

# How to deploy a CheckPoint as an unmanaged VNF using TCPing metric script:

The following wiki outlines how to bring up a Checkpoint VNF using CFP deployment and TCPing metric scripts:

**CheckPoint Image can be downloaded from:** `saesol@9.9.9.210:~/datadisk/IMAGES/CHECKPOINT/Check_Point_R80.40_Cloudguard_Security_Gateway_Generic_03252020.qcow2`

**NED:** `saesol@9.9.9.210:~/datadisk/IMAGES/CHECKPOINT/NEDS/ncs-5.2.2-checkpoint-gaiaos_rest-1.8.10.tar.gz`

**Day0 File:** [checkpoint-new](#)

## CREATE METRIC

1. Copy the following files to your "ACTIVE" ESC directory - `/var/tmp/` : **dmam.py**, **TCPing\_Metric.xml** and **TCPing\_Monitor.py** (Files attached below, download accordingly)

- [TCPing\\_Monitor.py](#)
- [dmam.py](#)
- [TCPing\\_Metric.xml](#) (Value of `vm_ip_address` is left blank intentional in this xml file because the `device_ip` is automatically populated by ESC when the script is called)

2. Please edit the privileges for all the files in `/var/tmp` directory to be executable. - `sudo chmod 0777 *.*`

## REGISTER METRIC

3. **[MAJOR]** Run the command: `"/var/tmp/dmam.py create-metric --payload_xml /var/tmp/TCPing_Metric.xml"` from the same directory `/var/tmp/` -- This will apply the TCPing\_Metric to ESC Manager. **[MAJOR]**

### REGISTER METRIC

```
[admin@esc-ha-249 ~]$ /var/tmp/dmam.py create-metric --payload_xml /var/tmp/TCPing_Metric.xml
Executing create-metric
Payload => /var/tmp/TCPing_Metric.xml
```

## VERIFY METRIC

4. Run the following command `"curl -X GET http://localhost:8080/ESCManager/internal/dynamic_mapping/metrics| xmllint --format -"` -- To verify whether the metric has been applied to ESC manager or not.

### metrics

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<metrics xmlns:ns2="urn:ietf:params:xml:ns:netconf:base:1.0">
  <metric>
    <metaData>
      <properties>
        <property>
          <name>remote_url</name>
          <value/>
        </property>
        <property>
          <name>enable_events_after_success</name>
          <value>true</value>
        </property>
        <property>
          <name>vm_gateway_ip_address</name>
          <value/>
        </property>
        <property>
          <name>enable_check_interface</name>
          <value>true</value>
        </property>
      </properties>
    </metaData>
  </metric>
</metrics>
```

```

        <name>script_location</name>
        <value>/opt/cisco/esc/esc-scripts/escadm.py</value>
    </property>
</properties>
<type>http_get</type>
</metaData>
<name>HTTPGET</name>
<type>MONITOR_SUCCESS_FAILURE</type>
<userLabel>HTTP GET</userLabel>
</metric>
<metric>
    <metaData>
        <properties>
            <property>
                <name>agent_protocol</name>
                <value>udp</value>
            </property>
            <property>
                <name>oid_current_value</name>
                <value>.1.3.6.1.4.1.2021.4.6.0</value>
            </property>
            <property>
                <name>compute_algorithm</name>
                <value>COMPUTE_TOTAL_AVAILABILITY_BASED</value>
            </property>
            <property>
                <name>agent_port</name>
                <value>161</value>
            </property>
            <property>
                <name>agent_address</name>
                <value/>
            </property>
            <property>
                <name>community</name>
                <value>public</value>
            </property>
            <property>
                <name>oid_total_value</name>
                <value>.1.3.6.1.4.1.2021.4.5.0</value>
            </property>
        </properties>
        <type>snmp_get_threshold_ratio</type>
    </metaData>
    <name>MEMORY</name>
    <type>MONITOR_COMPUTE_THRESHOLD</type>
    <userLabel>Memory (MIB:Ref)</userLabel>
</metric>
<metric>
    <metaData>
        <properties>
            <property>
                <name>agent_protocol</name>
                <value>udp</value>
            </property>
            <property>
                <name>agent_port</name>
                <value>161</value>
            </property>
            <property>
                <name>target_oid</name>
                <value>.1.3.6.1.4.1.2021.10.1.3.2</value>
            </property>
            <property>
                <name>agent_address</name>
                <value/>
            </property>
            <property>
                <name>community</name>
                <value>public</value>
            </property>
        </properties>
    </metaData>
    <name>MEMORY</name>
    <type>MONITOR_COMPUTE_THRESHOLD</type>
    <userLabel>Memory (MIB:Ref)</userLabel>
</metric>

```

```

        </properties>
        <type>snmp_get_threshold</type>
    </metaData>
    <name>CPU_LOAD_5</name>
    <type>MONITOR_THRESHOLD</type>
    <userLabel>CPU 5 Minutes Average Load (MIB:Ref)</userLabel>
</metric>
<metric>
    <metaData>
        <properties>
            <property>
                <name>agent_protocol</name>
                <value>udp</value>
            </property>
            <property>
                <name>agent_port</name>
                <value>161</value>
            </property>
            <property>
                <name>target_oid</name>
                <value>.1.3.6.1.4.1.2021.10.1.3.3</value>
            </property>
            <property>
                <name>agent_address</name>
                <value/>
            </property>
            <property>
                <name>community</name>
                <value>public</value>
            </property>
        </properties>
        <type>snmp_get_threshold</type>
    </metaData>
    <name>CPU_LOAD_15</name>
    <type>MONITOR_THRESHOLD</type>
    <userLabel>CPU 15 Minutes Average Load (MIB:Ref)</userLabel>
</metric>
<metric>
    <metaData>
        <properties>
            <property>
                <name>agent_protocol</name>
                <value>udp</value>
            </property>
            <property>
                <name>agent_port</name>
                <value>161</value>
            </property>
            <property>
                <name>target_oid</name>
                <value>.1.3.6.1.4.1.9.9.715.1.1.6.1.13</value>
            </property>
            <property>
                <name>agent_address</name>
                <value/>
            </property>
            <property>
                <name>community</name>
                <value>public</value>
            </property>
        </properties>
        <type>snmp_get_threshold</type>
    </metaData>
    <name>OUTPUT_TOTAL_BIT_RATE</name>
    <type>MONITOR_THRESHOLD</type>
    <userLabel>CSR Total Bit Rate</userLabel>
</metric>
<metric>
    <metaData>
        <properties>
            <property>

```

```

        <name>ip_address</name>
        <value/>
    </property>
    <property>
        <name>enable_events_after_success</name>
        <value>true</value>
    </property>
    <property>
        <name>vm_gateway_ip_address</name>
        <value/>
    </property>
    <property>
        <name>enable_check_interface</name>
        <value>true</value>
    </property>
    <property>
        <name>script_location</name>
        <value>/opt/cisco/esc/esc-scripts/escadm.py</value>
    </property>
</properties>
<type>icmp_ping</type>
</metaData>
<name>ICMPPING</name>
<type>MONITOR_SUCCESS_FAILURE</type>
<userLabel>ICMP Ping</userLabel>
</metric>
<metric>
    <metaData>
        <properties>
            <property>
                <name>agent_protocol</name>
                <value>udp</value>
            </property>
            <property>
                <name>agent_port</name>
                <value>161</value>
            </property>
            <property>
                <name>target_oid</name>
                <value>.1.3.6.1.4.1.2021.10.1.3.1</value>
            </property>
            <property>
                <name>agent_address</name>
                <value/>
            </property>
            <property>
                <name>community</name>
                <value>public</value>
            </property>
        </properties>
        <type>snmp_get_threshold</type>
    </metaData>
    <name>CPU_LOAD_1</name>
    <type>MONITOR_THRESHOLD</type>
    <userLabel>CPU 1 Minute Average Load (MIB:Ref)</userLabel>
</metric>
<metric>
    <metaData>
        <properties>
            <property>
                <name>agent_protocol</name>
                <value>udp</value>
            </property>
            <property>
                <name>oid_current_value</name>
                <value>.1.3.6.1.4.1.2021.11.50.0,.1.3.6.1.4.1.2021.11.51.0,.1.3.6.1.4.1.2021.11.52.0</value>
            </property>
            <property>
                <name>compute_algorithm</name>
                <value>COMPUTE_TOTAL_CURRENT_BASED</value>
            </property>
        </properties>
    </metaData>
    <name>CPU_LOAD_1</name>
    <type>MONITOR_THRESHOLD</type>
    <userLabel>CPU 1 Minute Average Load (MIB:Ref)</userLabel>
</metric>

```

```

    <property>
      <name>agent_port</name>
      <value>161</value>
    </property>
    <property>
      <name>agent_address</name>
      <value/>
    </property>
    <property>
      <name>community</name>
      <value>public</value>
    </property>
    <property>
      <name>oid_total_value</name>
      <value>.1.3.6.1.4.1.2021.11.50.0,.1.3.6.1.4.1.2021.11.51.0,.1.3.6.1.4.1.2021.11.52.0,.
1.3.6.1.4.1.2021.11.53.0</value>
    </property>
  </properties>
  <type>snmp_get_threshold_ratio</type>
</metaData>
<name>CPU</name>
<type>MONITOR_COMPUTE_THRESHOLD</type>
<userLabel>CPU (MIB: Ref)</userLabel>
</metric>
<metric>
  <metaData>
    <properties>
      <property>
        <name>agent_protocol</name>
        <value>udp</value>
      </property>
      <property>
        <name>agent_port</name>
        <value>161</value>
      </property>
      <property>
        <name>target_oid</name>
        <value>.1.3.6.1.4.1.9.9.786.1.2.1.1.5.1.1.1</value>
      </property>
      <property>
        <name>agent_address</name>
        <value/>
      </property>
      <property>
        <name>community</name>
        <value>public</value>
      </property>
    </properties>
    <type>snmp_get_threshold</type>
  </metaData>
  <name>SUBSCRIBER_SESSION</name>
  <type>MONITOR_THRESHOLD</type>
  <userLabel>CSR Subscriber Session</userLabel>
</metric>
<metric>
  <metaData>
    <properties>
      <property>
        <name>agent_protocol</name>
        <value>udp</value>
      </property>
      <property>
        <name>agent_port</name>
        <value>161</value>
      </property>
      <property>
        <name>target_oid</name>
        <value>.1.3.6.1.4.1.9.9.715.1.1.6.1.14</value>
      </property>
      <property>
        <name>agent_address</name>

```

```

        <value/>
      </property>
    </properties>
    <property>
      <name>community</name>
      <value>public</value>
    </property>
  </properties>
  <type>snmp_get_threshold</type>
</metaData>
<name>PROCESSING_LOAD</name>
<type>MONITOR_THRESHOLD</type>
<userLabel>CSR Processing Load</userLabel>
</metric>
<metric>
  <metaData>
    <properties>
      <property>
        <name>script_filename</name>
        <value>/var/tmp/ESC/TCPing_Monitor.py</value>
      </property>
      <property>
        <name>timeout_sec</name>
        <value>3</value>
      </property>
      <property>
        <name>tcp_port</name>
        <value>22</value>
      </property>
      <property>
        <name>vm_ip_address</name>
        <value/>
      </property>
      <property>
        <name>enable_events_after_success</name>
        <value>true</value>
      </property>
    </properties>
    <type>custom_script</type>
  </metaData>
  <name>TCPING_SSH_3SEC</name>
  <type>MONITOR_SUCCESS_FAILURE</type>
</metric>
</metrics>

```

5. Create a device template as shown below and load merge to your NSO. Please make sure the name of esc and other parameters are edited according to your setup.

## esc-vmalive-cp-kpi-data-nic

```
<config xmlns="http://tail-f.com/ns/config/1.0">
  <devices xmlns="http://tail-f.com/ns/ncs">
    <template>
      <name>esc-vmalive-cp-kpi-data-nic</name>
      <ned-id>
        <id xmlns:esc-id="http://tail-f.com/ned/esc-id">esc-id:esc</id>
        <config>
          <esc_datamodel xmlns="http://www.cisco.com/esc/esc">
            <tenants>
              <tenant>
                <name>{$TENANT}</name>
                <deployments>
                  <deployment>
                    <name>{$DEPLOYMENT_NAME}</name>
                    <vm_group>
                      <name>{$VM_GROUP_NAME}</name>
                      <kpi_data>
                        <kpi>
                          <event_name>VM_ALIVE_TCP</event_name>
                          <metric_value>0</metric_value>
                          <metric_cond>EQ</metric_cond>
                          <metric_type>UINT32</metric_type>
                          <metric_occurrences_true>5</metric_occurrences_true>
                          <metric_occurrences_false>5</metric_occurrences_false>
                          <metric_collector>
                            <type>TCPING_SSH_3SEC</type>
                            <nicid>0</nicid>
                            <poll_frequency>15</poll_frequency>
                            <polling_unit>seconds</polling_unit>
                            <continuous_alarm>false</continuous_alarm>
                          </metric_collector>
                        </kpi>
                      </kpi_data>
                    </deployment>
                  </deployments>
                </tenant>
              </tenants>
            </esc_datamodel>
          </config>
        </ned-id>
      </template>
    </devices>
  </config>
```

6. Load merge the CheckPoint payloads provided below:

## V\_CHECKPOINT

```
nfv {
  vnfd V_CHECKPOINT {
    provider      Checkpoint;
    product-name  CHECKPOINT;
```

```

software-version 1;
version 1;
vnfm-info [ csp-vim:csp-vim ];
vdu VDU_SRIOV_CHECKPOINT {
  name VDU_SRIOV_CHECKPOINT;
  int-cpd EXTERNAL {
    int-virtual-link-desc EXTERNAL;
    virtual-network-interface-requirement R-SRIOV {
      support-mandatory true;
      network-interface-requirements NIC_TYPE {
        value "X520|X710|XL710";
      }
      network-interface-requirements NW_TYPE {
        value SRIOV;
      }
    }
    layer-protocol [ ethernet ];
    interface-id 2;
  }
  int-cpd INTERNAL {
    int-virtual-link-desc INTERNAL;
    virtual-network-interface-requirement R-SRIOV {
      support-mandatory true;
      network-interface-requirements NIC_TYPE {
        value "X520|X710|XL710";
      }
      network-interface-requirements NW_TYPE {
        value SRIOV;
      }
    }
    layer-protocol [ ethernet ];
    interface-id 1;
  }
  int-cpd MGMT {
    int-virtual-link-desc MGMT;
    layer-protocol [ ethernet ];
    interface-id 0;
    management;
  }
  virtual-compute-desc vcd;
  virtual-storage-desc [ root ];
  sw-image-desc SID$I8;
  device-type {
    generic {
      ned-id checkpoint-gaiaos_rest-gen-1.8;
    }
  }
  artifact [ user-data ];
}
virtual-compute-desc vcd {
  virtual-memory {
    size 4.0;
  }
  virtual-cpu {
    num-virtual-cpu 2;
  }
}
virtual-storage-desc root {
  type-of-storage root-storage;
  size-of-storage 100;
}
sw-image-desc Check_Point_R80.40_Cloudguard_Security_Gateway_Generic_02282020.qcow2 {
  name Check_Point_R80.40_Cloudguard_Security_Gateway_Generic_02282020.qcow2;
  version 916.12.01a;
  container-format bare;
  disk-format qcow2;
  image file://opt/cisco/nso/images/Check_Point_R80.
40_Cloudguard_Security_Gateway_Generic_02282020.qcow2;
  additional-setting disk_type {
    value virtio;
  }
}

```



```

        additional-setting e1000_net {
            value false;
        }
        additional-setting serial_console {
            value true;
        }
        additional-setting virtio_net {
            value false;
        }
    }
    sw-image-desc SID$18 {
        name                Check_Point_R80.40_Cloudguard_Security_Gateway_Generic_03252020.qcow2;
        version              Check_Point_R80.40_Cloudguard_Security_Gateway_Generic_03252020.qcow2;
        container-format     bare;
        disk-format          qcow2;
        image                file://opt/cisco/nso/images/Check_Point_R80.
40_Cloudguard_Security_Gateway_Generic_03252020.qcow2;
        additional-setting disk_type {
            value virtio;
        }
        additional-setting e1000_net {
            value false;
        }
        additional-setting serial_console {
            value true;
        }
        additional-setting virtio_net {
            value false;
        }
    }
    int-virtual-link-desc EXTERNAL {
        connectivity-type {
            layer-protocol [ ethernet ];
        }
    }
    int-virtual-link-desc INTERNAL {
        connectivity-type {
            layer-protocol [ ethernet ];
        }
    }
    int-virtual-link-desc MGMT {
        connectivity-type {
            layer-protocol [ ethernet ];
        }
    }
    ext-cpd EXTERNAL {
        int-virtual-link-desc EXTERNAL;
    }
    ext-cpd INTERNAL {
        int-virtual-link-desc INTERNAL;
    }
    ext-cpd MGMT {
        int-virtual-link-desc MGMT;
    }
    df VDU_SRIOV_CHECKPOINT {
        vdu-profile VDU_SRIOV_CHECKPOINT;
        instantiation-level V_CHECKPOINT {
            vdu-level VDU_SRIOV_CHECKPOINT;
        }
        default-instantiation-level V_CHECKPOINT;
    }
    artifact user-data;
    service-type        OTHERS;
}
}

```

## N\_CHECKPOINT

```
nfv {
nsd N_CHECKPOINT {
    version 1.0;
    vnfd-id [ V_CHECKPOINT ];
    sapd FACING_CONSUMER {
        virtual-link-desc FACING_CONSUMER-vld;
        endpoint-type consumer;
    }
    sapd FACING_FABRIC {
        virtual-link-desc FACING_FABRIC-vld;
        endpoint-type chain;
    }
    sapd management {
        virtual-link-desc management-vld;
    }
    virtual-link-desc FACING_CONSUMER-vld {
        df small;
    }
    virtual-link-desc FACING_FABRIC-vld {
        df small;
    }
    virtual-link-desc management-vld {
        df small;
    }
    df N_CHECKPOINT {
        vnf-profile V_CHECKPOINT {
            vnfd-id V_CHECKPOINT;
            flavour-id VDU_SRIOV_CHECKPOINT;
            instantiation-level V_CHECKPOINT;
            virtual-link-connectivity FACING_CONSUMER-vld {
                constituent-cpd-id V_CHECKPOINT {
                    constituent-cpd-id EXTERNAL;
                }
            }
            virtual-link-connectivity FACING_FABRIC-vld {
                constituent-cpd-id V_CHECKPOINT {
                    constituent-cpd-id INTERNAL;
                }
            }
            virtual-link-connectivity management-vld {
                constituent-cpd-id V_CHECKPOINT {
                    constituent-cpd-id MGMT;
                }
            }
        }
        virtual-link-profile FACING_CONSUMER-vld {
            virtual-link-desc-id FACING_CONSUMER-vld;
            flavour-id small;
        }
        virtual-link-profile FACING_FABRIC-vld {
            virtual-link-desc-id FACING_FABRIC-vld;
            flavour-id small;
        }
        virtual-link-profile management-vld {
            virtual-link-desc-id management-vld;
            flavour-id small;
        }
        ns-instantiation-level N_CHECKPOINT {
            vnf-to-level-mapping V_CHECKPOINT;
            virtual-link-to-level-mapping FACING_CONSUMER-vld;
            virtual-link-to-level-mapping FACING_FABRIC-vld;
            virtual-link-to-level-mapping management-vld;
        }
    }
}
nodes FACING_CONSUMER {
    x-cord 268;
    y-cord 220;
}
```

```

nodes FACING_FABRIC {
    x-cord 796;
    y-cord 202;
}
nodes V_CHECKPOINT {
    x-cord 490.65;
    y-cord 270;
}
}
}

```

## VD\_CHECKPOINT

```

cfp-catalog {
nf-deployments {
vnfd V_CHECKPOINT {
    vnfd-deployment VD_CHECKPOINT {
        vnfm-type netconf;
        vim-type csp;
        deployment-flavor {
            name VDU_SRIOV_CHECKPOINT;
            vdu-profile VDU_SRIOV_CHECKPOINT {
                vnf-config VNF_CONFIG_CHECKPOINT;
            }
        }
    }
}
vnf-config VNF_CONFIG_CHECKPOINT {
    intangible;
    monitoring {
        bootup-time            300;
        recovery-wait-time     120;
        polling-frequency      15;
        metric-occurrences-success 3;
        metric-occurrences-failure 1;
    }
    day0 user-data {
        url http://9.9.9.203:8080/day0/checkpoint-data;
    }
    extensions {
        mode                    routed;
        support-remote-as true;
    }
}
}
}
}

```

## ND\_CHECKPOINT

```

cfp-catalog {
catalog SAE_CATALOG {
networkservice-deployment ND_CHECKPOINT {
    nsd-id N_CHECKPOINT;
    deployment-flavor N_CHECKPOINT {
        vnf-profile V_CHECKPOINT {
            vnfd-deployment VD_CHECKPOINT;
        }
    }
}
}
}
}

```

7. Apply the device template to VNFD\_DEPLOYMENT of your CHECKPOINT payloads by running the following command: **"set cfp-catalog nf-deployments vnfd <V\_CHECKPOINT> vnfd-deployment <VD\_CHECKPOINT> deployment-flavor vdu-profile VDU\_SRIOV\_CHECKPOINT vnfm-device-templates vnfm-device-template <esc-vmalive-cp-kpi-data-nic>**

#### Setting VNFM DEVICE TEMPLATE

```
set cfp-catalog nf-deployments vnfd V_CHECKPOINT vnfd-deployment VD_CHECKPOINT deployment-flavor vdu-profile VDU_SRIOV_CHECKPOINT vnfm-device-templates vnfm-device-template esc-vmalive-cp-kpi-data-nic
```

8. Deploy the Checkpoint VNF, example below: EXTERNAL ENDPOINT is CONSUMER22 with 22.22.22.1 IP ADDRESS.

#### DEPLOY\_CP

```
set sae-site SANJOSE sae-provider SAE_PROVIDER sae-tenant SAE_TENANT endpoint-gateway-vnf CP deployment ND_CHECKPOINT deployment-flavor N_CHECKPOINT external-end-point CONSUMER22 connectivity external-access-point FACING_CONSUMER ip 22.22.22.8 nf-profile V_CHECKPOINT
```

9. If the **esc\_nc\_cli get-notif** notification shows **"VM\_ALIVE"** and **"SERVICE\_ALIVE"** notifications -- This indicates the VM/Service has been successfully deployed.

10. You can also verify by performing a **tcping <vnf ip address> 22** to see port open response. -- This indicates the VM is reachable using tcping and ssh can be done.

#### HELPFUL COMMANDS pertaining to this VM Deployment Status/Execution using ESC:

- **esc\_nc\_cli get-notif** -- This will give all ESC notifications while the deployment is in progress/completed.

```

<?xml version="1.0" encoding="UTF-8"?>
<notification xmlns="urn:ietf:params:xml:ns:netconf:notification:1.0">
  <eventTime>2020-09-17T21:53:01.154+00:00</eventTime>
  <escEvent xmlns="http://www.cisco.com/esc/esc">
    <status>SUCCESS</status>
    <status_code>200</status_code>
    <status_message>Flavor creation completed successfully.</status_message>
    <flavor>VDU_VIRTIO_CHECKPOINT</flavor>
    <event>
      <type>CREATE_FLAVOR</type>
    </event>
  </escEvent>
</notification>
<?xml version="1.0" encoding="UTF-8"?>
<notification xmlns="urn:ietf:params:xml:ns:netconf:notification:1.0">
  <eventTime>2020-09-17T21:53:15.6+00:00</eventTime>
  <escEvent xmlns="http://www.cisco.com/esc/esc">
    <status>SUCCESS</status>
    <status_code>200</status_code>
    <status_message>VM Deployed in a service deployment. VM Generated ID: [CHCKPOINT_EPGW_Group1_0_d31525ed-9b3e-4-
e7-90e9-f25051cbce69]</status_message>
    <depname>CHCKPOINT_EPGW</depname>
    <tenant>nafta</tenant>
    <depid>6787a4a1-c9ed-4c71-833d-da7fcd271fb0</depid>
    <vm_group>Group1</vm_group>
    <vm_source>
      <vmid>fbc7c4a4-e16e-4871-83b1-fd66532f2acf</vmid>
      <vmname>CP1</vmname>
      <generated_vmname>CHCKPOINT_EPGW_Group1_0_d31525ed-9b3e-48e7-90e9-f25051cbce69</generated_vmname>
      <vim_id>csp-9-39</vim_id>
      <vim_project>csp-9-39</vim_project>
      <interfaces>
        <interface>
          <nicid>0</nicid>
          <type>access</type>
          <port_id>12ebbb1b-2b84-4868-9dd3-f759c5ac63e0</port_id>
          <admin_state_up>true</admin_state_up>
          <network>MGMTPC</network>
          <subnet/>
          <ip_address>9.9.32.7</ip_address>
          <netmask>255.255.0.0</netmask>
          <gateway>9.9.9.1</gateway>
        </interface>
      </interfaces>
    </vm_source>
    <event>
      <type>VM_DEPLOYED</type>
    </event>
  </escEvent>
</notification>

```

- /var/log/esc/yangesc.log -- This log will show the workflow of esc notifications similar to above command.

```

2020-09-17 10:03:10.472 INFO ===== SEND NOTIFICATION STARTS =====
2020-09-17 10:03:10.472 INFO Type: VM_ALIVE
2020-09-17 10:03:10.472 INFO Status: SUCCESS
2020-09-17 10:03:10.472 INFO Status code: 200
2020-09-17 10:03:10.472 INFO Status Msg: VM_Alive event received during deployment, VM Generated ID: [CHCKPOINT_EPGW_Group1_0_9a69f01d-63c0-4e6f-8dab-0994278adf76]
2020-09-17 10:03:10.472 INFO Tenant: nafta
2020-09-17 10:03:10.472 INFO Deployment ID: c7b958ee-1b1d-4616-a824-344272c9206e
2020-09-17 10:03:10.472 INFO Deployment name: CHCKPOINT_EPGW
2020-09-17 10:03:10.472 INFO VM group name: Group1
2020-09-17 10:03:10.472 INFO User configs: 1
2020-09-17 10:03:10.472 INFO VM Source:
2020-09-17 10:03:10.472 INFO VM ID: efacbe50-e1da-48f5-a712-a7da3c2fe0cd
2020-09-17 10:03:10.472 INFO VM Name: CP1
2020-09-17 10:03:10.472 INFO VM Name (Generated): CHCKPOINT_EPGW_Group1_0_9a69f01d-63c0-4e6f-8dab-0994278adf76
2020-09-17 10:03:10.472 INFO VIM ID: csp-9-39
2020-09-17 10:03:10.472 INFO VIM Project: csp-9-39
2020-09-17 10:03:10.472 INFO Host ID:
2020-09-17 10:03:10.472 INFO Host Name:
2020-09-17 10:03:10.472 INFO ===== SEND NOTIFICATION ENDS =====
2020-09-17 10:03:10.613 INFO ===== SEND NOTIFICATION STARTS =====
2020-09-17 10:03:10.613 INFO Type: SERVICE_ALIVE
2020-09-17 10:03:10.613 INFO Status: SUCCESS
2020-09-17 10:03:10.613 INFO Status code: 200
2020-09-17 10:03:10.613 INFO Status Msg: Service group deployment completed successfully!
2020-09-17 10:03:10.613 INFO Tenant: nafta
2020-09-17 10:03:10.613 INFO Deployment ID: c7b958ee-1b1d-4616-a824-344272c9206e
2020-09-17 10:03:10.613 INFO Deployment name: CHCKPOINT_EPGW

```

- /var/log/esc/mona/mona.log -- This log will show the execution of metric file to performing TCPing operation on VM.

```

2020-09-17 09:59:10.044 [QuartzScheduler_Worker-39] Error during base monitor execution
2020-09-17 09:59:13.000 [QuartzScheduler_Worker-39] [Name] : rule-VMLIVE-TCP-CHECKPOINT_EPGW_2bc96393-0d68-4ebc-bcbc-253b0ac89431_0 triggered
2020-09-17 09:59:13.000 [QuartzScheduler_Worker-39] [RuleName] : rule-VMLIVE-TCP-CHECKPOINT_EPGW_2bc96393-0d68-4ebc-bcbc-253b0ac89431_0: RuncustomScriptAction execution of script:/var/tmp/esc/TCping_Monitor.py
2020-09-17 09:59:13.000 [QuartzScheduler_Worker-39] Use the original script path and skip downloading: no protocol: /var/tmp/esc/TCping_Monitor.py
2020-09-17 09:59:13.000 [QuartzScheduler_Worker-39] Executing script:/var/tmp/esc/TCping_Monitor.py tcp_port '22' timeout_sec '3' enable_events_after_success 'true' vm_ip_address '9.9.32.7'
2020-09-17 09:59:13.001 [QuartzScheduler_Worker-39] Failed to execute script Cannot run program '/var/tmp/esc/TCping_Monitor.py': error=13, Permission denied
java.io.IOException: error=13, Permission denied
    at java.lang.UNIXProcess.forkAndExec(Native Method)
    at java.lang.UNIXProcess.<init>(UNIXProcess.java:247)
    at java.lang.ProcessImpl.start(ProcessImpl.java:134)
    at java.lang.ProcessBuilder.start(ProcessBuilder.java:1029)
    at com.cisco.esc.mona.actions.scripts.RuncustomScriptAction.executeScript(RuncustomScriptAction.java:572)
    at com.cisco.esc.mona.actions.scripts.RuncustomScriptAction.execute(RuncustomScriptAction.java:262)
    at com.cisco.esc.mona.model.monitors.BaseMonitor.execute(BaseMonitor.java:130)
    at org.quartz.core.JobRunShell.run(JobRunShell.java:202)
    at org.quartz.simpl.SimpleThreadPool$WorkerThread.run(SimpleThreadPool.java:573)
2020-09-17 09:59:15.001 [QuartzScheduler_Worker-39] Error during base monitor execution
2020-09-17 09:59:20.000 [QuartzScheduler_Worker-51] [Name] : rule-VMLIVE-TCP-CHECKPOINT_EPGW_2bc96393-0d68-4ebc-bcbc-253b0ac89431_0 triggered
2020-09-17 09:59:20.001 [QuartzScheduler_Worker-51] [RuleName] : rule-VMLIVE-TCP-CHECKPOINT_EPGW_2bc96393-0d68-4ebc-bcbc-253b0ac89431_0: RuncustomScriptAction execution of script:/var/tmp/esc/TCping_Monitor.py
2020-09-17 09:59:20.001 [QuartzScheduler_Worker-51] Use the original script path and skip downloading: no protocol: /var/tmp/esc/TCping_Monitor.py
2020-09-17 09:59:20.001 [QuartzScheduler_Worker-51] Executing script:/var/tmp/esc/TCping_Monitor.py tcp_port '22' timeout_sec '3' enable_events_after_success 'true' vm_ip_address '9.9.32.7'
2020-09-17 09:59:20.002 [QuartzScheduler_Worker-51] Failed to execute script Cannot run program '/var/tmp/esc/TCping_Monitor.py': error=13, Permission denied
java.io.IOException: error=13, Permission denied
    at java.lang.UNIXProcess.forkAndExec(Native Method)
    at java.lang.UNIXProcess.<init>(UNIXProcess.java:247)
    at java.lang.ProcessImpl.start(ProcessImpl.java:134)
    at java.lang.ProcessBuilder.start(ProcessBuilder.java:1029)
    at com.cisco.esc.mona.actions.scripts.RuncustomScriptAction.executeScript(RuncustomScriptAction.java:572)
    at com.cisco.esc.mona.actions.scripts.RuncustomScriptAction.execute(RuncustomScriptAction.java:262)
    at com.cisco.esc.mona.model.monitors.BaseMonitor.execute(BaseMonitor.java:130)
    at org.quartz.core.JobRunShell.run(JobRunShell.java:202)
    at org.quartz.simpl.SimpleThreadPool$WorkerThread.run(SimpleThreadPool.java:573)

```

- /var/log/esc/error\_escmanager.log -- This log will show any error caused during the deployment of VM.

```

2020-09-17 09:09:58.797 VM_STATE_MACHINE-CHECKPOINT_EPGW_Group1_0_d53ce9b8-2efc-4e7f-a6b6-795eaf5e98ae ERROR [MONADriverDynamic.java:setMonitorworker:239] [tid=7af8f780-3f0d-4a55-99a7-8628e1a1241] Unsupported metric type or meta
missing: TCPING_SSH_3SEC
2020-09-17 09:09:58.797 VM_STATE_MACHINE-CHECKPOINT_EPGW_Group1_0_d53ce9b8-2efc-4e7f-a6b6-795eaf5e98ae ERROR [MONADriverDynamic.java:setMonitorworker:352] [tid=7af8f780-3f0d-4a55-99a7-8628e1a1241] Internal server error please se
e for additional details
com.cisco.esc.exceptions.mona.InvalidMonodataException: unsupported metric type or metadata missing: TCPING_SSH_3SEC
    at com.cisco.esc.monitoring.engine.mona.MONADriverDynamic.setMonitor(MONADriverDynamic.java:240)
    at com.cisco.esc.monitoring.engine.mona.MONADriverDynamic.setMonitor(MONADriverDynamic.java:178)
    at com.cisco.esc.stateMachines.atl1s.StateMachineMonitorUtil1s.setMonitor(StateMachineMonitorUtil1s.java:32)
    at com.cisco.esc.stateMachines.vml.eventhandlers.VMStateMachineDefaultErrorHandler.doErrorAction(VMStateMachineDefaultErrorHandler.java:28)
    at com.cisco.esc.stateMachines.eventhandlers.AbstractErrorHandler.doAction(AbstractErrorHandler.java:26)
    at com.cisco.esc.db.util1.ManagedObjectService.doEventHandlerActionInTransaction(ManagedObjectService.java:158)
    at sun.reflect.GeneratedMethodAccessor217.invoke(Unknown Source)
    at sun.reflect.DelegatingMethodAccessorImpl.invoke(DelegatingMethodAccessorImpl.java:43)
    at java.lang.reflect.Method.invoke(Method.java:498)
    at com.cisco.esc.db.util1.ManagedObjectServiceUtil1sManagedObjectServiceInvocationHandler$1.call(ManagedObjectServiceUtil1.java:41)
    at com.cisco.esc.db.util1.RetryHandler.tryExecute(RetryHandler.java:57)
    at com.cisco.esc.db.util1.ManagedObjectServiceUtil1sManagedObjectServiceInvocationHandler.invoke(ManagedObjectServiceUtil1.java:36)
    at com.sun.proxy.$Proxy211.doEventHandlerActionInTransaction(Unknown Source)
    at com.cisco.esc.stateMachines.eventhandlers.AbstractEventHandler.do$Action(AbstractEventHandler.java:43)
    at com.cisco.esc.stateMachines.stateTransitionEventHandler.run$do$Action$StateTransitionEventHandler.java:183)
    at com.cisco.esc.stateMachines.stateTransitionEventHandler.do$Action$StateTransitionEventHandler.java:154)
    at com.cisco.esc.stateMachines.eventhandlers.AbstractEventHandler.do$Action(AbstractEventHandler.java:46)
    at com.cisco.esc.stateMachines.AbstractStateMachine.processEvent(AbstractStateMachine.java:233)
    at com.cisco.esc.stateMachines.StateMachineEngine.run$State(StateMachineEngine.java:237)
    at com.cisco.esc.stateMachines.StateMachineEngine.run$with$Context$State(StateMachineEngine.java:103)
    at com.cisco.esc.threadpool.ESCLogContextRunnable.run(ESCLogContextRunnable.java:60)
    at io.micrometer.core.instrument.internal.TimedRunnable.run(TimedRunnable.java:44)
    at com.cisco.esc.threadpool.worker.ThreadWorkerThread.run(ThreadWorkerThread.java:33)
2020-09-17 09:09:58.797 VM_STATE_MACHINE-CHECKPOINT_EPGW_Group1_0_d53ce9b8-2efc-4e7f-a6b6-795eaf5e98ae WARN [MONADriverDynamic.java:setMonitorworker:355] [tid=7af8f780-3f0d-4a55-99a7-8628e1a1241] About to removed MONA programme
tes: pollback of previously set monitors
LogContextService.java:outputDecoratedLog:204] [tid=ee894d06-6f39-4856-b8d6-ab8ea7c8da12] SERVICE_STATE_MACHINE-state machine (type:SERVIC
ATE_MACHINE_10f8c3e74-f4ab-4d3f-b097-b77c3c36d386)no matching event handler for given state SERVICE_UNDEPLOYING_STATE and event VM_UNSET_MONITOR_EVENT
2020-09-17 09:10:36.302 VM_STATE_MACHINE-CHECKPOINT_EPGW_Group1_0_d53ce9b8-2efc-4e7f-a6b6-795eaf5e98ae WARN [ObjectInvocation.java:validateTypeMethodEntity:131] [tid=ee894d06-6f39-4856-b8d6-ab8ea7c8da12] Entity must be null f
or tcp metric DELETE.
2020-09-17 09:13:06.981 http-nio-127.0.0.1-8080-exec-10 ERROR [DynamicMappingRequestProcessor.java:createDynamicMappingMetric:232] [tid=367aa75d-6d79-461d-a62c-c609244c3527] Metric [TCPING_SSH_3SEC] already exists.
2020-09-17 09:13:17.343 SERVICE_STATE_MACHINE-a8e8d4ae-5d70-4f8d-8bd3-14f466cd98d8 WARN [Network.java:getTenantNameByInternalTenantId:354] [tid=b48ba547-aafc-4bcb-81c8-23d57d971a7c] Attempting to send notification using a NULL
tenant ID
2020-09-17 09:13:17.379 SERVICE_STATE_MACHINE-a8e8d4ae-5d70-4f8d-8bd3-14f466cd98d8 WARN [Network.java:getTenantNameByInternalTenantId:354] [tid=b48ba547-aafc-4bcb-81c8-23d57d971a7c] Attempting to send notification using a NULL
tenant ID
2020-09-17 09:13:17.380 SERVICE_STATE_MACHINE-a8e8d4ae-5d70-4f8d-8bd3-14f466cd98d8 WARN [Network.java:getTenantNameByInternalTenantId:354] [tid=b48ba547-aafc-4bcb-81c8-23d57d971a7c] Attempting to send notification using a NULL
tenant ID
2020-09-17 09:13:18.844 VM_STATE_MACHINE-CHECKPOINT_EPGW_Group1_0_8fc83e74-5641-4118-b838-ed565d2f6a41 WARN [Deployment.java:getInterfaceFacesFromDataModel:1155] [tid=b48ba547-aafc-4bcb-81c8-23d57d971a7c] Interface network name: HQ
2020-09-17 09:13:18.844 VM_STATE_MACHINE-CHECKPOINT_EPGW_Group1_0_8fc83e74-5641-4118-b838-ed565d2f6a41 WARN [Network.java:getTenantNameByInternalTenantId:354] [tid=b48ba547-aafc-4bcb-81c8-23d57d971a7c] Attempting to send notif
ication using a NULL tenant ID
2020-09-17 09:13:18.846 VM_STATE_MACHINE-CHECKPOINT_EPGW_Group1_0_8fc83e74-5641-4118-b838-ed565d2f6a41 WARN [Network.java:getTenantNameByInternalTenantId:354] [tid=b48ba547-aafc-4bcb-81c8-23d57d971a7c] Attempting to send notif
ication using a NULL tenant ID

```

## DELETE METRIC

- dnam.py delete-metric --name <metricName> -- To delete existing metric from ESC manager.

### Reference Links:

1. <https://confluence-eng-sjc1.cisco.com/conf/pages/viewpage.action?pageId=47078158>
2. <https://confluence-eng-sjc1.cisco.com/conf/display/ESCWIKI/ESC++CSP+2100++ASAv+HA+Deployment>