Workload Optimization Manager 2.0 Installation and Update Guide
Contents

Introduction ......................................................... 5
Task Overview ...................................................... 6
Minimum Requirements ........................................... 7
Installing Workload Optimization Manager .................... 8
  Installing on VMware Systems ................................. 8
  Installing on Microsoft Hyper-V ............................... 9
General Configuration Tasks ..................................... 10
  (Optional) Specifying a Static IP Address .................. 10
  (Best practice) Synchronizing Time ......................... 11
  (Optional) Configuring remote MariaDB connections for the Workload
    Optimization Manager instance ............................. 11
  (Required) Ports ............................................. 12
  (Optional) Enforcing Secure Access ......................... 13
License Installation and First-time Login .................... 16
  License Installation: Alternate procedure .................. 16
  Upgrading Your Workload Optimization Manager License .... 16
Updating Workload Optimization Manager to a New Version .... 18
FAQs ............................................................... 21
  Do I need special software to run the Workload Optimization Manager client? 21
  Why can I not execute some of the recommendations made by Workload
    Optimization Manager? ........................................ 21
  Why do I get an Invalid Feature Set error when I add a license? 21
Introduction

Thank you for choosing Workload Optimization Manager, the Intelligent Workload Management solution for Cloud and Virtualized Environments. This guide gives you information you need to install Workload Optimization Manager in your virtual environment, install your license, and get started managing your resources. This guide also includes instructions for updating your Workload Optimization Manager to a newer version.

If you have any questions, please contact Cisco Support.

Sincerely:

The Workload Optimization Manager Team
# Task Overview

This Workload Optimization Manager *Installation Guide* provides instructions to accomplish the following tasks:

<table>
<thead>
<tr>
<th>If you need to:</th>
<th>Perform or go to:</th>
</tr>
</thead>
</table>
| Deploy a new Workload Optimization Manager installation. | • Review the Workload Optimization Manager *Release Notes*.  
• Ensure you satisfy the minimum requirements. See *Minimum Requirements* on page 7.  
• Perform the installation procedure in *Installing Workload Optimization Manager* on page 8.  
• Configure any settings if necessary. See *General Configuration Tasks* on page 10.  
• Log in for the first time. See *License Installation and First-time Login* on page 16.  
• Install your license. See *License Installation and First-time Login* on page 16.  
• Continue to use your Workload Optimization Manager instance. See the Workload Optimization Manager *User Guide* and the Workload Optimization Manager *Target Configuration Guide*. |
| Upgrade a license or expand a license to support additional workloads. | Follow the instructions in *Upgrading Your Workload Optimization Manager License* on page 16. |
| Update your existing Workload Optimization Manager installation. | • Review the Workload Optimization Manager *Release Notes*.  
• Ensure you satisfy the minimum requirements for updating Workload Optimization Manager on supported hypervisors. See *Minimum Requirements* on page 7  
• Perform the following update procedure. See *Updating Workload Optimization Manager to a New Version* on page 18.  
• Upgrade your license, if necessary. See *Upgrading Your Workload Optimization Manager License* on page 16.  
• Log in.  
• Continue to use your Workload Optimization Manager instance. See the Workload Optimization Manager *User Guide* and the Workload Optimization Manager *Target Configuration Guide*. |
Minimum Requirements

You can run Workload Optimization Manager on hosts that meet the following minimum requirements:

<table>
<thead>
<tr>
<th>Supported Hypervisors</th>
<th>Storage Requirements</th>
<th>Memory</th>
<th>CPUs</th>
</tr>
</thead>
<tbody>
<tr>
<td>VMware vCenter versions 4.x, 5.x, or 6.x running with ESXi 3.x, 4.x, 5.x, or 6.x</td>
<td>150GB or greater disk storage + swap space to match the RAM allocation (for example, 150GB + 16GB = 166GB)</td>
<td>16 GB</td>
<td>2 vCPUs – 4 vCPUs preferred</td>
</tr>
<tr>
<td>Microsoft Hyper-V as bundled with Windows 2016, 2008 R2, Hyper-V Server 2012, or Hyper-V Server 2012 R2</td>
<td>150GB or greater disk storage</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** Minimum requirements depend on the size of your environment’s inventory. The more datastores, hosts, VMs, and applications you have, the more resources you need to run the installation effectively. Also note that other management software might recommend that you run the Workload Optimization Manager VM with lower resources. Please be sure to give Workload Optimization Manager enough resources, using the guidelines above.

Workload Optimization Manager supports DHCP or static IP addressing. For information about using static IP addresses, see *(Optional)* Specifying a Static IP Address on page 10.
Installing Workload Optimization Manager

As you get started with Workload Optimization Manager, be aware that there are different downloads available for the supported hypervisors. These downloads all deliver the same version of Workload Optimization Manager with the same capabilities, but they are packaged to install and run on different hypervisor platforms.

Each installation manages virtual environments in exactly the same way. The installation you choose depends on the policies and standards for your enterprise. This document describes installation procedures for each of the Workload Optimization Manager downloads. The installation you choose has no effect on the technologies you can manage with Workload Optimization Manager. No matter which type of machine hosts Workload Optimization Manager, you can manage all workloads running on the supported hypervisors, as well as those managed via cloud platforms and load balancer targets.

This section describes how to install a new Workload Optimization Manager instance. If you are updating a current installation to new version, you should not perform a full install – Instead you should update your current installation. See Updating Workload Optimization Manager to a New Version on page 18.

This section includes installation instructions for the following supported virtual platforms:

- Installing on VMware Systems on page 8
- Installing on Microsoft Hyper-V on page 9

Installing on VMware Systems

This download of the Workload Optimization Manager instance is in the .OVA 1.0 format.

To install Workload Optimization Manager:

1. Download the Workload Optimization Manager installation package.
   Refer to the email you received from Cisco for links to the Workload Optimization Manager download pages.

2. Import the OVA file into your VMware infrastructure using VCenter.

3. Start the Workload Optimization Manager appliance and record its IP address.
   Users navigate to the appliance IP address to start up the Web User Interface in a browser.

4. If necessary, specify a static IP address for the appliance.
   If your environment does not have DHCP, or if you want to give the Workload Optimization Manager instance a static IP address, see (Optional) Specifying a Static IP Address on page 10.

5. Perform the required configuration steps for the Workload Optimization Manager instance.
   See General Configuration Tasks on page 10.
Installing on Microsoft Hyper-V

1. Download the Workload Optimization Manager installation package.
   Refer to the email you received from Cisco for links to the Workload Optimization Manager download pages.

2. Expand the .zip file and copy the contents, which includes the Virtual Machine image, to your Hyper-V server (either to your cluster shared volume or to a local hard drive).

3. Use the Import Virtual Machine Wizard in the Hyper-V Manager to import the Virtual Machine into your environment.

4. Make sure your virtual network adapter is connected to the correct virtual network.

5. Ensure the Workload Optimization Manager instance will have sufficient memory.
   Cisco recommends that you use static memory for your Workload Optimization Manager instance. However, you can specify static or dynamic memory for the instance.
   In Properties for the instance, navigate to Hardware Configuration:
   - For Static Memory, set Virtual machine memory to at least 16 GB.
   - For Dynamic Memory, then set Startup memory and Minimum memory to 16 GB.

6. Start the Workload Optimization Manager appliance and record its IP address.
   Users navigate to the appliance IP address to start up the Web User Interface in a browser.

7. If necessary, specify a static IP address for the appliance.
   If your environment does not have DHCP, or if you want to give the Workload Optimization Manager instance a static IP address, see (Optional) Specifying a Static IP Address on page 10.

8. Perform the required configuration steps for the Workload Optimization Manager instance.
   See General Configuration Tasks on page 10.

**NOTE:** The Workload Optimization Manager instance configuration includes a NIC that is not connected to any network. After installing the instance, you should use the Hyper-V Manager to configure the network and VLAN settings to suit the requirements of your cluster’s network.
General Configuration Tasks

After you install the Workload Optimization Manager instance, perform the following configuration tasks:

- (Optional) Specify a static IP address.
- (Best practice) Synchronize the system clock.
- (Optional) Configure remote MariaDB connections.
- (Required) Ensure the ports that Workload Optimization Manager needs for network communication are open.
- (Optional) Enforce secure access by installing a trusted certificate.

(Optional) Specifying a Static IP Address

Many installations use DHCP for dynamic IP address allocation. You can also specify a static address via the virtual machine’s IP configuration.

Only if you need to specify a static IP address, choose one of the following methods:

- Use the `ipsetup` script from Workload Optimization Manager.
- Configure the static IP address manually as described in this topic.

The ipsetup Script

Workload Optimization Manager provides the `ipsetup` script to assist you with this task.

1. Open an SSH terminal session to your Workload Optimization Manager instance.

   Use the following default credentials:

   - Username: root
   - Password: vmturbo

2. Once the session is open, execute the script with the `ipsetup` command.

Manually Configuring a Static IP Address

To specify a static IP address, perform these steps:

1. Open an SSH terminal session to your Workload Optimization Manager instance.

   Use the following default credentials:

   - Username: root
   - Password: vmturbo
2. Open the connection editor.
   a. Execute the `nmtui` command.
      This opens the user interface for the NetworkManager.
   b. Select **Edit a connection** to open the editor.

3. Add a new connection.
   Select the **Add** option on the screen to open the New Connection dialog box.

4. Add an Ethernet connection.
   a. Select **Ethernet** from the list of options and complete the following information (values given are examples only):
      - **Profile Name:** eth0
      - **Device:** eth0
      - **IPv4 Configuration:** Manual
      - Select **Show** and complete the Configuration sub-settings based on your environment.
   b. Select **OK** to return to the configuration list.

5. Verify that the connection you created is present.

6. Select **Quit** to return to the command line.

7. Restart the network services.
   ```bash
   service network restart
   ```
   The network service restarts successfully.

8. Verify that your machine is accessible and the static IP address is correct.
   ```bash
   ifconfig eth0
   ```
   This procedure applies the IP address to the Workload Optimization Manager instance. You can now access the Web user interface using this IP address.

(Best practice) Synchronizing Time

It is important that you synchronize the clock on the Workload Optimization Manager instance with the devices on the same network. For performance reasons, Cisco recommends that you set your Workload Optimization Manager system clock to your time zone, because Workload Optimization Manager runs regular data maintenance processes at night. Use the Network Time Protocol daemon (`ntpd`) to set your Workload Optimization Manager system clock.

(Optional) Configuring remote MariaDB connections for the Workload Optimization Manager instance

If you want to allow remote client connections to the MariaDB database in the Workload Optimization Manager instance, you can replace the local host bind address (127.0.0.1) with the IP address of your Workload Optimization Manager instance.
To configure remote client connections to the MariaDB database, perform these steps:

1. Open an SSH terminal session to your Workload Optimization Manager instance.
   
   Use the following default credentials:
   
   - **Username:** root
   - **Password:** vmturbo

2. Open the bind-addr configuration file.
   
   For example, use the `vi /etc/my.cnf.d/bind-addr.cnf` command.

3. Set the `bind_address` parameter to the IP address of your Workload Optimization Manager instance.
   
   For example: `bind_address=10.10.10.123`

4. Save the file.

5. Restart the MariaDB service.
   
   Execute the `systemctl restart mariadb` command.

(Required) Ports

Ensure the ports for network communication are open.

Workload Optimization Manager uses the following ports:

<table>
<thead>
<tr>
<th>Port</th>
<th>To support:</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>Incoming browser connections over HTTP</td>
</tr>
<tr>
<td>443</td>
<td>• Incoming browser connections over HTTPS</td>
</tr>
<tr>
<td></td>
<td>• Proactive Support (automatically generate support tickets for Workload Optimization Manager issues)</td>
</tr>
</tbody>
</table>

For browser connections with the Workload Optimization Manager instance, you should use either port 80 or 443.

**NOTE:** Various targets that you use with Workload Optimization Manager may require you to open ports on those target servers to allow communications with Workload Optimization Manager. For more information, see the Workload Optimization Manager Target Configuration Guide.
(Optional) Enforcing Secure Access

If your company policy requires a trusted certificate, Workload Optimization Manager enables you to install a trusted certificate from a known certificate authority.

1. Request a certificate.
   a. Open an SSH terminal session to your Workload Optimization Manager instance.
      The default credentials are:
      ■ **Username:** root
      ■ **Password:** vm turbo
   b. Change to the /private directory where you will store the private key.
      ```
      cd /etc/pki/tls/private
      ```
   c. Execute the command to create the private key file.
      ```
      openssl genrsa -out turbonomic.key 2048
      ```
   d. Create a file containing the information used to generate the CSR.
      ```
      vi certsignreq.cfg
      ```
   e. In the file, insert the following code and specify the fields:

      ```
      [req]
      ts = 2048
      prompt = no
      default_md = sha256
      req_extensions = req_ext
      distinguished_name = dn
      
      [dn]
      C=<country, 2 letter code>
      L=<city>
      O=<company>
      OU=<organizational unit name>
      CN=<FQDN>
      emailAddress=<email address>
      
      [req_ext]
      subjectAltName = <alternate domains to use with the SSL Certificate>
      
      [alt_names]
      DNS.1 = <FQDN>
      DNS.2 = <server’s short name>
      DNS.3 = <server’s IP address>
      ```

   For the CN field, specify the fully-qualified domain name of the Workload Optimization Manager instance. Alternate names are other ways to access the Workload Optimization Manager instance. In the alternate names ([alt_names]) section, the value for the DNS.1 field is required. For the DNS.1 field, specify the fully-qualified domain name of the Workload Optimization Manager instance. Values for the DNS.2 and DNS.3 fields are optional. You can add more DNS.<n> fields if needed.
f. Write and quit the file.
   Press **esc**, type **:wq!**, and press **Enter**.

h. Transfer the certificate request file to your local machine.
   The path to the certificate request file (turbonomic.csr) on your remote machine is /etc/pki/tls/private.

i. Send this file to your certificate authority.
   Your certificate authority will use this file to create the certificate for you.

2. Rename the certificate file.

When you receive the certificate file from your certificate authority (CA), check the name of the certificate file.

Rename it to **turbonomic.crt**.

For an Intermediate Certificate Bundle, certificate authorities (for example, GoDaddy or Symantec) may use intermediate certificates as a proxy to their root certificate for security purposes – if so, you will also receive a certificate chain bundle. If this is the case, also name the certificate chain with the **.crt** extension (for example: <intermediate>.crt).

3. Upload the certificate.

Transfer the above certificate file(s) to the /etc/pki/tls/certs directory of the Workload Optimization Manager instance.

4. Apply the certificate.

   a. Open an SSH terminal session to your Workload Optimization Manager instance.
      The default credentials are:
      - **Username:** root
      - **Password:** vmturbo

   b. Make a backup file of the ssl.conf file.
      
      ```
      cp /etc/httpd/conf.d/ssl.conf /etc/httpd/conf.d/ssl.conf-LOCALHOST
      ```

   c. Open the ssl.conf file.
      
      ```
      vi /etc/httpd/conf.d/ssl.conf
      ```

   d. Edit the ssl.conf file to specify the file paths for the new key and crt files.
      
      - **Replace the** localhost.crt **with the name of the new certificate** (turbonomic.crt).
        
        ```
        # Server Certificate
        SSLCertificateFile /etc/pki/tls/certs/localhost.crt
        ```

      - **Also, replace the** localhost.key **with the name of the new key file** (turbonomic.key).
        
        ```
        # Server Private Key
        SSLCertificateKeyFile /etc/pki/tls/private/localhost.key
        ```
If you received an intermediate certificate bundle, replace the server-chain.crt with the name of the new intermediate file (<intermediate>.crt).

```bash
# Server Certificate Chain
SSLCertificateChainFile /etc/pki/tls/certs/server-chain.crt
```

e. Write and quit the ssl.conf file.
```
esc :wq!
```
f. Restart the httpd service.
```
service httpd restart
```

5. (Optional) Set up secure LDAP.

a. Save the SSL Certificate information from your LDAPS Server to a .CER file.
```
For example, view the certificate properties and click Save As or Export to create a .CER file.
```
b. Transfer this .CER file from your system to the Workload Optimization Manager appliance.
```
For example, use the SCP (secure copy) command with the default credentials (root/vmturbo) to copy the .CER file to the /tmp directory of the Workload Optimization Manager instance.
```
c. In the Workload Optimization Manager instance, copy the .CER file to the /anchors directory.
```
For example, copy the rootca.cer file to the /usr/share/pki/ca-trust-source/anchors/ directory.
```
d. Run the update-ca-trust command as root.
```
This automatically updates the built-in cacerts jks and puts the certificates in the proper location to be used by curl without additional options.
```
e. Restart the Tomcat service.
```
/bin/service tomcat restart
License Installation and First-time Login

Before you begin, make sure you have your full or trial license key file that was sent to you in a separate email.

To use Workload Optimization Manager for the first time, perform the following steps:

1. Type the IP address of your installed Workload Optimization Manager instance in a Web browser to connect to it.
2. Log in to Workload Optimization Manager.
   - Use the default credential for **Username**: administrator.
   - Type a password for **Password**.
   - Type the password again to verify it.
3. Install your license.
   A wizard directs you to install your license:
   - In the License Page of the wizard, copy your license key file into the license window.
   - Then complete the wizard.

Depending on which license you have installed, the license enables either a trial or a full unlimited license for Workload Optimization Manager.

License Installation: Alternate procedure

You can also install a license without using the wizard interface.

1. Log in to Workload Optimization Manager.
2. Select **Settings > License**.
3. Copy your license key file into the License Configuration window.
4. Click **Save**.

Depending on which license you have installed, the license enables either a trial or a full unlimited license for Workload Optimization Manager.

Upgrading Your Workload Optimization Manager License

You can upgrade your current license to:

- Upgrade to a richer feature set
  You can purchase a license to upgrade from a trial version to a full version, or you can purchase a license for a different edition of Workload Optimization Manager.
- Increase the number of workloads your installation supports

Cisco Systems, Inc.  www.cisco.com
When you purchase a new license, you receive the license file in an email message.

**note:** As you apply new licenses to Workload Optimization Manager, you must be sure that they are for the same edition or feature set. If you try to apply an incompatible license file, Workload Optimization Manager displays an *Invalid Feature Set* error. To apply the new license you must either delete your current license so you can install the new feature set, or you must obtain a different license file that matches your current feature set.

To increase your licensed workload coverage:

1. Obtain your additional license.
   
   Note that your additional licenses must match the feature set of your current license.

2. Select **Settings > License**.

3. Click **Update License**.

4. Copy your license key file into the License Configuration window.

5. Click **Save**.

To upgrade your license to a higher feature set:

1. Obtain your new license for the new features.

   You should obtain a license that supports at least the same number of workloads as your current license.

2. Select **Settings > License**.

3. Delete your current license from Workload Optimization Manager.

   On the license page, select all the licenses that you currently have installed, then click **DELETE**.

4. Click **Update License**.

5. Copy your license key file into the License Configuration window.

6. Click **Save**.

Once you install the new license, the additional workload capacity automatically becomes available to you. For a feature set upgrade, the features become available as well as any data collected in a database during a trial evaluation.
Updating Workload Optimization Manager to a New Version

**IMPORTANT:** To successfully update to version 2.0 or later, the starting version must be version 1.1.3 or later. For example, you cannot update from version 1.1 to version 2.0 or later.

Also note that starting with version 1.2, Workload Optimization Manager introduced Workload-Based licensing (where a VM is one workload). If you are updating to version 2.0 from version 1.1.3, then you must apply a workload-based license after you perform the update. To update from version 1.1.3:

1. Get a Workload-Based license from your Cisco Representative.

2. Perform the update using the procedure below.

3. Apply the Workload-Based license to your updated version of Workload Optimization Manager. Do not apply the Workload-Based license until after you have updated from 1.1.3 to 2.0 or later.

If you update and then do not change to a Workload-Based license, you will not have access to any Workload Optimization Manager features in the new version. For more information, and to get a Workload-Based license, contact your Cisco Representative.

We continually innovate and improve all aspects of Workload Optimization Manager. This means that we periodically release newer versions of Workload Optimization Manager. You should check regularly to see if a new version is available.

When a new version is available, it's important to properly update your existing installed server, rather than just install a new one. When you first installed Workload Optimization Manager, you put into place sophisticated data collection and analysis processes. Internal to the installation is an integrated database that retains performance data from across your virtual environment. Workload Optimization Manager uses this historical data for right-sizing, projecting trends, and other analysis. This means that the database is important to Workload Optimization Manager and becomes more so over time. Properly updating your installation of Workload Optimization Manager preserves the database for continued use.

To update your Workload Optimization Manager installation:

1. Check whether you have adequate disk space on the Workload Optimization Manager VM.

   To check the disk space usage on your server, SSH into the Workload Optimization Manager instance as `root` (the default password is `vmturbo`). Then issue the command: `df -kh`

   To perform an update, you should have at least 5 GB of disk free space. The required amount depends on the size of your database, and you should have enough space in the database partition to accommodate a full copy of the database. For example, if you have a large environment and a large database, then 15 GB is a more reasonable estimate of the required space.

2. If you’re updating from version 1.2.1, set the version for the Update Script.

   **note:** You *must* perform these steps when updating from 1.2.1 to a later version. You do not need to perform these steps when updating from versions 1.1.3 through 1.2, and you do not need to perform these steps when updating from version 1.2.2 or later. If you perform these steps when they’re not needed they will have no ill effect, and the update will execute correctly.
While you’re still in the shell session, execute the following commands:

```
sed -i "s/vmt-/cwom-/g" /srv/www/cgi-bin/vmtadmin.cgi
sed -i "s/vmturbo_temp/cisco_temp/g" /srv/www/cgi-bin/vmtadmin.cgi
sed -i "s/tmp/vmturbo/tmp/cisco/g" /srv/www/cgi-bin/vmtadmin.cgi
```

3. Save a snapshot of your current Workload Optimization Manager VM.

Before updating, you should properly shut down (not power off) the Workload Optimization Manager VM and perform a snapshot (or clone the VM). This provides a reliable restore point you can turn to in the event that trouble occurs during the update. After you have the snapshot, bring the VM back online.

4. Download the offline installation package.

Navigate to [http://www.cisco.com](http://www.cisco.com) to find the latest update packages for Workload Optimization Manager. Download the package to your local machine. Save the download to a location you can return to.

5. Open the Workload Optimization Manager Update Page.

Your Workload Optimization Manager serves an Update Page from the following URL: [https://YOUR_WOM_URL_or_IP/update.html](https://YOUR_WOM_URL_or_IP/update.html). For example, if you view Workload Optimization Manager from the address 10.10.222.333, then you would navigate your browser to [https://10.10.222.333/update.html](https://10.10.222.333/update.html).


Give the credentials for your default Workload Optimization Manager administrator account:

- **User:** administrator
- **Password:** The password you set for this account
7. Upload the update package to apply an offline update.

Choose the **Apply Offline Update** action

Select the update package that you want to apply

- Click **Choose File** to browse to the update package that you saved on your local machine.
- Click **Upload** to apply the update package

Uploading the package starts the update process on your Workload Optimization Manager VM.

8. When the update is complete, restart your Workload Optimization Manager VM.

The update process can take a varying amount of time, depending on the size of your environment, the size of your Workload Optimization Manager database, and other factors. When the update is complete, Workload Optimization Manager displays an **Action Successful** message in your browser, along with a listing of verifications and the updated components. At this time, you can then restart your VM. Once the VM has restarted, you can then update your browser to see the user interface for your new version.

To restart the VM, use the hypervisor that manages your Workload Optimization Manager VM.

**IMPORTANT**: DO NOT RESTART the Workload Optimization Manager VM until the software update is complete. If you believe the update process has run for too long and it will not complete, contact your Cisco Support Representative.

Workload Optimization Manager applies the update in stages. The software updates immediately, along with certain configuration files. The update process restarts your Workload Optimization Manager server as soon as possible.

For some versions the update must restructure the database. This can take a number of hours, depending on the size of your environment and your database. To enable a quick server restart, the update performs this restructuring in the background while the server is running. Workload Optimization Manager will manage your environment, but your access to historical data might be incomplete. For example, you might not be able to view reports until the database restructuring is complete.
FAQs

To ensure that you have the most rewarding experience with your evaluation of Workload Optimization Manager, we have collected the top installation issues that people experience. If you have any further questions, please contact Technical Support.

Do I need special software to run the Workload Optimization Manager client?

Just make sure that your browser supports javascript.

Why can I not execute some of the recommendations made by Workload Optimization Manager?

To automate the Workload Optimization Manager recommendations, review the Workload Optimization Manager User Guide for complete information about setting policies. Policies are located in Settings > Policies.

Workload Optimization Manager supports the following action modes:

- **Disabled** — Do not recommend or perform the action.
- **Recommended** — Recommend the action so a user can perform it using the given hypervisor or by other means.
- **Manual** — Recommend the action, and provide the option to perform that action through the user interface.
- **Automated** — Workload Optimization Manager performs the action automatically.

Some actions are set to Recommend or Disabled by default. To enable execution of these actions, you must change them to Manual or Automated.

Other actions cannot be executed by Workload Optimization Manager. These actions will only have Disabled or Recommended as an option.

Why do I get an Invalid Feature Set error when I add a license?

As you apply new licenses to Workload Optimization Manager, you must be sure that they are all for the same edition or feature set. If you try to apply an incompatible license file, Workload Optimization Manager displays an Invalid Feature Set error.

When you increase the workloads your installation supports, the new license must match the feature set of your current licenses. When you upgrade to a new feature set, you must first delete all your current licenses of the old feature set.