

GETTING STARTED GUIDE

NI Monitoring Devices and NI InsightCM™

Version 3.3

This document contains step-by-step instructions for the setup tasks you must complete to connect an NI monitoring device to NI InsightCM server and start monitoring your assets. After you complete this document, you can use additional features to add several devices, configure alarms, and so on to customize how the devices and server operate.

System Overview and Terms

Figure 1. System Overview



-
- 1 **NI InsightCM web application**—The browser-based tool for configuring NI InsightCM and monitoring devices and visualizing data. Hosted by the server machine and accessible from computers with network access.
 - 2 **Network connection**—The connection between the server machine and the machines used to access the NI InsightCM web application.
 - 3 **Server machine**—The server computer with NI InsightCM installed.
 - 4 **Network connection**—The connection between the server machine and devices.
 - 5 **NI monitoring device**—The device that acquires sensor data and transfers that data to NI InsightCM server.
-



Before You Begin

Ensure the following tasks are complete on the server machine:

1. NI InsightCM software is installed and configured.
2. Required ports are open to communication.

Refer to the *NI InsightCM Readme*, located on the NI InsightCM installation USB drive, for more information and instructions for completing these tasks.

You can complete portions of this document without a device that is powered on and connected to the network. However, the process is easier if the device is connected to power and the network. Refer to the printed *NI InsightCM Monitoring Devices Quick Start* document, shipped with NI monitoring devices, for information about connecting devices to the network, power, and sensors.

Logging In to the NI InsightCM Web Application

Complete the following steps to access the software you use to set up your system:

1. In a web browser on any computer or device on the same network as the server machine, navigate to `http://serverDNSHostname:82` or `http://serverIPAddress:82`.
2. Enter the default username (`admin`). The NI InsightCM web application does not require a password until you configure SSL.

User Interface Quick Reference

Figure 2. InsightCM Toolbar



- ① **Navigation bar:** Links to pages operators require most frequently.
- ② **Tabs:** Contain page-specific actions and information.
- ③ **Dashboard page:** Contains an overview of different parts of the system.
- ④ **Asset and Device Configuration pages:** Contain options for configuring assets and devices, respectively.
- ⑤ **Data Viewer page:** Contains options for data analysis.
- ⑥ **Help button:** Links to help for the current page or tab.
- ⑦ **Navigation menu:** Links to additional pages not shown in the Navigation bar, such as the Notifications and System pages.
- ⑧ **Action menu:** Contains additional actions for the current page or tab. Not available on the Dashboard page.
- ⑨ **View menu:** Links to additional views for a device. Available only on device-related pages.

Defining the Sensors Monitoring the Equipment

Complete the following steps to define the names and locations of equipment that NI monitoring devices monitor.

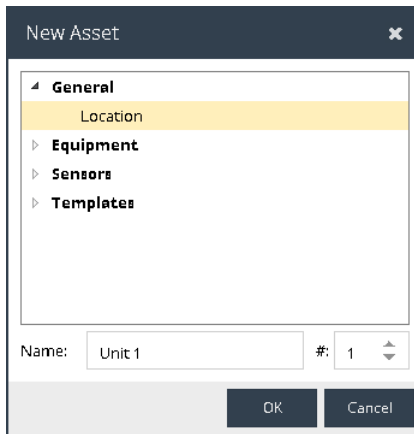
1. Click the **Configuration** pull-down menu in the **Navigation** bar at the top of the page and select **Assets**.



Note The first time you access the Asset Configuration page, the NI InsightCM web application prompts you to enter a site name. Use a name that describes the overall location of all the equipment to be monitored.

2. Click **Add** and expand the **General** section in the resulting dialog box. Select **Location** as the asset type and enter the name of the specific area where the equipment is located. Click **OK**.

Figure 3. New Asset Dialog Box

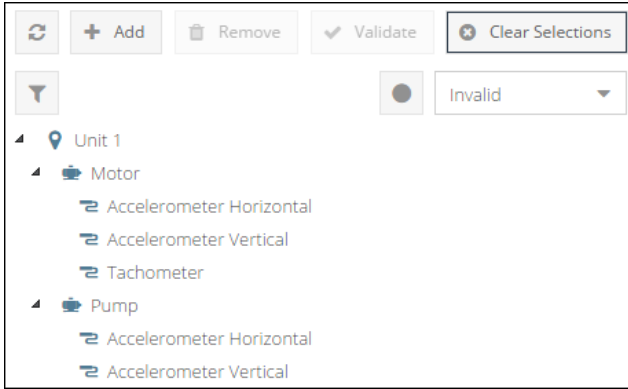


3. With the location node selected, click **Add** and expand the **Equipment** section in the resulting dialog box.
4. Select the option that best describes the equipment to be monitored.
5. Enter the equipment name and click **OK**.
6. Select the equipment node in the asset tree and click **Add**.
7. Expand the **Sensor** section in the resulting dialog box.
8. Expand the category containing the asset type that describes the sensor monitoring the equipment and click the asset type.
9. Enter a descriptive name for the sensor and click **OK**.

- Repeat steps 6 through 9 to define additional sensors to monitor the same piece of equipment.

Your asset tree should look similar to Figure 4.

Figure 4. Example Asset Tree



Tip You can branch the asset tree at any level. For example, you can add more specific locations under the top-level location or add multiple pieces of equipment under a single location. There is no maximum or minimum requirement for the number of levels you can include in the asset tree.



Note Ensure that you add at least one sensor node under each equipment node. Later in this document you will map these sensors to device channels.

- Configure the options in the **Properties** tab for each sensor and equipment node.

Finding or Setting a Device IP Address

Proceed with this document according to the option that best describes your situation:

- If you do not know the IP address of a device and the device is physically accessible, complete the steps in this section.
- If you do not know the device IP address but the device is not currently in an accessible location, proceed to the [Adding the Device to NI InsightCM Server](#) section to create an offline device as a placeholder so that you can continue to set up your InsightCM system containing the device. You will need to access the physical device later to connect the device to the NI InsightCM server.
- If you already know the device IP address, proceed to the [Adding the Device to NI InsightCM Server](#) section.

Complete the following steps to find or set the IP address for a device:

1. Insert a USB drive into the USB port on the controller front panel. Within 20 seconds, the USER1 LED lights solid, which indicates that the device is reading from or writing to the settings file.
2. When the USER1 LED returns to blinking steadily, remove the USB drive.
3. Insert the USB drive into a USB port on your computer.
4. Browse the file structure of the drive to the following directory:
`<RootLevel>:\InsightCM\download\DeviceHostname-SerialNumber.`
5. Open the JSON file named
`networkInfo_DeviceHostname-SerialNumber.json.`
6. In the array that contains the line, `"IsPrimary":true`, the following line displays the current IP address:

```
"IPAddr": "x.x.x.x"
```

where `x.x.x.x` is the IP address.

If you do not need to change the IP address, record the IP address and continue to the next section.

7. To change the IP address or set the IP address to be static, complete the following steps:
 - a. Copy the JSON file named
`networkInfo_DeviceHostname-SerialNumber.json` to the following location on the USB drive: `<RootLevel>:\InsightCM\upload.`



Note If the upload folder does not exist, create it.

- b. To change the IP address, enter a new value where the current IP address is.
 - c. To assign a static IP address, configure the following line in the array as shown:
`"IP Address Request Mode": "1"`
8. Save and close the file.
9. Insert the USB drive back into the USB port on the controller front panel. The USER1 LED lights solid, which indicates that the device is reading network and connection properties. You can remove the USB drive when the USER1 LED returns to blinking steadily.



Tip To verify that the device successfully applied changes you made to the file, reinsert the USB drive in a computer and browse to the `<RootLevel>:\InsightCM` directory. If the changes succeeded, the `upload` folder no longer contains the JSON file you edited. Instead, a folder named `applied` contains the file.

Adding the Device to NI InsightCM Server



Note The following steps do not apply when adding thermal cameras. Refer to the *NI InsightCM Thermal Imaging Help* for more information about getting started with thermal imaging.

Complete the following steps to add a configuration for a device to the NI InsightCM server:

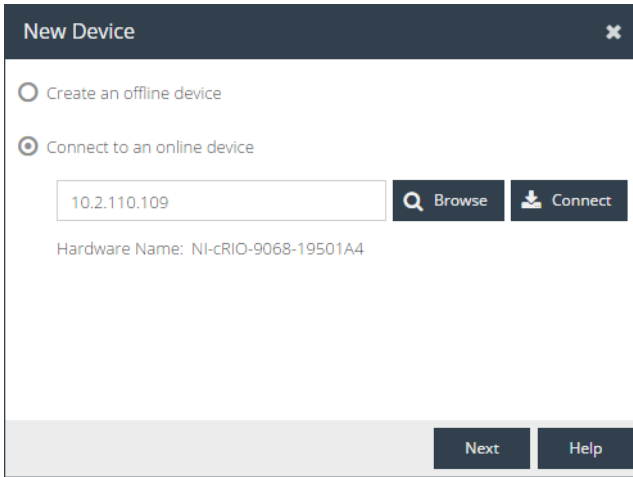
1. Return to the NI InsightCM web application.
2. Click the **Configuration** pull-down menu in the **Navigation** bar at the top of the page and select **Devices**.
3. Click the **Add** button.
4. In the **New Device** dialog box, complete the set of steps appropriate for your situation.
If you know the IP address of the device:
 - a. Select **Connect to an online device**.
 - b. Enter the IP address in the textbox or click **Browse** and select the device from the **Subnet Devices** dialog box that displays and click **OK**.
 - c. Click **Connect**. The NI InsightCM web application automatically performs tests to check the device IP address, firmware, connection, and hardware. In the **Testing Connection** dialog box that displays, you can see the results of these tests and information about how to resolve the issue.



Note You can continue to add an online device without resolving failed checks if the device passes the IP address check.

- d. Click **OK**. The NI InsightCM web application finds the device and displays the hardware name below the IP address textbox in the **New Device** dialog box, as Figure 5 shows.
- e. Proceed to step 5.

Figure 5. New Device Dialog Box




If you do *not* know the IP address of the device and the device is not physically accessible:



Note If the device is physically accessible, refer to [Finding or Setting a Device IP Address](#).

- a. Select **Create an offline device** and click **Next**.
 - b. Use the **Device Type** pull-down menu to select the item that describes the NI monitoring device.
 - c. Ensure the modules in the device and their slot assignments match the configuration on screen.
 - d. Click **Next**.
 - e. Proceed to step 5. To connect the device to the NI InsightCM server, you must export the connection information file for the device when prompted later in step 7.
5. Click **Next** until the dialog box prompts you to enter a Device Name and a Hardware Name.

6. Enter the two types of names for the device:
 - **Device Name**—The name that appears throughout the NI InsightCM web application. Assign an easily identifiable name, such as one that indicates the physical device location or the equipment it monitors.
 - **(Optional) Hardware Name**—The hostname of the device in the format of *DeviceHostname-SerialNumber*. If you entered the IP address during step 3, the NI InsightCM server automatically populates this name. Otherwise, you can find the model and serial number printed on a label on the back of the device.
 7. Click **Finish**. Depending on whether you enter an IP address during step 4, the InsightCM web application displays one of the following prompts:
 - **Do you want to send the connection information to the device web server?**—Click **Yes** to transfer credentials across the network to the device.
 - **Do you want to export the device connection information file?**—Click **Yes** and save this file in a location where you can access it in the future. Later in this document, you will manually transfer credentials to the device via USB drive.
-  **Note** Device credentials consist of a temporary password that the NI InsightCM server expects from the device. Devices cannot come online and connect to the NI InsightCM server until they receive this temporary password.
8. The InsightCM web application automatically loads the Device Configuration page for the new device.

Mapping the Device to the Equipment Layout



Note The following steps do not apply when mapping thermal cameras to the equipment layout. Refer to the *NI InsightCM Thermal Imaging Help* for more information about getting started with thermal imaging.

In the *Defining the Sensors Monitoring the Equipment* section, you created a representation of the physical equipment and the sensors that monitor it. Now that you added an NI monitoring device to the NI InsightCM server you can map specific sensors to channels on the device. Mapping channels to equipment allows NI InsightCM to group data with the equipment that produced it.

Complete the following steps to map sensors to device channels:

1. Click the **Equipment Mapping** tab on the Device Configuration page.
2. In the **Data Groups** section, highlight the **Default** data group. In the asset tree, select the node that contains a group of sensors that monitor the same piece of equipment. This is most likely an equipment node.



Note Data groups allow you to group data from channels that monitor the same piece of equipment into one data set. Add a data group for each piece of equipment a device monitors.

3. In the **Channels** section, select a channel. In the asset tree, click the sensor to which the device channel is physically connected.

The following screenshot shows a device with one channel mapped to a sensor monitoring a piece of equipment.

Figure 6. Mapping Channels to Sensors

The screenshot shows the 'Plant' configuration page in the NI InsightCM web application. The page has a dark header with 'Equipment Mapping' and tabs for 'Channels', 'Device Properties', and 'Hardware'. Below the header, there are two main sections: 'Data Groups' and 'Channels'. The 'Data Groups' section contains a table with columns 'Data Group' and 'Asset'. The 'Channels' section contains a table with columns 'Channel', 'Data Group', and 'Asset'. The 'Assets' tree on the right shows the hierarchy: Unit 1 > Motor > Tachometer.

Data Group	Asset
Motor	Unit 1 > Motor

Channel	Data Group	Asset
Tachometer (Mod1/Ch0)	Motor	Unit 1 > Motor > Tachometer
(Mod1/Ch1)	Motor	
(Mod1/Ch2)	Motor	

4. Repeat step 3 for each channel on the device.
5. When you finish mapping channels to sensors, click the **Validate** button.



Note When you click **Validate**, the NI InsightCM web application removes any unmapped channels from the **Channels** table to avoid acquiring unnecessary data. You can add these channels back on the **Channels** tab as needed.

6. When you change the device configuration in the web application, you must send the configuration and software to the device. Click **Back to Devices**. Select the device you added on the **Devices** tab and click the **Update Configuration** button.



Note Update the device configuration anytime you make changes to the Asset or Device Configuration pages.

Transferring Credentials to an Offline Device



Note Complete this section only if you did not enter an IP address for the device in the *Adding the Device to NI InsightCM Server* section. If you entered an IP address, skip to the next section, *Verifying Device Connectivity*.

If you added the device configuration without entering the IP address, the device cannot yet connect to NI InsightCM because it does not have the credentials the server expects. Device credentials consist of a temporary password. Complete the following steps to transfer credentials to the device:

1. Find the device connection file you exported in step 7 of the *Adding the Device to NI InsightCM Server* section. If you did not export a connection file, return to the Device Configuration page in the NI InsightCM web application. Select the device, and then select **Connection»Export Connection File** from the **Action** menu in the top-right corner of the page.
2. Copy the file to a USB drive, in a folder named `upload` in the following directory: `<RootLevel>:\InsightCM`. The filename must be in the format of `DeviceHostname-SerialNumber.json` or the device cannot read it.
3. Insert the USB drive into the USB port on the controller front panel. The USER1 LED lights solid, which indicates that the device is reading from the settings file.
4. When the USER1 LED returns to blinking steadily, remove the USB drive.

Verifying Device Connectivity

After you send the connection information to the device, it automatically connects to the NI InsightCM server.

Complete the following steps to verify that the device connects successfully:

1. In the NI InsightCM web application, click the **Configuration** pull-down menu in the **Navigation** bar at the top of the page and select **Devices**.

Figure 7. Device Configuration Page, Devices Tab

Name	Device Type ↑	IP Address	Connection Status	Config Status	Analysis Disabled
Unit 1 - CMS-9036	CMS-9036	10.2.110.71	Online	Ok	
Unit 1 - CMS-9065	CMS-9065	10.2.64.34	Online	Ok	
Unit 1 - CMS-9068	CMS-9068	10.14.67.35	Offline	Invalid Configuration	
Unit 1 - EMSA-9065	EMSA-9065	10.2.104.78	Online	Ok	
Unit 1 - EMSA-9068	EMSA-9068	10.2.110.56	Online	Ok	
Unit 1 - IR-3120	IR-3120	10.2.110.102	Online	Ok	
Unit 1 - MCSA-9068	MMS-9068	10.2.64.25	Offline	Ok	

2. On the **Devices** tab, verify that the Connection Status column for the device contains Online, which means the device finished updating and connected successfully.



Tip The device might require several minutes to download configuration files and reboot before it connects to the server and comes online. During this time, the device status might change multiple times. Click the **Refresh** button to see the latest status.

Performing an Initial Acquisition

Now that the device is online with all relevant channels mapped to sensors, it can begin acquiring data. Automatic acquisitions occur periodically, but you can force an acquisition at any time.

1. On the **Devices** tab of the Device Configuration page, highlight the device you added. In the **Action** menu in the upper-right corner of the page, select **Force Trigger** to perform an acquisition from all channels.
2. Wait several seconds for the acquisition to complete, and then repeat the force acquisition several times to acquire multiple data sets.



Note Before the data is available, devices must finish performing the acquisition and the NI InsightCM server must receive and store the data. You can change the duration of force-triggered acquisition on the **Operating States** tab for the piece of equipment being monitored on the Asset Configuration page.

For a complete list of ways you can configure a device to perform acquisitions, refer to the *Methods for Initiating Device Acquisitions* topic of the *NI InsightCM Configuration and Monitoring Help*.

Viewing Data

When you force an acquisition, there are several data sets that the NI InsightCM web application can load on the Data Viewer page.

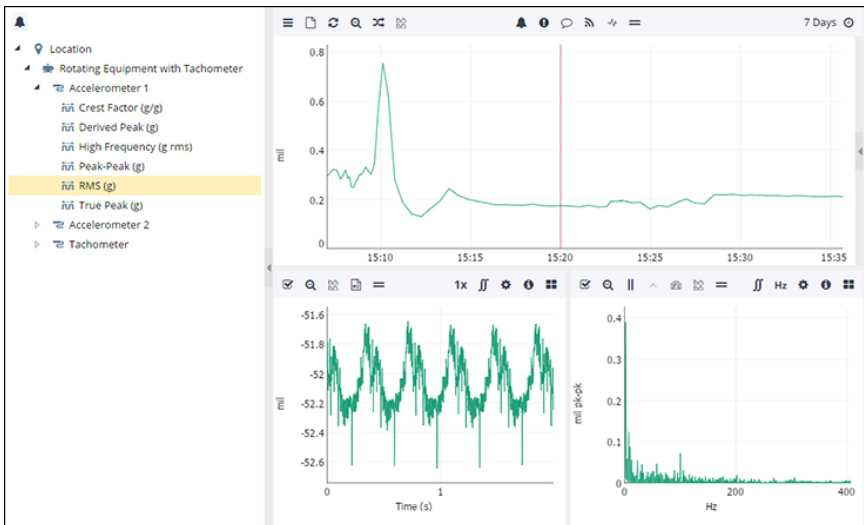
Complete the following steps to view trend data for the features calculated on the device:

1. Navigate to the Data Viewer page using the **Data Viewer** button in the **Navigation** bar at the top of the page.
2. In the asset tree to the left, locate one of the sensors you added to monitor your equipment and expand it. Notice that the asset tree now contains feature nodes nested under each sensor node.
3. Click a feature in the asset tree. The trend viewer at the top of the window to the right populates with trend data for that feature.



Note To load data for multiple features at once, <Ctrl> or <Shift>-click the features in the asset tree.

Figure 8. Trend Viewer on the Data Viewer Page



Where to Go Next

After completing the tasks in this document, use the following table to determine what action to take next and where to find resources for next steps.

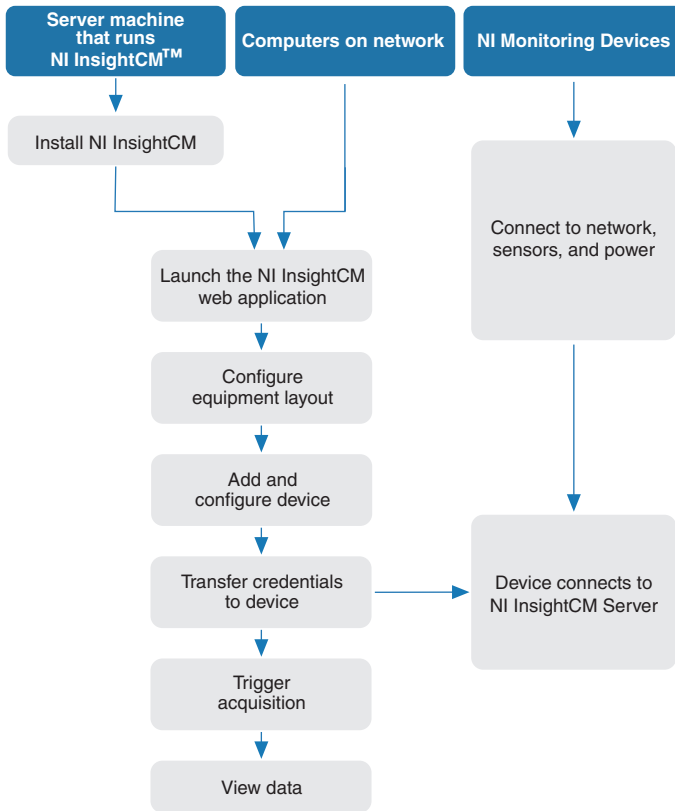
Figure 9.

Task	Location	Resources
Assign permissions to users.	Options dialog box	Refer to the <i>Creating Roles and Assigning Permissions</i> topic of the <i>NI InsightCM Configuration and Monitoring Help</i> .
Configure acquisition triggers.	Asset Configuration page	Refer to the <i>Methods for Initiating Data Set Collection</i> topic of the <i>NI InsightCM Configuration and Monitoring Help</i> .
Select features and spectral bands to calculate.	Asset Configuration page	Refer to the <i>Features Tab on Asset Configuration Page</i> topic of the <i>NI InsightCM Configuration and Monitoring Help</i> .
Define alarm rules.	Asset Configuration page	Refer to the <i>Alarm Rules Tab on Asset Configuration Page</i> topic of the <i>NI InsightCM Configuration and Monitoring Help</i> .

Overview of Initial NI InsightCM Setup

You can start setting up the components of an NI InsightCM system independently from one another. However, certain steps require that the setup process for a separate component reach a certain point before you can complete them. The following diagram describes the dependencies between the setup processes for each component.

Figure 10. Overview of Setup Process



Refer to the *NI Trademarks and Logo Guidelines* at ni.com/trademarks for more information on National Instruments trademarks. Other product and company names mentioned herein are trademarks or trade names of their respective companies. For patents covering National Instruments products/technology, refer to the appropriate location: **Help>Patents** in your software, the `patents.txt` file on your media, or the *National Instruments Patents Notice* at ni.com/patents. You can find information about end-user license agreements (EULAs) and third-party legal notices in the readme file for your NI product. Refer to the *Export Compliance Information* at ni.com/legal/export-compliance for the National Instruments global trade compliance policy and how to obtain relevant HTS codes, ECCNs, and other import/export data. NI MAKES NO EXPRESS OR IMPLIED WARRANTIES AS TO THE ACCURACY OF THE INFORMATION CONTAINED HEREIN AND SHALL NOT BE LIABLE FOR ANY ERRORS. U.S. Government Customers: The data contained in this manual was developed at private expense and is subject to the applicable limited rights and restricted data rights as set forth in FAR 52.227-14, DFAR 252.227-7014, and DFAR 252.227-7015.

© 2014–2018 National Instruments. All rights reserved.