



# Run example workflow using Cisco NSO adapter

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## Run example workflow using Cisco NSO adapter

This quick start uses a locally installed [Cisco Crosswork Network Service Orchestrator](#) application and the CWM with the Cisco NSO adapter to show you a basic use case scenario for creating and running a successful workflow. It will guide you through how to install an adapter, create a worker for the workflow execution and run the created workflow to quickly get tangible results in Cisco NSO.

### Workflow overview

The purpose of the example workflow is to automatically create a VPN service for two NSO devices.

First, we point to the devices in the data input and then try to perform the NSO `check-sync` operation on them. Then, depending on the result:

- if not in sync, we push a device to perform a `sync-from`, and only then try to create a VPN for it;
- if in sync, we don't perform `sync-from` but directly create a VPN for the device.

If all the steps are executed successfully, the execution engine reports workflow execution completion and displays the final data input. The results are visible in NSO too. If the engine encounters errors while performing a step, it uses the specified `retry` policy. In case errors persist beyond the retry limits, the engine ends the execution with a **Failed** status.

Go through the sections below to learn the details of how data input, functions, states, actions, and data filters are defined. If you want to know how the sausage is made, you can read the [Create workflow](#) chapter in the [Workflow Creator](#) guide.

### Prerequisites

- Cisco NSO 6.0 installed. If you don't have it, follow the [installation instructions](#).
- CWM installed using OVA. Go to [CWM Administrator guide for instructions](#).

## Step 1: Install NSO adapter

To interact with Cisco NSO, CWM needs a dedicated Cisco NSO adapter. Here's how you install it using the CWM API:

### Upload NSO adapter file

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- Step 1** Get the latest NSO adapter installation file from the CWM Software Package.
  - Step 2** Go to the CWM User Interface in a browser, and log in using credentials generated upon the installation of CWM. If the application is hosted locally, then the default address is `localhost:8443`.
  - Step 3** From the navigation menu on the left, click the **swagger** icon.
  - Step 4** In the **adapters** section, click the `POST /adapter` endpoint to expand it. Inside the endpoint, click **Try it out**.
  - Step 5** In the subsection that appears, click **Choose File**, select the NSO installation file and click **Upload**, then click **Execute**.  
If the server response code is `201`, the adapter file is successfully uploaded into the CWM database.
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### Deploy Cisco NSO adapter

Before you can use the adapter, you need to deploy the uploaded adapter file using the CWM API:

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- Step 1** In the CWM API **adapters** section, click the `GET /adapter` endpoint to expand it. Inside the endpoint, click **Try it out** and **Execute**.
  - Step 2** From the server response body, copy the value of the `id` field. It should be `cisco.nso.v1.0.0` or similar, depending on your adapter version.
  - Step 3** In the CWM API **adapters** section, click the `POST /adapter/{adapterId}/deploy` endpoint to expand it.
  - Step 4** Inside the endpoint, click **Try it out**. Paste the adapter id into the **Adapter ID** field.
  - Step 5** In the **createWorker** field, set the `createWorker` parameter to `true`. This will create a worker with the same name as the adapter id.
  - Step 6** Click **Execute**.

If the server response code is `201`, the adapter plugin is successfully installed and you're good to proceed.

**Note** If you want to create a worker manually, follow the instructions in the CWM Administrator Guide. Remember that in this case, you will need to update the workflow definition with your created worker name.

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## Step 2: Create secret and resource

To define the resources and secrets to be passed in securely to the Cisco NSO adapter, you need to create a secret and resource in the CWM API. Here's how to do it:

## Create secret

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**Step 1** In the CWM API **secrets** section, click the `POST /secret` endpoint to expand it.

**Step 2** Inside the endpoint, click **Try it out**, and paste the following data into the **Secret to add** field:

```
{
  "secret": {
    "username": "admin",
    "password": "admin"
  },
  "secretId": "NSOSecret",
  "secretType": "basicAuth"
}
```

**Step 3** Click **Execute**.

If the server response code is 201, the secret is successfully created and you can start creating your resource.

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## Create resource

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**Step 1** In the CWM API **resources** section, click the `POST /resource` endpoint to expand it.

**Step 2** Inside the endpoint, click **Try it out**, and paste the data into the **Resource input** field (modify if needed to fit your installation):

```
{
  "resource": {
    "scheme": "http",
    "host": "127.0.0.1",
    "port": 8080
  },
  "resourceId": "NSOLocal",
  "resourceType": "cisco.nso.resource.v1.0.0",
  "secretId": "NSOSecret"
}
```

**Step 3** Click **Execute**.

If the server response code is 201, the resource is successfully created and you're good to proceed.

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## Step 3: Set up NSO example service

The NSO example that we use for the purposes of our workflow is setting up a Layer3 VPN in a service provider MPLS network for two NSO-simulated devices. Here's how you set up the example:

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**Step 1** In a terminal, open your main NSO directory and go to `mpls-vpn-new-template`:

```
cd examples.ncs/service-provider/mpls-vpn-new-template
```

**Step 2** Execute the Makefile by running:

**Step 4: Run the workflow**

```
make stop clean all start
```

This command will start your local NSO instance and the sample netsim devices.

**Step 3** For the example workflow to execute successfully, execute a **Sync from** on all the netsim devices beforehand:

```
devices sync-from
```

## Step 4: Run the workflow

Now that we have the NSO adapter, the worker, and the NSO example all up and running, we can create a workflow in the CWM UI and run the job.

### Add new workflow

**Step 1** In the CWM UI, select the **Workflows** tile from the navigation menu on the left.

**Step 2** In the **Workflows** panel, click **Create new workflow**.

**Step 3** In the **Create new workflow** modal, provide the required input:

a) **Workflow definition name:** provide name for the example workflow definition: `CreateL3VPN`.

b) **Version:** provide workflow definition version: `1.0`.

**Step 4** Click **Create workflow**.

*Figure 1: Create workflow*

### Create new workflow

Workflow definition name\*

Version\*

## Run job

- Step 1** In the **Workflows** panel, enter the newly created workflow definition by clicking its name.
- Step 2** Click the **Code** tab and delete the sample content from the **Code** field.
- Step 3** Download the workflow file using the link below and unzip it. Open the JSON file and copy the contents. Open the file, copy the workflow definition and paste it inside the **Code** field, then click **Save changes**.

[Workflow\\_v1.json](#)

- Step 4** Click **Run**.
- Step 5** Download the data input file using the link below and unzip it. Open the JSON file and copy the contents. In the **Run job** modal, provide a name for the job and in the **Job variables** field, paste the copied data input.

[Data\\_input\\_v1.json](#)

- Step 6** Click **Run Job**.

**Figure 2: Run job**

Run job

Job name\*

CreateL3VPN - 0

Workflow definition name      Definition ID      Version

CreateL3VPN      6c000761-ee49-4362-b1cb-2cf2a5c7024c      1.0

Start user

Job variables\*

```
{
  "device0Name": "ce0",
  "device1Name": "ce1",
  "nsoResource": "NSOLocal"
}
```

**Run Job**    Cancel

## Step 5: Check results

Check the results of example workflow execution:

### In CWM UI

- Step 1** In the CWM UI, select the **Job Manager** tile from the navigation menu on the left.

- Step 2** In the **All jobs** tab, find your job and check the status of the workflow execution in the **Status** table column.
- If the workflow is executed correctly, a green tick with **Completed** status will be visible.
  - If the workflow execution is still in progress or the engine is retrying an action, a blue label with the **Running** status will be displayed.
- Step 3** Click the job name to enter its details.
- Step 4** In the **Job Event Log** table, expand the bottommost **WorkflowExecution** entry by clicking its name.
- Step 5** In the JSON payload displayed, find the *data* key. It presents the final data output updated by the successful execution of the workflow actions for which *toStateData* inside the *actionDataFilter* was defined:

Figure 3: Event log

Job Event Log

Full event history in JSON format

Job Event Name	Job Event Type	Status	Attempts	Worker	Start Time	Close Time	Assignee
		All se					

```

"result": {
  "payloads": [
    {
      "metadata": {
        "encoding": "anNvbI9wbGFpbG=="
      },
      "data": {
        "checkSyncResult0": "in-sync",
        "checkSyncResult1": "in-sync",
        "createServiceResult": 201,
        "device0Name": "ce0",
        "device1Name": "ce1"
      }
    }
  ],
  "workflowTaskCompletedEventId": "22"
}

```

## In NSO

- Step 1** Log in to your NSO account and in the **Application hub** view, click the **Service manager** tile.
- Step 2** From the **Select service points** drop-down, select **/l3vpn:vpn/l3vpn**.
- Step 3** In the table, find **testnetwork** and click the **devices** arrow to see that your netsim devices **ce0** and **ce1** now belong to the **testnetwork** together with a **pe0** device.

Figure 4: L3VPN in NSO



