



## Monitoring VNF Using D-MONA

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The ESC Monitoring and Action (MONA) monitors VNFs that are deployed by ESC. To maintain accuracy, it executes actions, such as ping, custom\_scripts, and so on at specific intervals.

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## Onboarding D-MONA

The following prerequisites must be fulfilled before deploying D-MONA:

### Prerequisites

- Ensure Connectivity exists between ESC and the D-MONA.
- Ensure connectivity exists between the D-MONA and the deployed VNFs.

Upon successful deployment, D-MONA is monitored by the local MONA running on the ESC VM.



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**Note** Monitoring of D-MONA by another D-MONA is not supported.

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## Deploying D-MONA

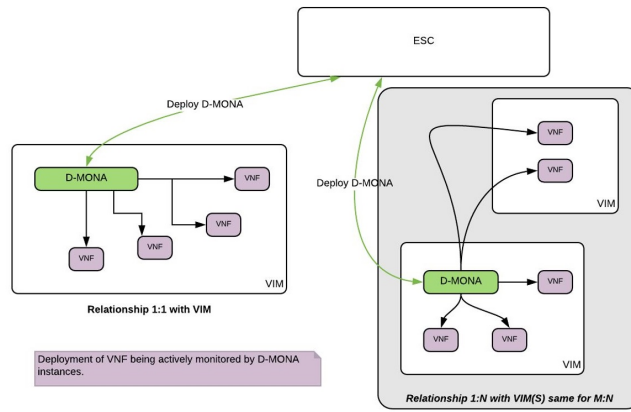
From ESC 5.3 or later, 1:1 mapping is not required. It supports explicit D-MONA deployment.

- In this scenarios, multiple D-MONA Instances can be deployed.
- VNFs can be deployed under, or migrated to specified monitoring agent.

For using D-MONA in your infrastructure, you must:

1. Deploy the D-MONA with the monitoring infrastructure.
2. Deploy the VNFs using the D-MONA for the monitoring.

Figure 1: D-MONA Deployment Types



If you are not using D-MONA for monitoring, see [Monitoring Virtual Network Functions](#) section.

The following table lists the D-MONA VM flavors for large scale deployments:

Deployment	Number of VMs	Virtual CPU per VM	Virtual Memory (GB) per VM	Virtual Hard Disk (GB)per VM	Number of total VMs Supported
D-MONA	1	4	8	40	1500

## Configuring D-MONA

While configuring D-MONA, you can view 2 types of runtime behavior, one where you can view the full behavior expected from a typical ESC deployment, and the other one depicts the capabilities provided by D-MONA.

The D-MONA runtime behavior is controlled by the day-0 configuration that is provided to the VM at deployment time. For more information on day zero configuration, see the [D-MONA Day Zero Configuration](#) section.

You must provide the notification URL for HA Active/Standby and Standalone. However, for the Active/Active HA, the URL is auto-generated or computed during the deployment.

### D-MONA Day Zero Configuration

The following example shows D-MONA SSH VM access configuration:

```
<configuration>
  <dst>--user-data</dst>
  <file>file:///opt/cisco/esc/esc-config/dmona/user-data.template</file>
  <variable>
    <name>vm_credentials</name>
    <val>REPLACED_WITH_GENERATED_PWD</val>
  </variable>
</configuration>
```

The following example shows the notification URL for HA Active/Standby and Standalone:

```
<variable>
  <name>notification.url</name>
  <val>
    http(s)://xxx.xx.x.xx:xxxx/ESCManager/dmona/api/events/notif
  </val>
</variable>
```

The `vm_credentials` passes the encrypted password to admin for SSH access to the D-MONA.

The following example shows the D-MONA ESC certificate configuration:

```
<configuration>
  <dst>/opt/cisco/esc/mona/dmona.crt</dst>
  <data>$DMONA_CERT</data>
</configuration>
```

The following example shows the D-MONA application user data configuration:

```
<configuration>
<dst>/opt/cisco/esc/mona/config/application-dmona.properties</dst>
<file>file:///opt/cisco/esc/esc-config/dmona/application-dmona.template</file>
<variable>
  <name>monitoring.agent</name>
  <val>true</val>
</variable>
<variable>
  <name>monitoring.agent.vim.mapping</name>
  <val>true</val>
</variable>
<!--Used to enable Basic Authentication for communication with the D-MONA Application.-->
<variable>
  <name>security_basic_enabled</name>
  <val>true</val>
</variable>
<variable>
  <name>security_user_name</name>
  <val>REPLACED_WITH_USER_NAME</val>
</variable>
<variable>
  <name>security_user_password</name>
  <val>REPLACED_WITH_USER_PASSWORD</val>
</variable>
</configuration>
```

## Deploying VNFs with Explicit D-MONA Monitoring Agent

From ESC 5.3 onwards, ESC allows to explicitly specify the D-MONA identifier to monitor a VNF. Following are the steps to deploy VNFs with explicit VNF to D-MONA monitoring agent:

### Procedure

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- Step 1** Deploy a D-MONA with `monitoring.agent.vim.mapping` property in the D-MONA day-0 config omitted or set to false.

The following example shows the day 0 config of a D-MONA datamodel where `monitoring.agent.vim.mapping` is set to `false`.

```
<configuration>
  <dst>/opt/cisco/esc/mona/config/application-dmona.properties</dst>
  <file>file:///opt/cisco/esc/esc-config/dmona/application-dmona.template</file>
  <variable>
    <name>monitoring.agent</name>
    <val>true</val>
  </variable>
  <!-- property for one to one mapping - omit or set to false for explicit VNF to
D-MONA mapping-->
  <variable>
    <name>monitoring.agent.vim.mapping</name>
    <val>>false</val>
  </variable>
  <!-- property to enable basic auth in dmona. Not to be confused with basic auth for
esc -->
  <variable>
    <name>security_basic_enabled</name>
    <val>true</val>
  </variable>
  <variable>
    <name>security_user_name</name>
    <val>REPLACE_WITH_USER_NAME</val>
  </variable>
  <variable>
    <name>security_user_password</name>
    <val>REPLACE_WITH_USER_PASSWORD</val>
  </variable>
</configuration>
```

**Step 2** Deploy the VNF by specifying the `monitoring_agent` parameter in the KPI config of the deployment datamodel.

The tag `<monitoring_agent>` is used as an explicit identification of a distributed mona deployment which monitors the VNF. When the tag is present, ESC looks for a distributed mona deployment with that exact deployment name. The D-MONA identifier is specified in the URI by using a specific scheme to represent a previously deployed D-MONA VNF.

For example, `dmonaName://<D_MONA_DEP_NAME>` Replace `<D_MONA_DEP_NAME>` with deployment name of Distributed MONA instance.

The following example shows the KPI config of a VNF datamodel with monitoring agent specified:

```
<kpi>
  <event_name>VM_ALIVE</event_name>
  <!-- specify dmona deployment name using dmonaName:// URI format-->
  <monitoring_agent>dmonaName://D-MONA-OTTAWA</monitoring_agent>
  <metric_value>1</metric_value>
  <metric_cond>GT</metric_cond>
  <metric_type>UINT32</metric_type>
  <metric_collector>
    <type>ICMPPing</type>
    <nicid>0</nicid>
    <poll_frequency>3</poll_frequency>
    <polling_unit>seconds</polling_unit>
    <continuous_alarm>>false</continuous_alarm>
    <monitoring_public_ip>>true</monitoring_public_ip>
  </metric_collector>
</kpi>
```

**Note** ESC allows only one single monitoring agent per VNF.

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## Recovering the D-MONA

You can recover the D-MONA completely. During the recovery process, monitoring VNFs by D-MONA is not possible. Only on successful completion of D-MONA recovery, the VNFs monitoring state is automatically refreshed by reprogramming each VNF monitoring rule.

## Retrieving D-MONA Logs

Access the D-MONA with the `vm_credentials` password that was provided as part of the D-MONA day-0 configuration.

To retrieve the D-MONA logs, use the following command:

```
<security_user_name>:<security_user_password>
```

Where `ip-address` is the IP Address of the targeted D-MONA and `username`, `password` are the username and password provided as day-0 configuration at deployment of the D-MONA.

For complete list of all ESC logs, see ESC Logs section in the ESC Administration Guide.

For ETSI-related information, see Monitoring VNF Using D-MONA chapter in the Cisco Elastic Services Controller ETSI NFV MANO User Guide.

## Resetting the Monitoring Rules for D-MONA

The Monitoring and Action (MONA) monitors and executes actions, such as `ping`, `custom_scripts`, and so on at specific intervals to maintain accuracy.

The local MONA keeps a track of the last known startup time of the polled D-MONA process. The status code 200 indicates the successful request. In case of successful request, the local MONA compares the last known startup time with the returned startup time from the polled application. On DMONA restart, the recovery setup starts automatically.

To enable the start time check, you must set `application_startup_time` in the `dep.xml`.

However, if the `application_startup_time` is not present or set to `false`, then DMONA reboot check is disabled. You must set this property for DMONA deployment.



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**Note** Backward compatibility is not supported. It must be set for version 5.3 and later only.

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Following is a sample deployment model for D-MONA:

```
<?xml version="1.0"?>
<esc_datamodel xmlns="http://www.cisco.com/esc/esc">
  <tenants>
    <tenant>
```

```

<name>A_tenant_name</name>
<deployments>
  <deployment>
    <name>dmona_deployment</name>
    <vm_group>
      <name>g1</name>
      <image>ESC-5_3_0_31</image>
      <flavor>m1.large</flavor>
      <bootup_time>120</bootup_time>
      <recovery_wait_time>0</recovery_wait_time>
      <interfaces>
        <interface>
          <nicid>0</nicid>
          <network>esc-net</network>
        </interface>
      </interfaces>
      <kpi_data>
        <kpi>
          <event_name>VM_ALIVE</event_name>
          <metric_value>1</metric_value>
          <metric_cond>GT</metric_cond>
          <metric_type>UINT32</metric_type>
          <metric_occurrences_true>1</metric_occurrences_true>
          <metric_occurrences_false>5</metric_occurrences_false>
          <metric_collector>
            <type>HTTPGET</type>
            <nicid>0</nicid>
            <poll_frequency>3</poll_frequency>
            <polling_unit>seconds</polling_unit>
            <continuous_alarm>false</continuous_alarm>
            <properties>
              <!-- Set to true to enable start time check --->
              <property>
                <name>application_startup_time</name>
                <value>true</value>
              </property>
              <property>
                <name>protocol</name>
                <value>https</value>
              </property>
              <property>
                <name>port</name>
                <value>8443</value>
              </property>
              <property>
                <name>path</name>
                <value>mona/v1/health/status</value>
              </property>
            </properties>
          </metric_collector>
        </kpi>
      </kpi_data>
    </vm_group>
  </deployment>
</deployments>
</tenant>
</tenants>
</esc_datamodel>

```