1           ; Serial
                   604800           ; Refresh
                    86400           ; Retry
                  2419200           ; Expire
                    86400 )   ; Negative Cache TTL
;
@           IN    NS    lodz.pl.
@           IN    A     18.31.192.3
monitor     IN    A     18.31.192.3
```
Save and close (Ctrl+X Y Enter)

nano /etc/bind/db.ict

Paste:
```
$TTL  86400
@     IN    SOA   ict.pl. root.ict.pl. (
                        1           ; Serial
```

```
                        604800          ; Refresh
                         86400          ; Retry
                       2419200          ; Expire
                         86400 )    ; Negative Cache TTL
;
@       IN      NS      ict.pl.
@       IN      A       172.16.30.1
```
Save and close (Ctrl+X Y Enter)

D) Edit options file to allow query from everywhere without validation:
`nano /etc/bind/named.conf.options`

Change dnssec-validation:
`dnssec-validation no;`

Add allow-query:
`allow-query { any; };`
Save and close (Ctrl+X Y Enter)

INTRAWEB node configuration (Ubuntu node in CML)

1. Connect VM to External Conncetor in NAT mode.

2. Change root password (if needed) according to TP:
   `sudo su`
   `passwd root`
   Enter password - *Passw0rd!*

3. Install Apache2 service:
   `apt update`
   `apt install apache2`

4. Remove VM from External Conncetor and connect the VM back to the `INTRAFW (Interface GigabitEthernet 0/1)`.

5. Configure IP address (For Ubuntu Nodes):
   `nano /etc/netplan/50-cloud-init.yaml`
   Change configuration to (changes are marked with yellow):

```
network:

    ethernets:
        ens2:
            dhcp4: false
            addresses: [172.16.30.1/24]
            routes:
                - to: default
                  via: 172.16.30.254
            nameservers:
                addresses:
                - 87.250.250.1
            match:
                macaddress: 52:54:00:00:8b:3a
            set-name: ens2
    version: 2
```

   Save and close (Ctrl+X Y Enter)
   `netplan generate`
   `netplan apply`

6. Verify IP configuration changes:
   `ip a`
   Should show configured IP address on ens2
   `ip route`

Should show:
`default via 87.250.250.254 dev ens2 proto static`

7. Configure `000-default.conf` site to work with ict.pl name:
   `nano /etc/apache2/sites-available/000-default.conf`
   Edit ServerName to this:
   `ServerName ict.pl`
   Save and close (Ctrl+X Y Enter)

8. Customize WEB page with simple `<h1>` tag:
   `rm /var/www/html/index.html`
   `nano /var/www/html/index.html`
   Add line:
   `<h1> This is ICT.pl website! </h1>`
   Save and close (Ctrl+X Y Enter)

9. Restart apache2 service
   `service apache2 restart`

RDWARRIOR CME-X03 configuration (Windows 10 client)

Install following software:

1. CIPC
2. AnyConncet client
3. Java
4. Virtual Audio cable

CME201 and CME101 configuration (Windows 10 Client)

Install following software:

1. CIPC
2. Java
3. Virtual Audio cable

CME102 and CME301 configuration (Debian client)

Install following software:

1. Zoiper

ISP configuration

1. Select the ISP node and, if needed, stop and wipe it.
2. Paste configuration in EDIT CONFIG section in CML UI:

```
hostname ISP
!
interface Loopback1666
ip address 1.6.6.6 255.255.255.255
!
interface Loopback8844
ip address 8.8.4.4 255.255.255.255
!
interface Loopback8888
ip address 8.8.8.8 255.255.255.255
!
interface GigabitEthernet0/0
ip address 100.10.9.6 255.255.255.252
ip tcp adjust-mss 1200
duplex auto
speed auto
media-type rj45
no mop enabled
no mop sysid
!
interface GigabitEthernet0/1
ip address 132.87.2.254 255.255.255.0
ip tcp adjust-mss 1200
duplex auto
speed auto
media-type rj45
no mop enabled
no mop sysid
!
interface GigabitEthernet0/2
ip address 94.121.72.254 255.255.255.0
ip tcp adjust-mss 1200
duplex auto
speed auto
media-type rj45
no mop enabled
no mop sysid
!
interface GigabitEthernet0/3
ip address 65.32.147.254 255.255.255.0
ip tcp adjust-mss 1200
duplex auto
```

```
speed auto
media-type rj45
no mop enabled
no mop sysid
!
interface GigabitEthernet0/4
no ip address
duplex auto
speed auto
media-type rj45
!
interface GigabitEthernet0/5
ip address 18.31.192.254 255.255.255.0
duplex auto
speed auto
media-type rj45
no mop enabled
no mop sysid
!
interface GigabitEthernet0/6
ip address 100.71.60.254 255.255.255.252
ip tcp adjust-mss 1200
duplex auto
speed auto
media-type rj45
no mop enabled
no mop sysid
!
interface GigabitEthernet0/7
ip address 87.250.250.254 255.255.255.0
ip tcp adjust-mss 1200
duplex auto
speed auto
media-type rj45
no mop enabled
no mop sysid
!
router bgp 65000
bgp log-neighbor-changes
neighbor 18.31.192.1 remote-as 65005
neighbor 18.31.192.2 remote-as 65005
neighbor 65.32.147.1 remote-as 65004
neighbor 94.121.72.1 remote-as 65003
neighbor 100.10.9.5 remote-as 65002
neighbor 132.87.2.1 remote-as 65001
!
address-family ipv4
```

```
 network 1.6.6.6 mask 255.255.255.255
 network 8.8.4.4 mask 255.255.255.255
 network 8.8.8.8 mask 255.255.255.255
 network 18.31.192.0 mask 255.255.255.0
 network 65.32.147.0 mask 255.255.255.0
 network 87.250.250.0 mask 255.255.255.0
 network 94.121.72.0 mask 255.255.255.0
 network 100.10.9.4 mask 255.255.255.252
 network 100.71.60.252 mask 255.255.255.252
 network 132.87.2.0 mask 255.255.255.0
 neighbor 18.31.192.1 activate
 neighbor 18.31.192.2 activate
 neighbor 65.32.147.1 activate
 neighbor 94.121.72.1 activate
 neighbor 100.10.9.5 activate
 neighbor 132.87.2.1 activate
exit-address-family
!
```