Technical white paper

HP Network Node Manager i Software 10.00

Step-by-Step Guide to Custom Poller

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Customer Poller

This document steps through an example of setting up the Custom Poller to monitor a MIB that NNMi does not monitor by default.

Note the following:

- This example uses a Unix NNMi server, but can be followed on a Windows server.
- Some screen captures might slightly be different than those that appear in the NNMi graphical user interface.

Setting Up Your MIB

Step 1: Identify the MIB Variable You Want to Poll

To begin, identify a MIB variable that you want to poll.

This example monitors the disk usage on Microsoft PCs using the rfc2790-HOST-RESOURCES-MIB. This MIB is shipped with NNMi under the following directory:

```
%NnmInstallDir%\misc\nnm\snmp-mibs\Standard
```

The `%NnmInstallDir%` location depends on your operating system:

- Windows 2008
  %NnmInstallDir% = <drive>\Program Files(x86)\HP\HP BTO Software\
- Linux
  $NnmInstallDir = /opt/OV/

This example uses `rfc2790-HOST-RESOURCES-MIB` for the following reasons:

- The availability of Microsoft PCs makes this example easy to test
- You can easily increase disk space usage to change the resultant query and trigger a State change

Step 2: Ensure the MIB Includes Supported Types

Make sure you are familiar with the MIB you will be using. This is especially important because the variables used must have a type that NNMi supports. See *Troubleshooting Tips* for a list of supported MIB variables.

1. Check whether the MIB is loaded by selecting **Configuration > MIBs > Loaded MIBs**. If the MIB is loaded in NNMi, you can study the MIB using the Loaded MIBs view:

   a. Select the row that represents the MIB you want to view.

   b. Select **Actions > Display MIB** File.

2. To check the MIBs that are available to load use the **Tools > Load/Unload MIB** menu:

   a. Select **Tools > Load/Unload MIB.**

   b. Look for the MIB in the **MIBs Available to Load (NNMi Provided)** table.

   c. If the MIB is listed, click **Display** in the **Actions** column that appears next to the MIB name.

   NOTE: To study the MIB, you can also use the HP tool `nnmsnmpwalk.ovpl` or read through the MIB with a text editor

   An excerpt from the `rfc2790-HOST-RESOURCES-MIB` is shown below:

   ```
   HrStorageEntry:: = SEQUENCE
   ```

```
{
hrStorageIndex Integer32,
hrStorageType AutonomousType,
hrStorageDescr DisplayString,
hrStorageAllocationUnits Integer32,
hrStorageSize Integer32,
hrStorageUsed Integer32,
hrStorageAllocationFailures Counter32
}
```

As shown in the example excerpt, `hrStorageDescr` is of type `DisplayString`. `hrStorageUsed` is of type `Integer32` and `hrStorageAllocationUnits` is of type `Integer32`. The NNMi Custom Poller supports both of these types.

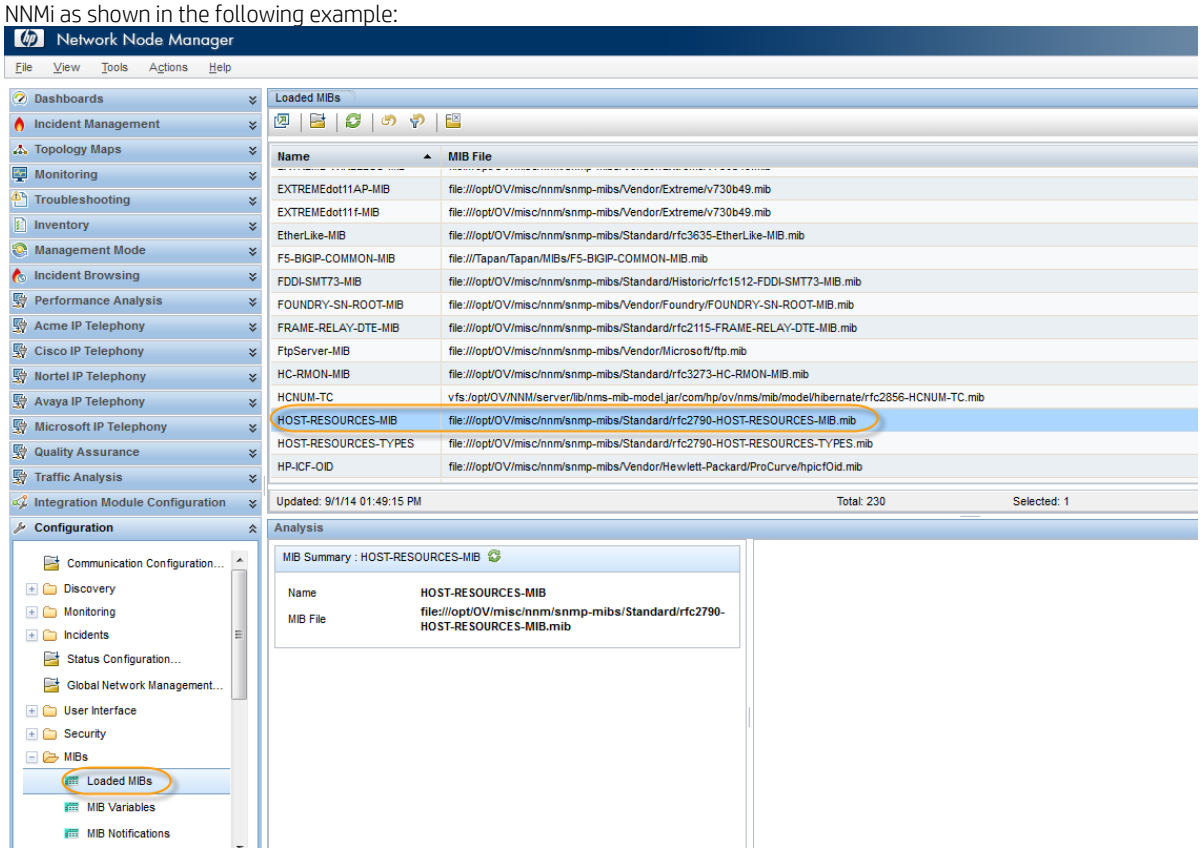
According to the MIB definition, hrStorageSize is the size of the storage measured in hrStorageAllocationUnits. To show the amount of storage in kilobytes (KB) on the C drive, this example uses the following MIB expression:

```
((hrStorageSize / 1000) * hrStorageAllocationUnits)
```

Step 3: Load the Required MIB

NNMi's Custom Poller requires that the MIB be loaded onto the NNMi management server.

Use the **Actions > MIBs > Loaded MIBs** view to determine whether the `rfc2790-HOST-RESOURCES-MIB` is loaded in NNMi as shown in the following example:



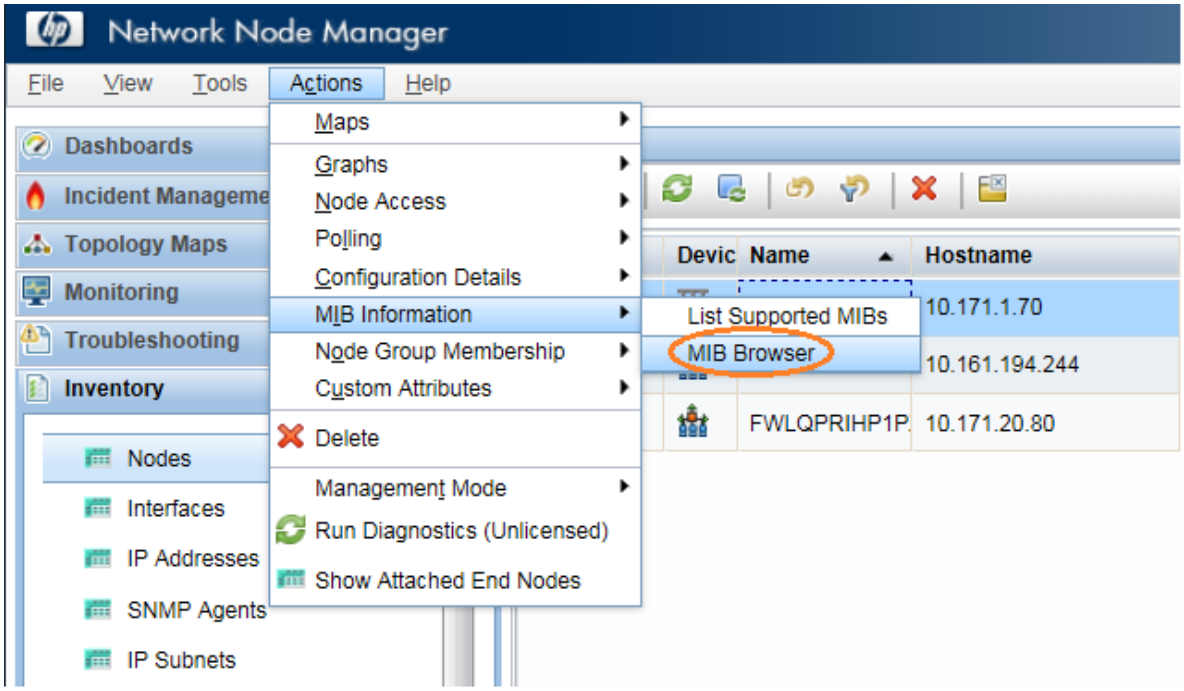
TIP: To check whether the MIB is already loaded, you can also run the `nnmloadmib.ovpl -list` command. Look for the desired MIB in the results.

If the MIB had not been loaded, you can load it with the **Tools > Load/Unload MIB** or the `nnmloadmib.ovpl -load` command.

Step 4: Use the MIB Browser to View Current MIB Variable Values

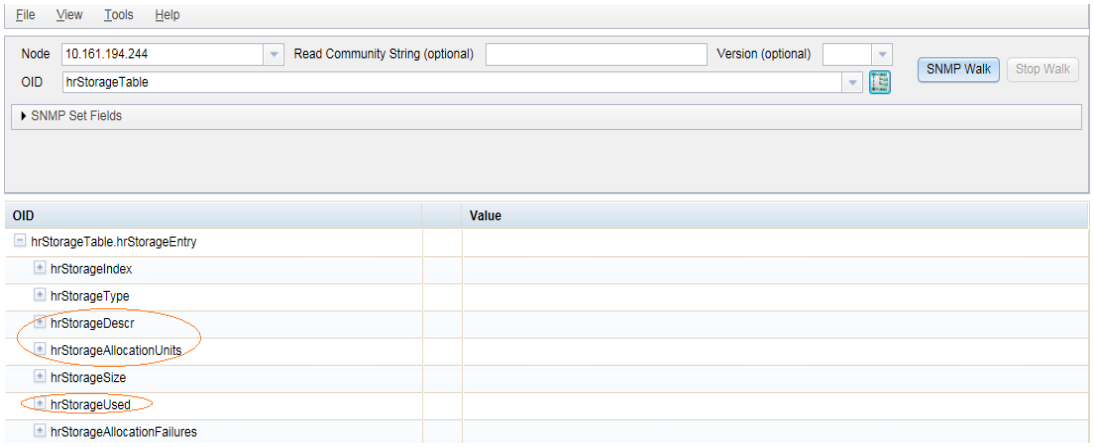
Use the MIB Browser to perform an SNMP query and become familiar with the MIB variable values returned from the node. In this example, the node is a Linux server.

1. Select a node that has a Device Category of Server ( ) or Computer ( ).
2. Select **Actions > MIB Information > Browse MIB.**

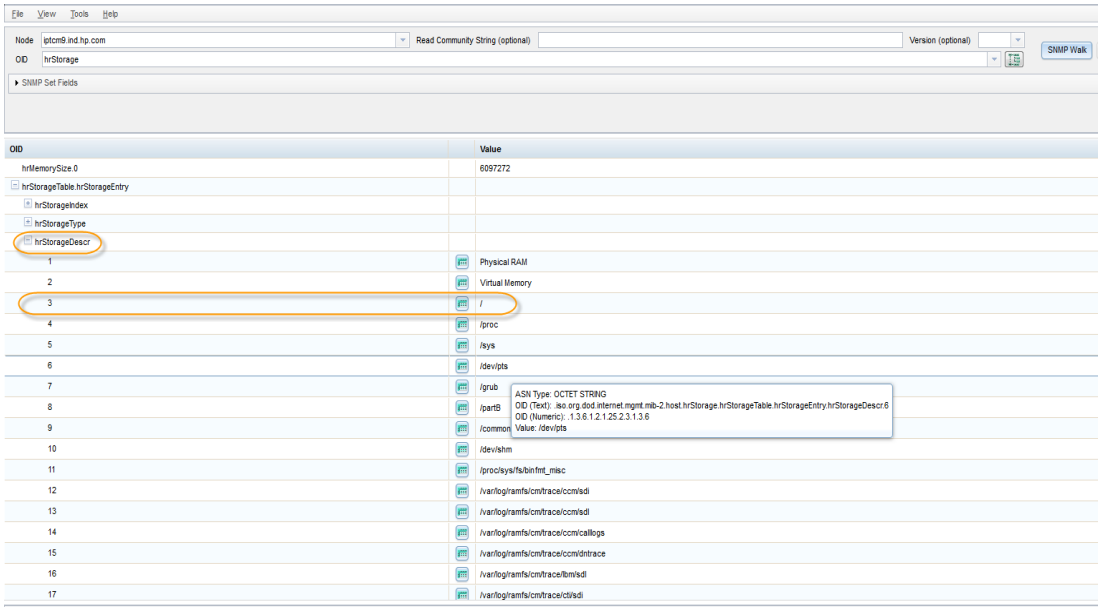


In the **Node** attribute you should see the name of the node you selected.

3. In the **OID** attribute, enter **hrStorageTable.**
4. Click the **SNMP Walk** icon.
5. Expand the following folders:
   - hrStorageDescr
   - hrStorageAllocationUnits
   - hrStorageUsed



The following example shows a root partition:



To check the storage used on the *root* partition, look for the string from the hard disk that begins with /.

As shown in the example above, the Value column that begins with / is the third item. The value for `hrStorageAllocationUnits` is 4096 on this drive. The `hrStorageUsed` value is 2904519.

Next, enable Custom Poller so that you can use it to specify the MIB Expression you want NNMi to poll.

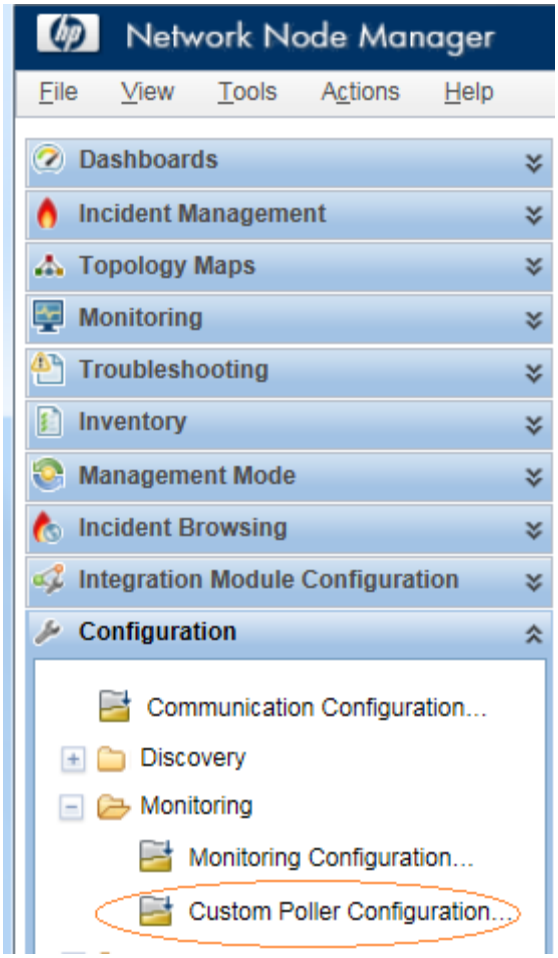
Setting Up a Custom Poll

Step 1: Enable Custom Poller

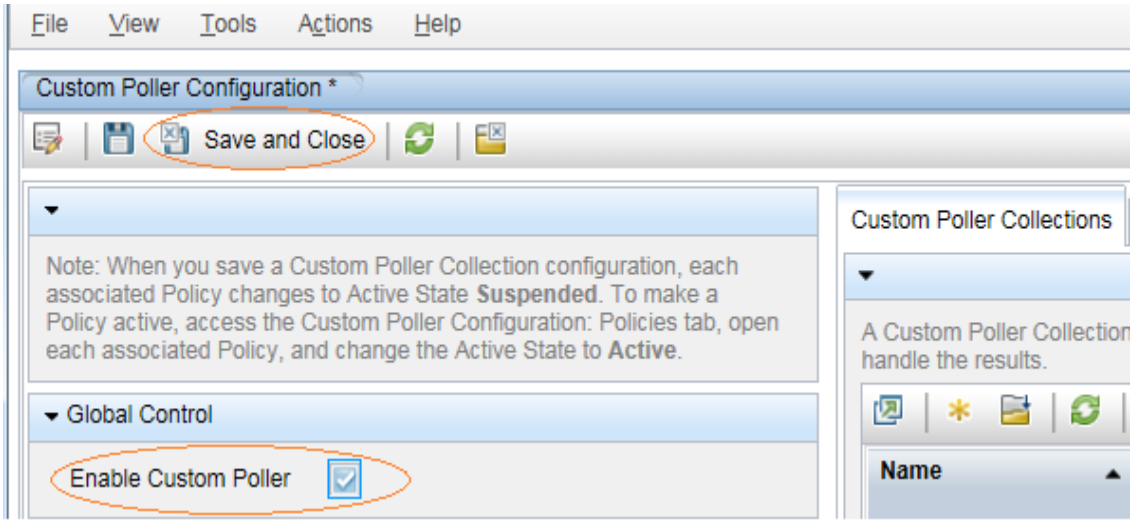
Custom Poller is not enabled by default.

To enable Custom Poller:

1. Navigate to the **Configuration** workspace.
2. Expand the **Monitoring** folder.
3. Select **Custom Poller Configuration**.



4. Check **Enable Custom Poller.**
5. Click **Save and Close.**

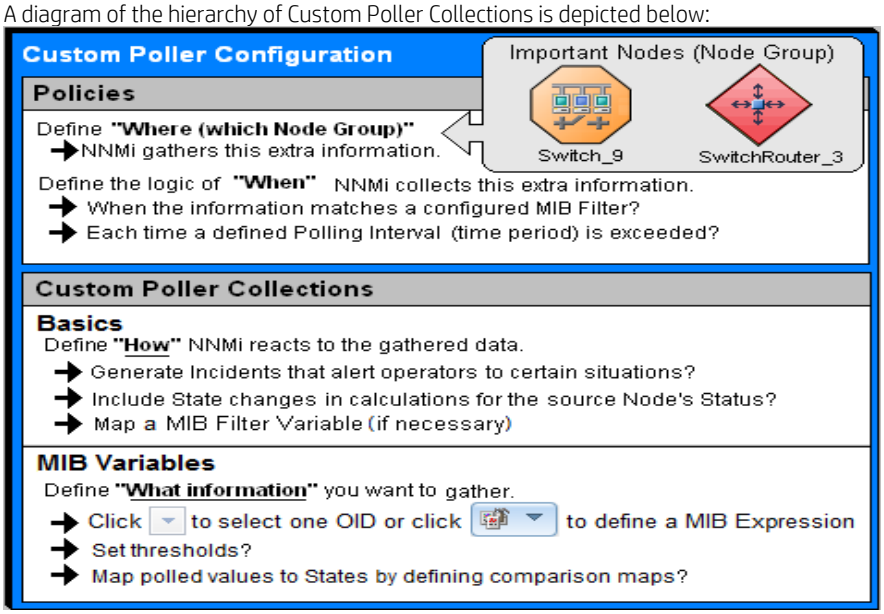


Step 2: Create a Custom Poller Collection

After you enable Custom Poller, you are ready to create a Custom Poller Collection. A Custom Poller Collection defines the information you want to gather (poll) as well as how NNMi reacts to the gathered data.

In addition to a Custom Poller Collection, you should define at least one Custom Poller Policy. Each policy specifies the Node Group on which you apply the Custom Poller Collection.

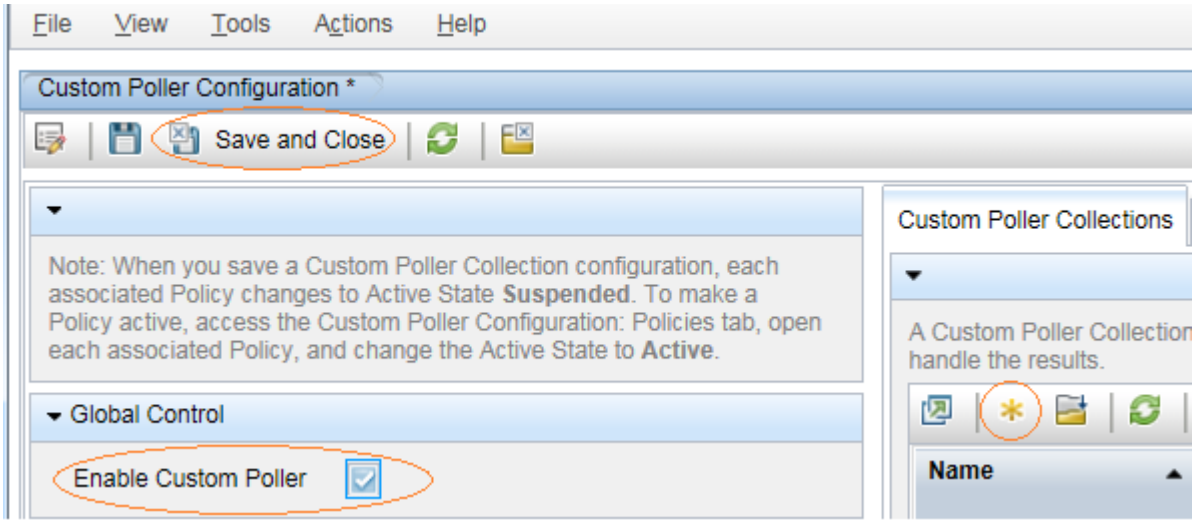
A diagram of the hierarchy of Custom Poller Collections is depicted below:



In our example, we are required to provide a MIB Filter value to select the disks we want NNMi to monitor. If we do not specify a MIB Filter Variable and MIB Filter, NNMi assumes the MIB variable does not have multiple instances.

To create our Custom Poller Collection:

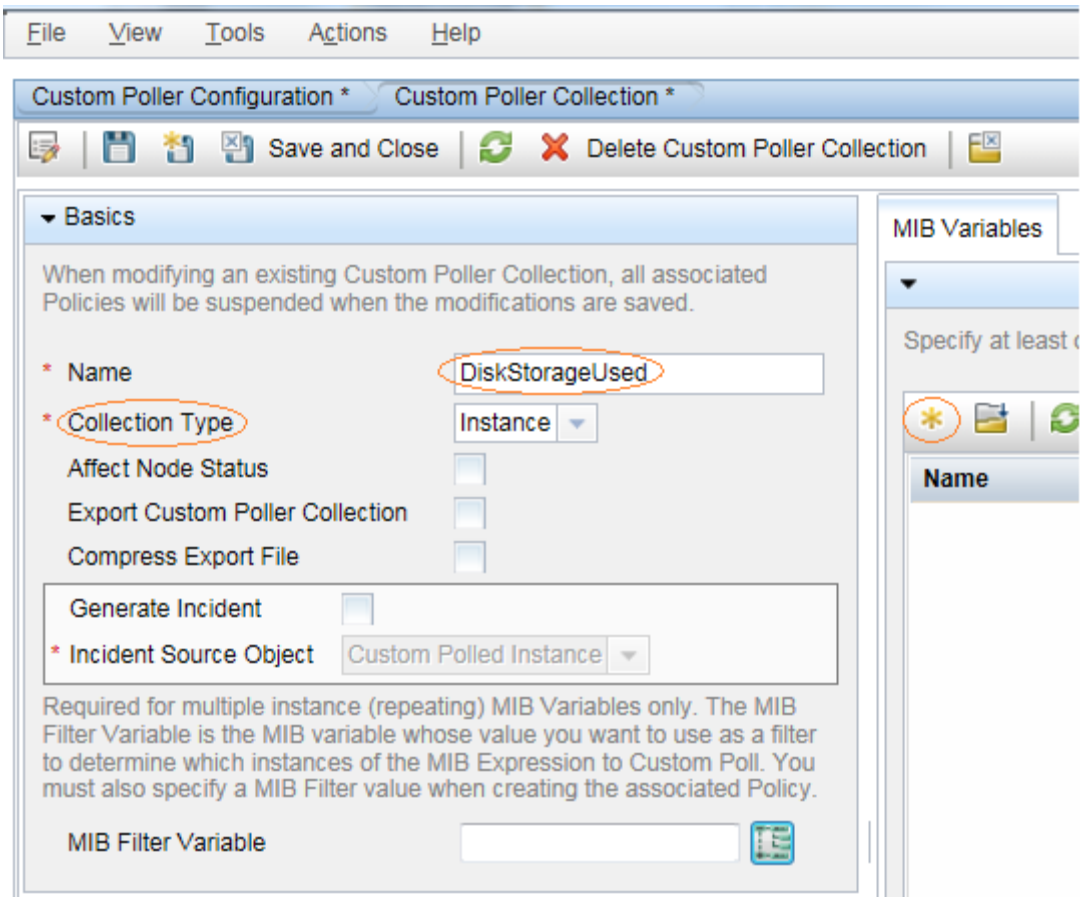
1. Open the Custom Poller Configuration form:
   a. Navigate to the **Configuration** workspace.
   b. Expand the **Monitoring** folder.
   c. Select Custom Poller Configuration.
2. Navigate to the **Custom Poller Collections** tab.
3. Click the * New icon.



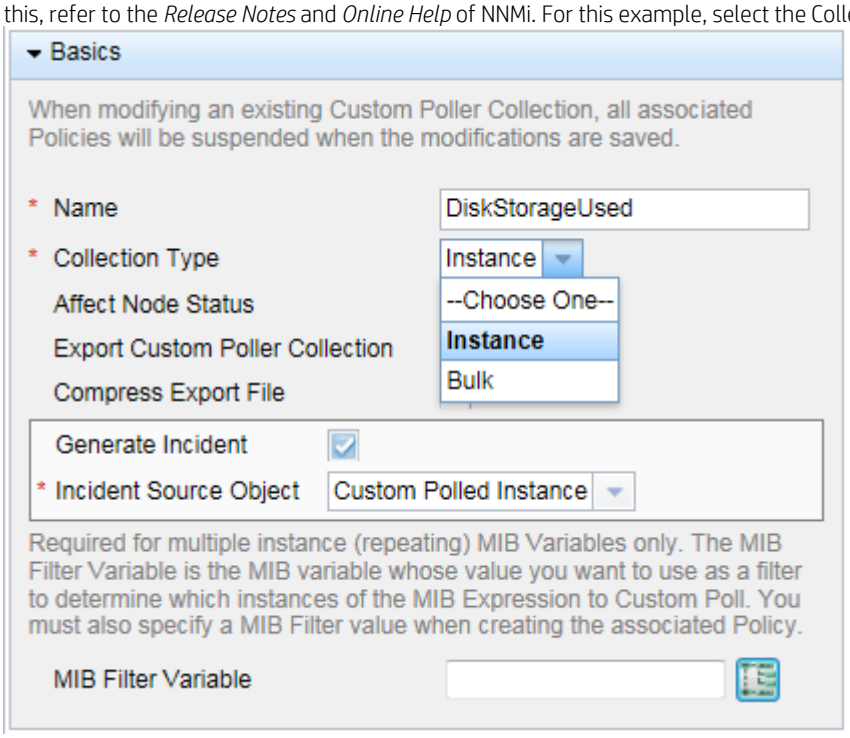
4. In the **Name** attribute of the Custom Poller Collections form, name the Collection `DiskStorageUsed`.
5. Check **Affect Node Status and Generate** Incident.
6. Specify a MIB variable – the variable or expression on which collection needs to be done.

   NOTE: With 10.00 version, a single custom collection can have multiple MIB variable or expressions within it. For more details, please look at the *Create Custom Poller Configurations* section in *NNMi Online Help for Administrators*.

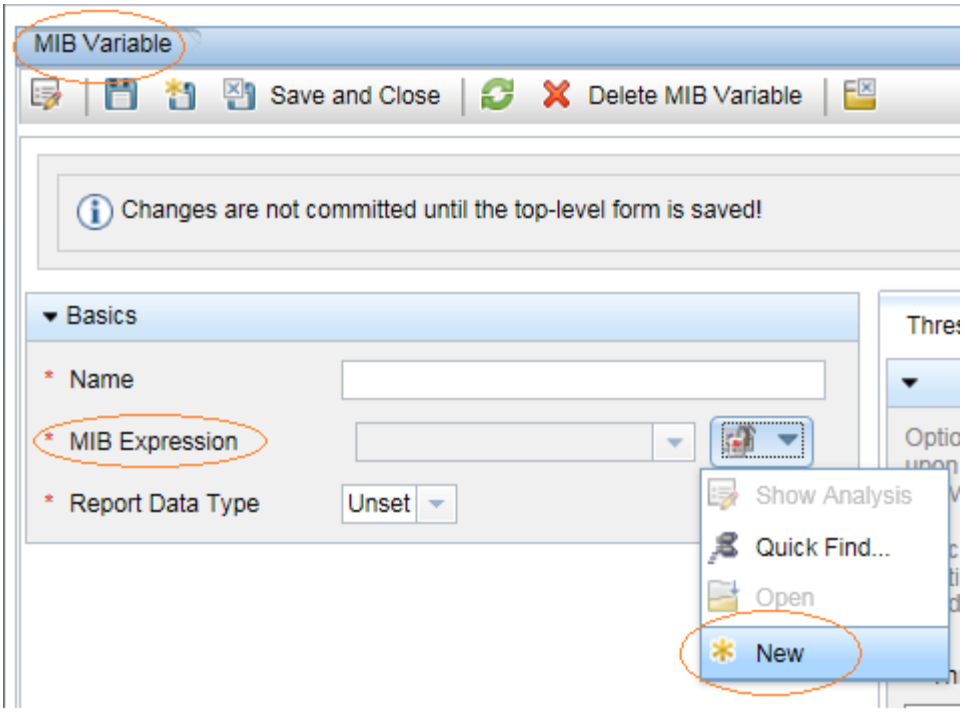
7. In the **MIB Variables** tab, click on the * New icon to define a new variable or expression.



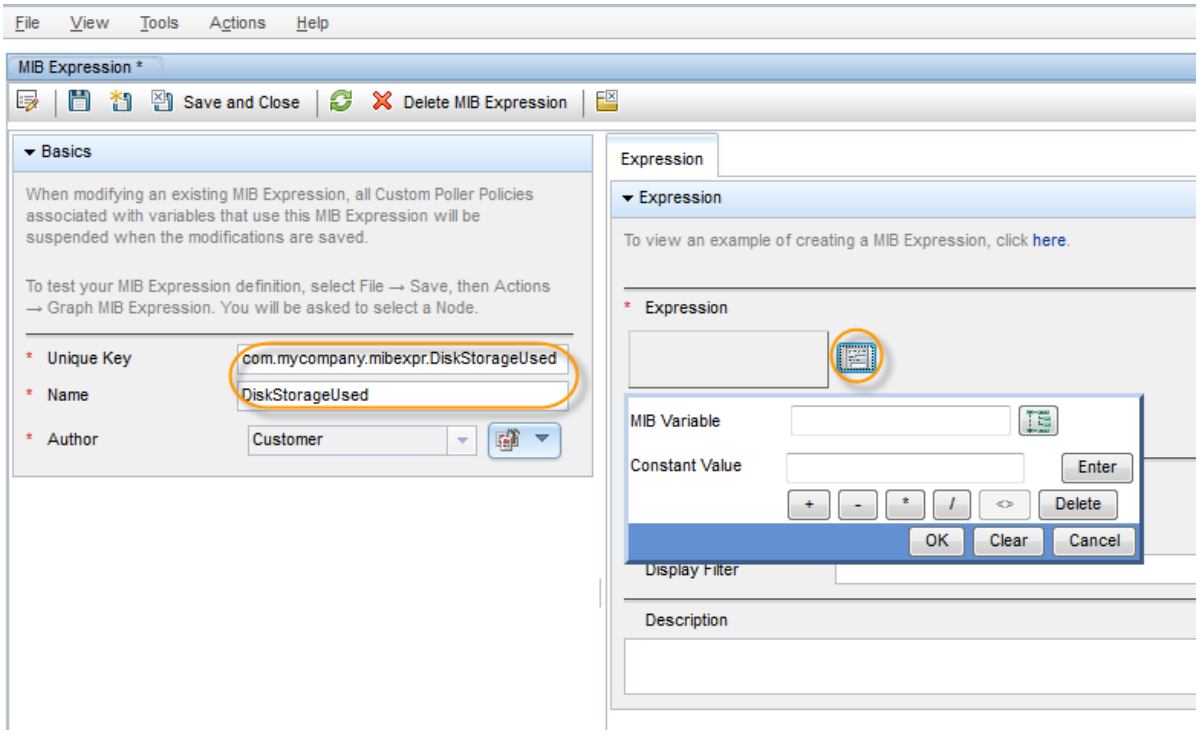
NOTE: Starting version 10.00, NNMi custom poller support a new collection type called *Bulk* collection. For more on this, refer to the *Release Notes* and *Online Help* of NNMi. For this example, select the Collection Type as *Instance*.



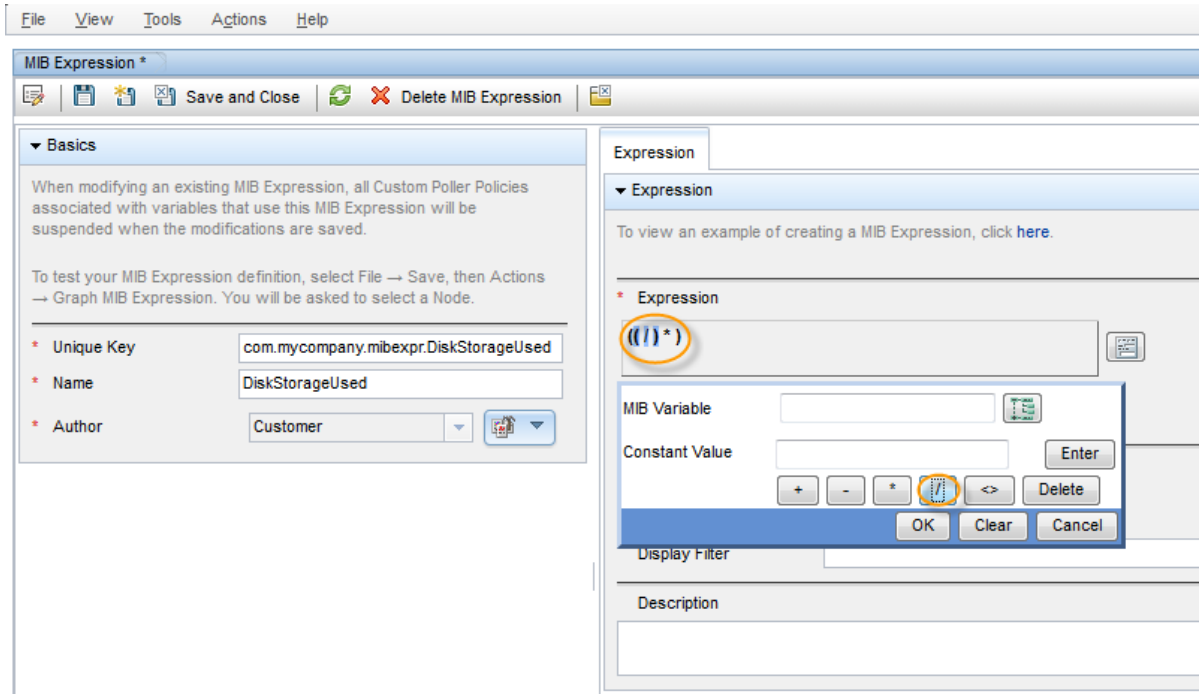
8. In the MIB Expression attribute, click * **New** to open a New MIB Expression form. At this time, give a name to this MIB Variable (in a single collection with multiple MIB variables, it is required to use unique names for each variable) and also select the "Report Data Type" based on the type of the MIB variables for which collection needs to be configured.



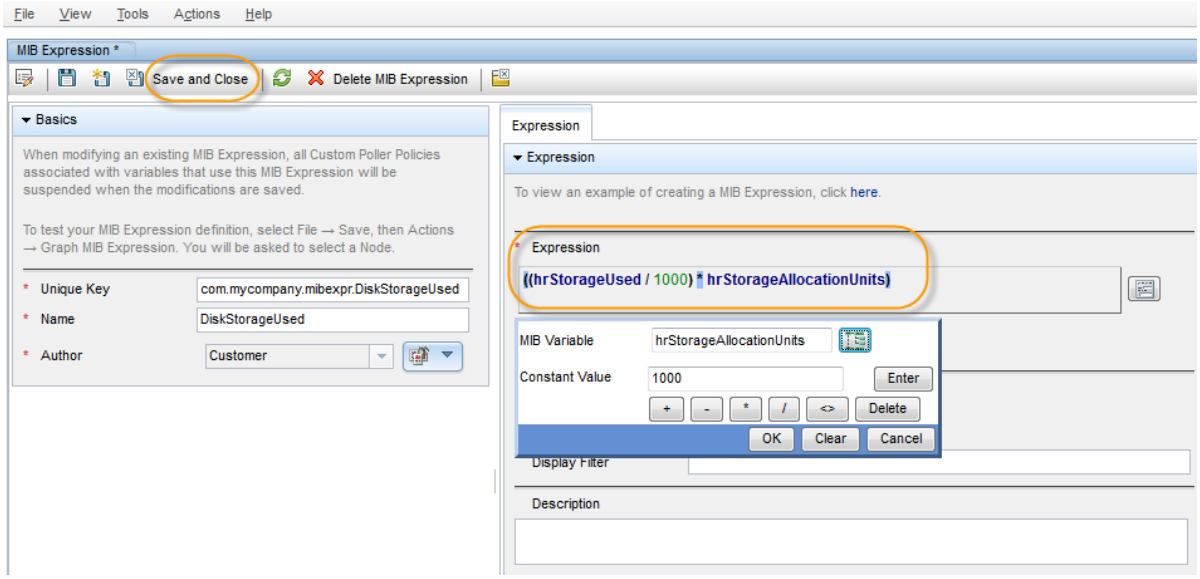
9. Enter in a Unique Key, Name and Author.
   This example uses the author **Customer**, which is the default.



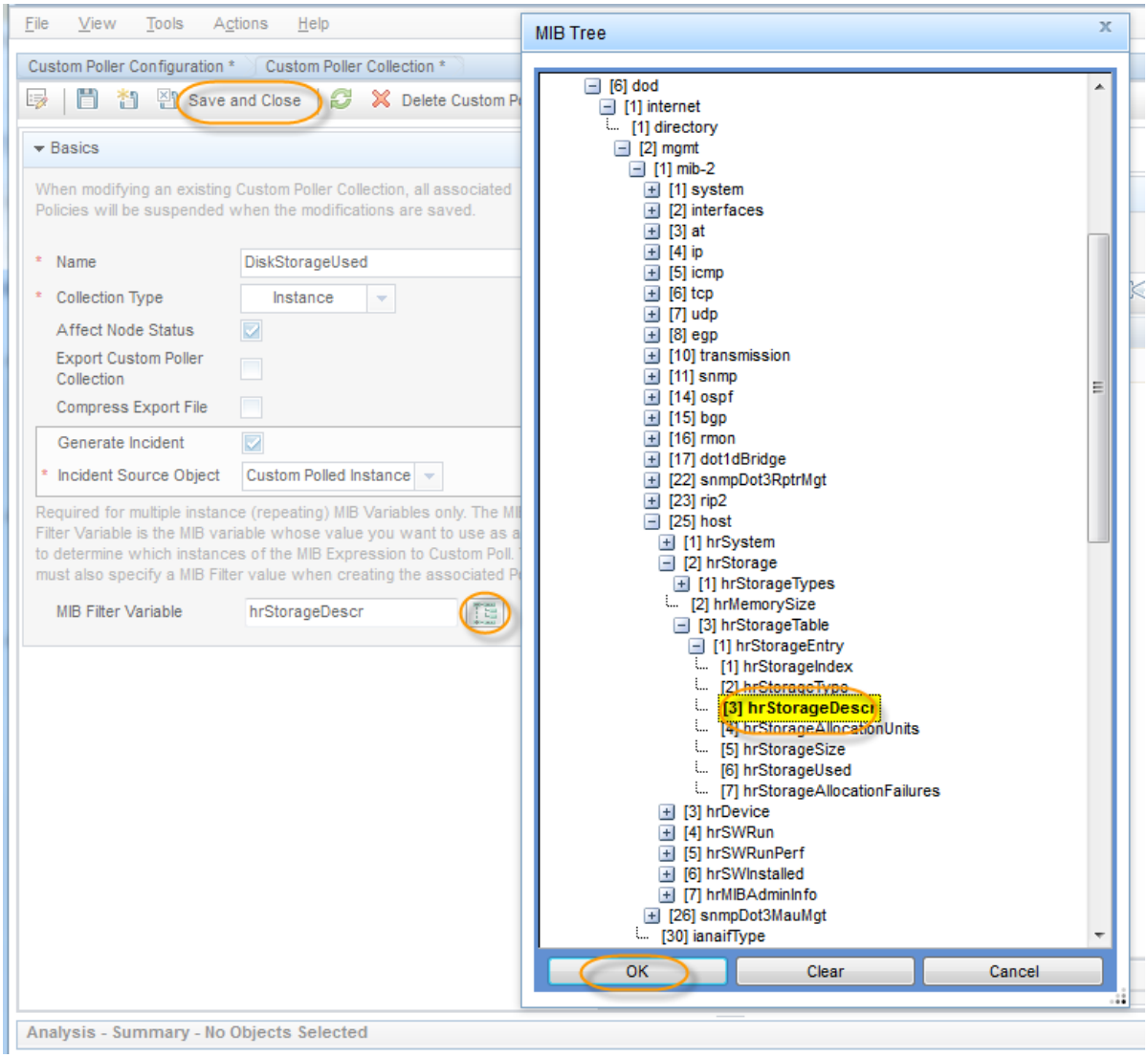
10. Create the MIB expression.
11. Write out the expression before working with the user interface. In this example, the MIB expression is:
    `((hrStorageSize / 1000) * hrStorageAllocationUnits)`
12. When specifying the expression, begin by inserting all of the operands. The operands in this expression include / and *.



13. After you select each operand, place the cursor in the location where you want to insert a MIB variable.
14. Navigate the MIB Variable tree to select the `hrStorageUsed` and `hrStorageAllocationUnits` variables.
15. Add the constant 1000.

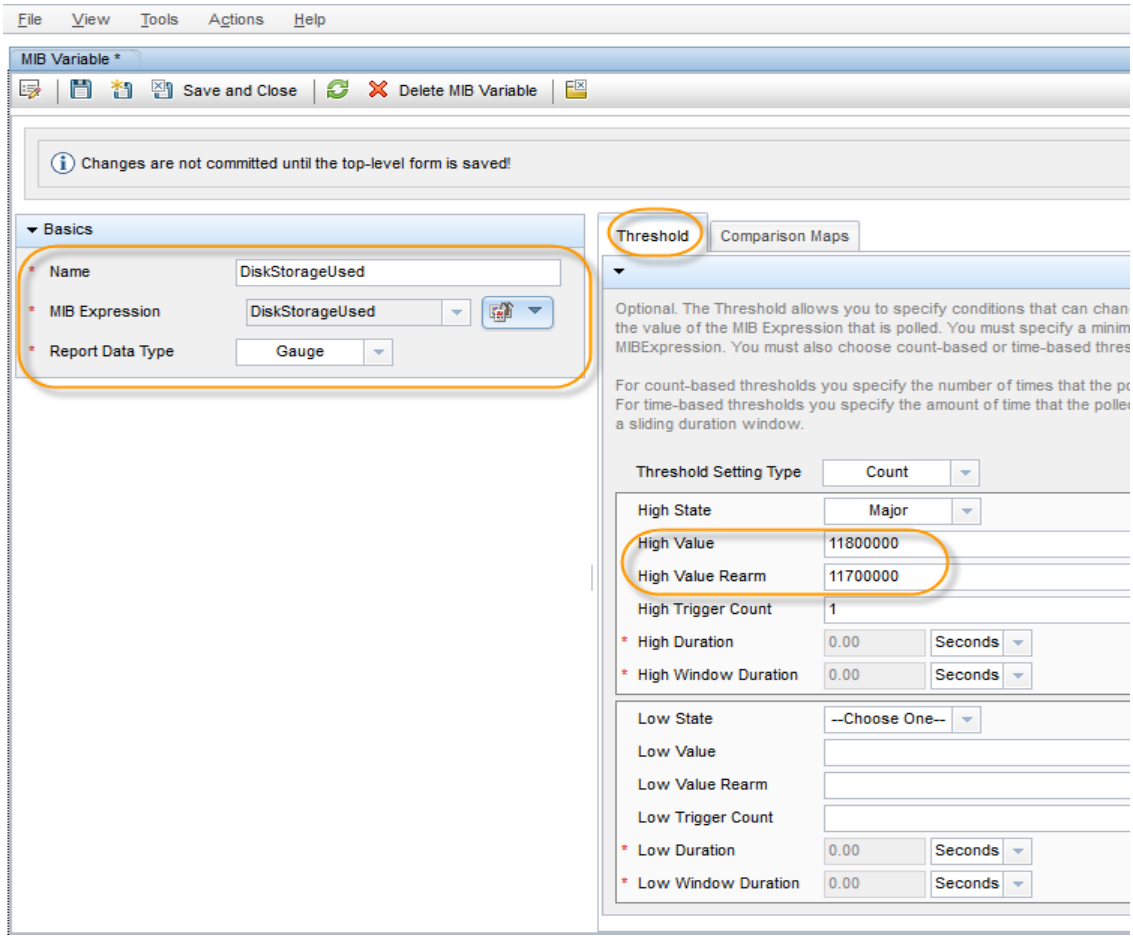


16. Click **Save and Close.**
    Specify a MIB Filter Variable. This example uses `hrStorageDescr.`
17. From the MIB Filter Variable entry, navigate to the `hrStorageDescr` value.



Finally, set a threshold to trigger an alarm. This example uses 11800000 as the threshold value with a rearm value of 11700000. The alarm triggers with just one sample above the threshold.

18. Navigate to the **Thresholds** tab.
19. In the **High Value** attribute, enter 11800000.
20. In the **High Value Rearm** attribute, enter 11700000.
21. In the **High Trigger Count** attribute, enter 1.



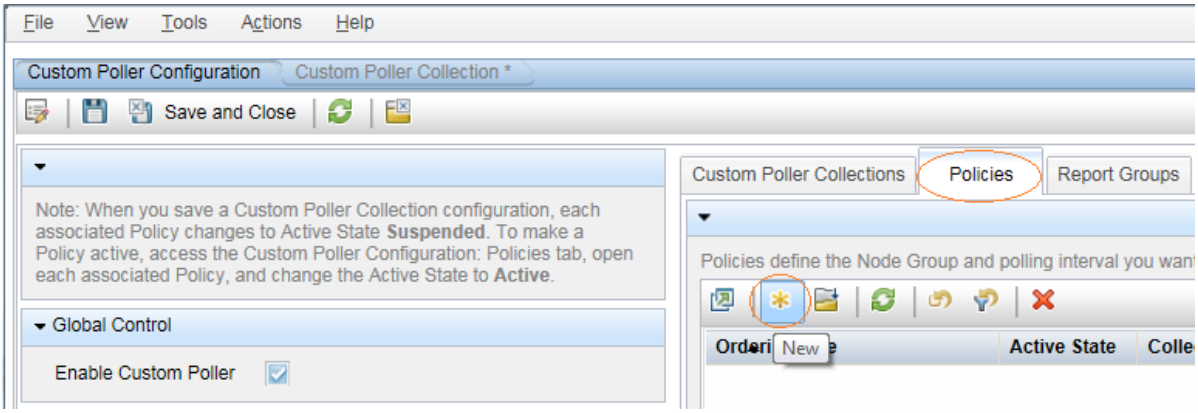
22. Click **Save and Close**;

    You now have a Custom Poller Collection.
23. Create a policy for the Custom Poller Collection that looks for / ('root' partition) at the start of the value.

Step 3: Create a Policy for a Custom Poller Collection

A Policy defines which Node Groups are participating in this Custom Poller Collection and how often the variable is polled. It is also used to define the MIB filter to select specific instances. You can create more than one Policy associated with a Custom Poller Collection.

1. To begin, navigate to the **Policies** tab and select the * New icon.



2. In the **Name** attribute, enter `ServerUsedDiskSpace`.
   NNMi displays this name in the incident browser, whenever an associated incident is generated for the Custom Poll.

3. Specify the Ordering.

   Because you can create more than one Policy associated with a Custom Poller Collection, you need to specify an order to remove ambiguity when a node is matched to more than one policy.

For example, you might want a Custom Poller Collection to run against a Node Group for Routers and a Node Group for Switches. You also might want to poll the routers every 5 minutes and the Switches every 8 minutes.

If a node is both a switch and a router, then it is not allowed to be polled twice by the same collection. You might decide that if a node is both a switch and a router, it is important that it be polled more quickly (using the Router policy). Therefore, you use a higher priority order number for the Router Policy. When you specify an order, the node is matched against the highest priority policy (lowest Ordering number).

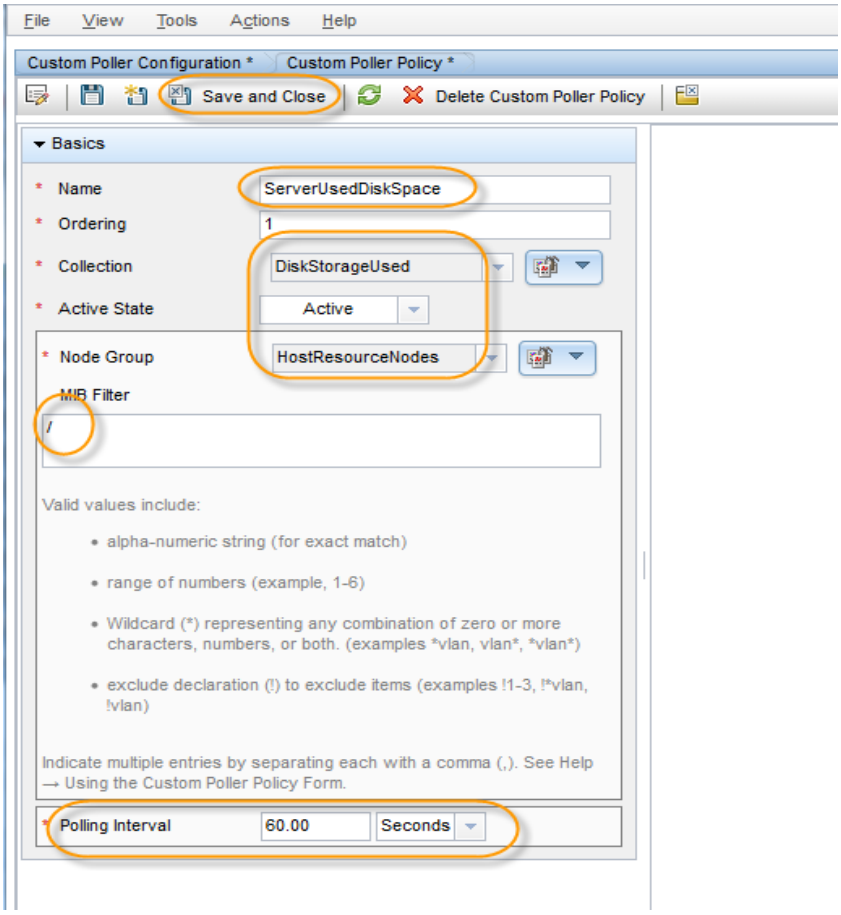
Because we have only one Policy for a Collection, we do not need to be concerned about this order.

4. In the **Ordering** attribute, accept the default value of **1.**
5. Use the **Quick Find pull** down menu to select the Collection that we previously defined (DiskStorageUsed).
6. Change the **Active State** to **Active.**
7. Use the **Quick Find pull** down menu to select the **HostResourceNodes Node Group.**
8. Specify the MIB Filter.
9. Recall that the values from our SNMP walk, the *root* partition always started with /. Therefore, in the MIB Filter attribute, enter '/' as the filter. Avoid matching all instances by entering the asterisk (*) as the filter. This could lead to a large number of matches and adversely affect NNMi Custom Poller performance.
10. Specify the Polling Interval.

    In NNMi, you cannot force a Custom Poll. (The Status Poll or Configuration Poll options from the Actions menu do not include the Custom Poller.) Therefore, while initially setting up your Custom Polls, you might want to set the Polling Interval fairly short, so you do not have to wait a long time for each poll cycle.

11. For the purposes of this example, set the Polling Interval attribute to 1 minute. As a best practice, after you have set up your Custom Polls as desired, select a longer Polling Interval. Using short Polling Intervals can adversely affect NNMi Custom Poller performance.
12. Click **Save and Close** to save your Policy.

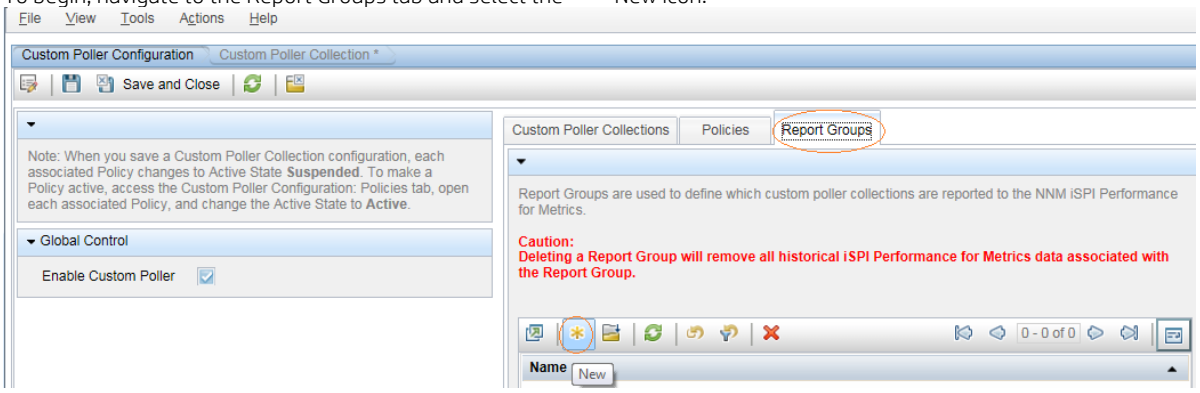
    TIP: If you make a change to a Custom Poller Collection configuration after you save it (for example, change the **High Value**), NNMi automatically changes the Active State of the associated Custom Poller Policies to Suspended. If this occurs, open the Policy configuration and change the Active State back to Active.



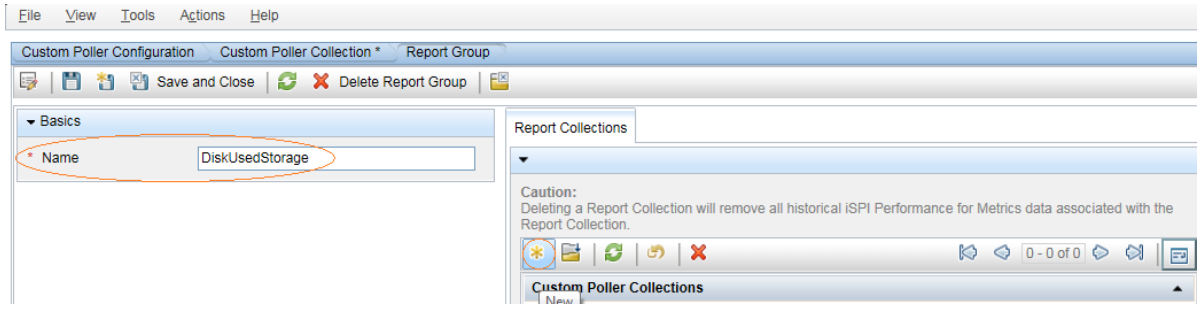
Step 4: Create a Report Group for Custom Collection(s)

Report Groups are used to defined which custom poller collections are reported to the NNM iSPI Performance for Metrics. Once the Report Group is created, the same is seen (dynamically) as a new report Extension Pack on the NPS and appears in the Reporting tree on the iSPI Performance for Metrics Reports Home Page.

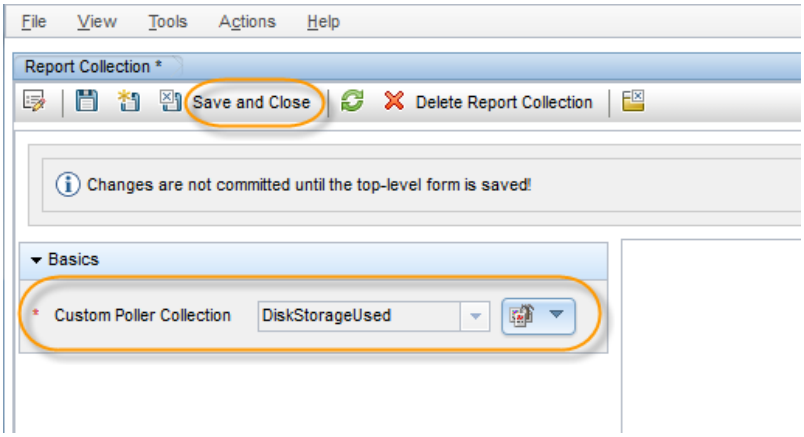
1. To begin, navigate to the Report Groups tab and select the * New icon.



2. Give the Report Group a name (this name appears as an extension pack name in NPS) and add a “New” collection to the Report Group.



3. Select the required Custom Collection(s) and click **Save and Close**.



NOTE: A single report group can have multiple relevant Custom Collections added within it. That is, for relevant MIB variables/expressions data, a single Report Extension Pack can show all data.
Also, note that it is NOT mandatory to export a custom collection to send the collection data into NPS reports.

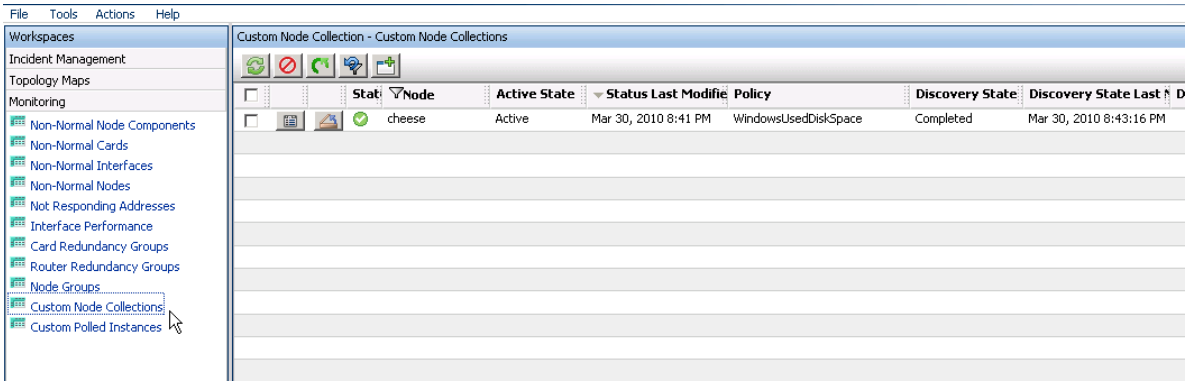
View the Results of Your Custom Poll

Step 1: View the Node Collections Associated with Custom Poller Policies

After you configure your Custom Poller Collections, you can view the Custom Poller objects. NNMi identifies these objects as Custom Node Collections.

To view Custom Node Collections:
1. Navigate to the **Monitoring** workspace.
2. Select **Custom Node Collections**.

NNMi displays a table view of all Custom Node Collections that includes:
- The Custom Node Collection status.
- The topology node associated with the Custom Node Collection.
- The Active State for the associated policy.
- The date and time the Status was last modified.
- The name of each policy associated with each Custom Node Collection.
- Discovery information regarding the MIB Poll Variable on each topology node, such as Discovery State, the time stamp when the Discovery State was last modified, and Discovery State Information.

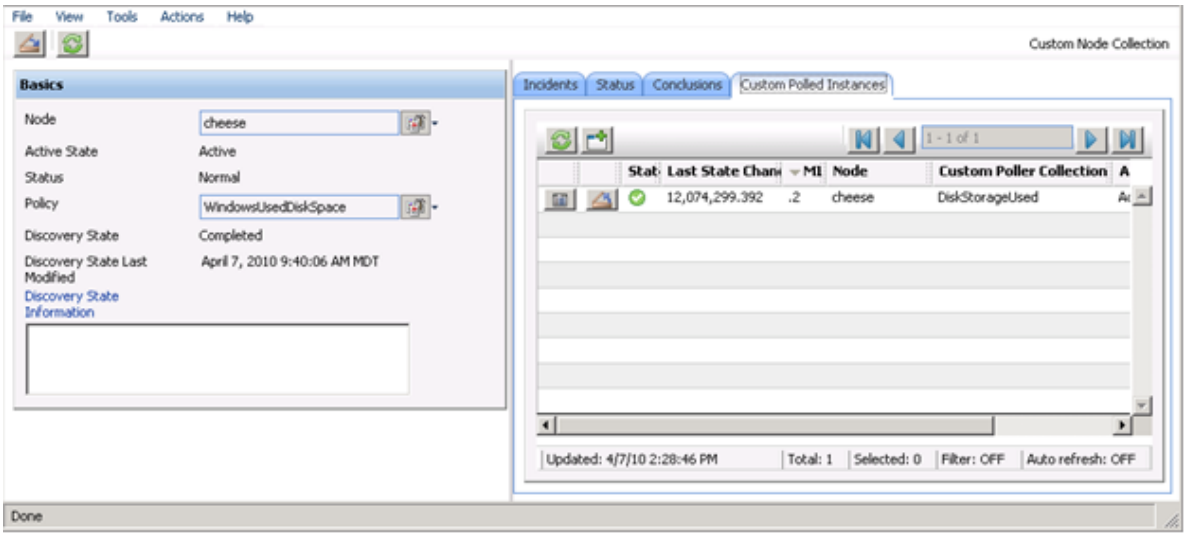


TIP: The same node name can be listed in the Custom Node Collections view multiple times if it has multiple Custom Poller Collections applied to it. These are not "Nodes" but "Node Collections".

Step 2: View the Details of a Custom Node Collection

To view the details for a specific Custom Node Collection, double-click the Node Collection of interest.

As shown in the example below, you can see any incidents that have been generated, the Status history, Conclusions, and Polled Instances.



Step 3: View Details of a Polled Instance

Another useful view is the **Custom Polled Instances** view. The first time the specified MIB variable is discovered, the results appear in a Polled Instance object. The Polled Instance object is updated whenever a change in the MIB Poll Variable's State is detected and includes the most recent polled value that caused the State to change.

NOTE: The Custom Polled Instance value does not necessarily reflect the most recent polled value. It is the value that caused the State change, which might not be subsequent value.

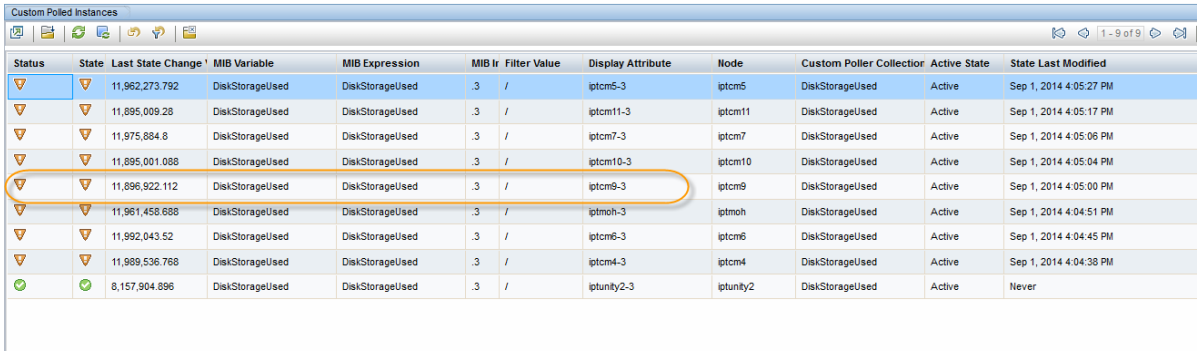
To view Custom Polled Instances:

1. Navigate to the **Monitoring** workspace.
2. Select **Custom Polled Instances**.

   This view allows you to easily see all the Polled Instances that are polled by a specific Custom Poller Collection. For example, you can sort the view based on the MIB variable to see all the Polled Instances for a particular Custom Poller Collection.

   The following table does not include the Custom Poller Collection Name. However, it lists the names of the MIB Variable being polled. Each collection has only one MIB Poll Variable. Therefore, if you use a unique name for your Custom Poller Collection variables, it is easy to associate the Custom Poller Collection with the MIB Poll Variable

As shown in the example below, another server has the / drive mapped to MIB Suffix (or instance) .3.



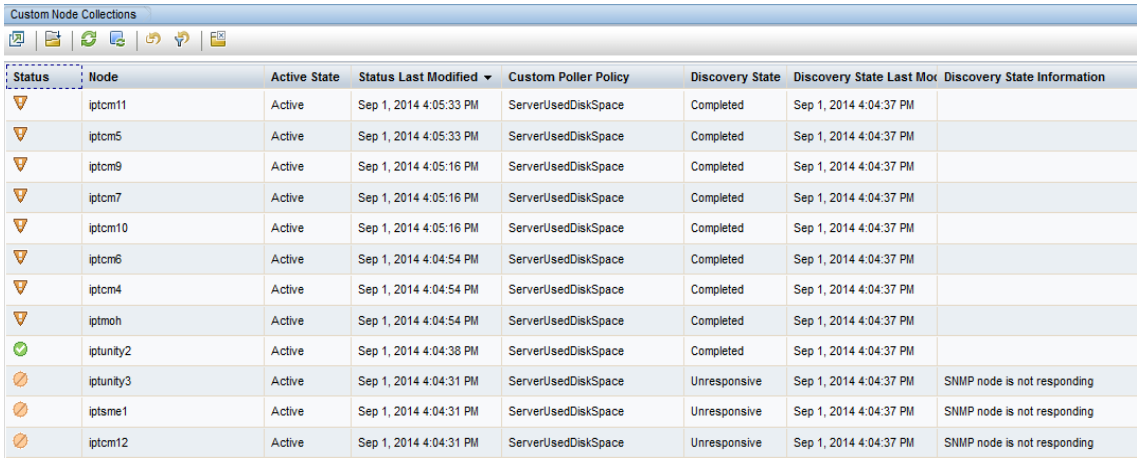
Status	State	Last State Change	MIB Variable	MIB Expression	MIB Ir	Filter Value	Display Attribute	Node	Custom Poller Collectior	Active State	State Last Modified
		11,962,273.792	DiskStorageUsed	DiskStorageUsed	.3	/	iptcm5-3	iptcm5	DiskStorageUsed	Active	Sep 1, 2014 4:05:27 PM
		11,895,009.28	DiskStorageUsed	DiskStorageUsed	.3	/	iptcm11-3	iptcm11	DiskStorageUsed	Active	Sep 1, 2014 4:05:17 PM
		11,975,884.8	DiskStorageUsed	DiskStorageUsed	.3	/	iptcm7-3	iptcm7	DiskStorageUsed	Active	Sep 1, 2014 4:05:06 PM
		11,895,001.088	DiskStorageUsed	DiskStorageUsed	.3	/	iptcm10-3	iptcm10	DiskStorageUsed	Active	Sep 1, 2014 4:05:04 PM
		11,896,922.112	DiskStorageUsed	DiskStorageUsed	.3	/	iptcm9-3	iptcm9	DiskStorageUsed	Active	Sep 1, 2014 4:05:00 PM
		11,961,458.688	DiskStorageUsed	DiskStorageUsed	.3	/	iptmoh-3	iptmoh	DiskStorageUsed	Active	Sep 1, 2014 4:04:51 PM
		11,992,043.52	DiskStorageUsed	DiskStorageUsed	.3	/	iptcm6-3	iptcm6	DiskStorageUsed	Active	Sep 1, 2014 4:04:45 PM
		11,989,536.768	DiskStorageUsed	DiskStorageUsed	.3	/	iptcm4-3	iptcm4	DiskStorageUsed	Active	Sep 1, 2014 4:04:38 PM
		8,157,904.896	DiskStorageUsed	DiskStorageUsed	.3	/	iptunity2-3	iptunity2	DiskStorageUsed	Active	Never

Step 4: Evaluate the Results of the Custom Poll

To evaluate the results of our example Custom Poll, trigger the threshold to see the changed State and the generated incident.

1. Copy a few large files onto the disk of the Server to increase the disk usage.

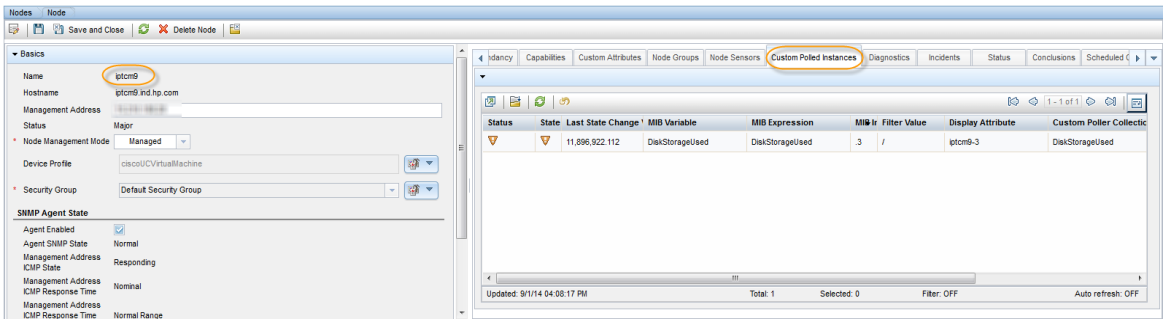
   As shown in the following example, copying a few large files onto the disk of the Server causes the Status of the Custom Node Collection to change to Major.



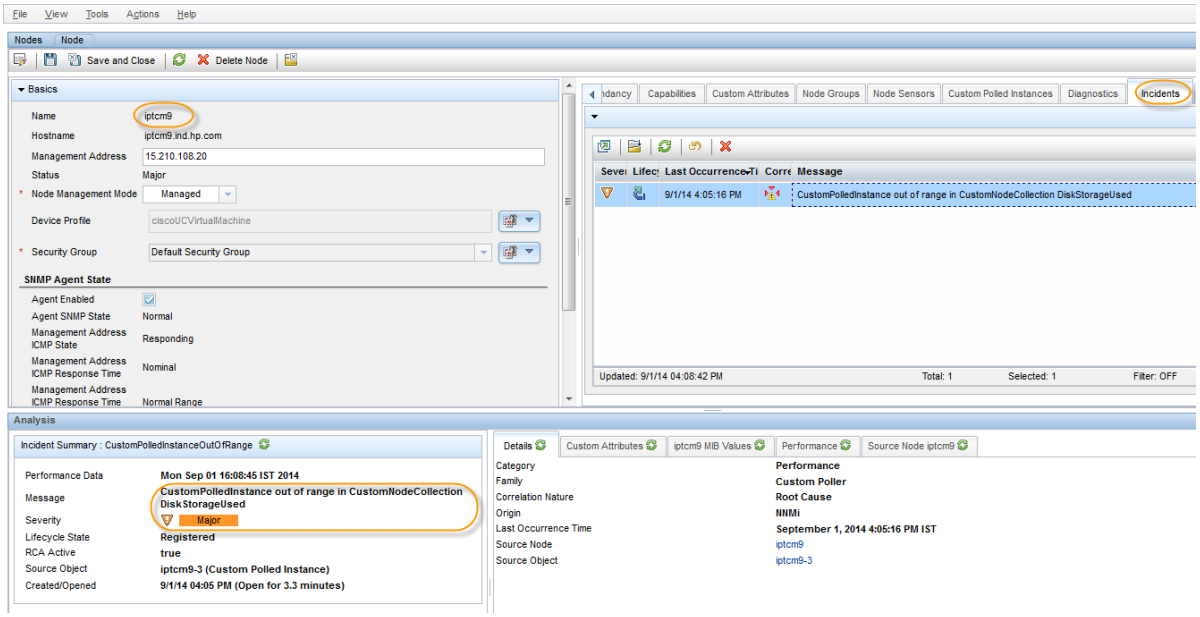
Status	Node	Active State	Status Last Modified	Custom Poller Policy	Discovery State	Discovery State Last Mo	Discovery State Information
	iptcm11	Active	Sep 1, 2014 4:05:33 PM	ServerUsedDiskSpace	Completed	Sep 1, 2014 4:04:37 PM	
	iptcm5	Active	Sep 1, 2014 4:05:33 PM	ServerUsedDiskSpace	Completed	Sep 1, 2014 4:04:37 PM	
	iptcm9	Active	Sep 1, 2014 4:05:16 PM	ServerUsedDiskSpace	Completed	Sep 1, 2014 4:04:37 PM	
	iptcm7	Active	Sep 1, 2014 4:05:16 PM	ServerUsedDiskSpace	Completed	Sep 1, 2014 4:04:37 PM	
	iptcm10	Active	Sep 1, 2014 4:05:16 PM	ServerUsedDiskSpace	Completed	Sep 1, 2014 4:04:37 PM	
	iptcm6	Active	Sep 1, 2014 4:04:54 PM	ServerUsedDiskSpace	Completed	Sep 1, 2014 4:04:37 PM	
	iptcm4	Active	Sep 1, 2014 4:04:54 PM	ServerUsedDiskSpace	Completed	Sep 1, 2014 4:04:37 PM	
	iptmoh	Active	Sep 1, 2014 4:04:54 PM	ServerUsedDiskSpace	Completed	Sep 1, 2014 4:04:37 PM	
	iptunity2	Active	Sep 1, 2014 4:04:38 PM	ServerUsedDiskSpace	Completed	Sep 1, 2014 4:04:37 PM	
	iptunity3	Active	Sep 1, 2014 4:04:31 PM	ServerUsedDiskSpace	Unresponsive	Sep 1, 2014 4:04:37 PM	SNMP node is not responding
	iptsme1	Active	Sep 1, 2014 4:04:31 PM	ServerUsedDiskSpace	Unresponsive	Sep 1, 2014 4:04:37 PM	SNMP node is not responding
	iptcm12	Active	Sep 1, 2014 4:04:31 PM	ServerUsedDiskSpace	Unresponsive	Sep 1, 2014 4:04:37 PM	SNMP node is not responding

   NOTE: The Custom Node Collection Status is not necessarily equivalent to the Status of the Source Node.

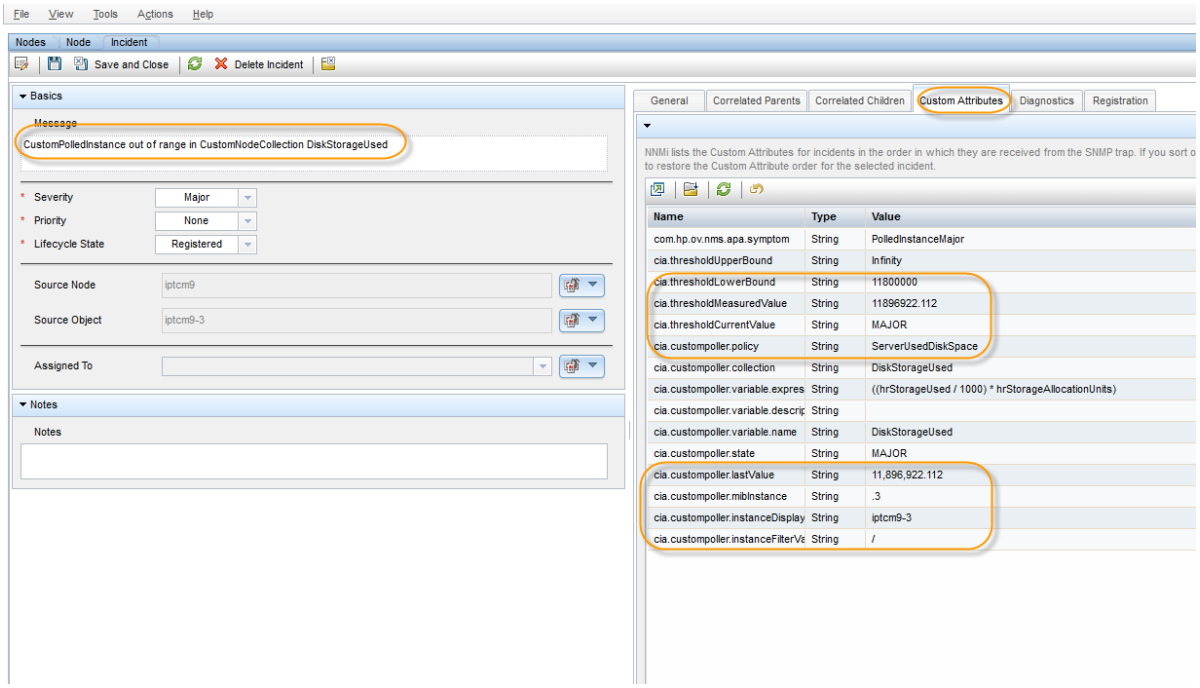
2. Open one of Custom Collection nodes to see that the value of `hrStorageUsed` is above the **High Value** threshold. (This is the value that triggered the State change.)



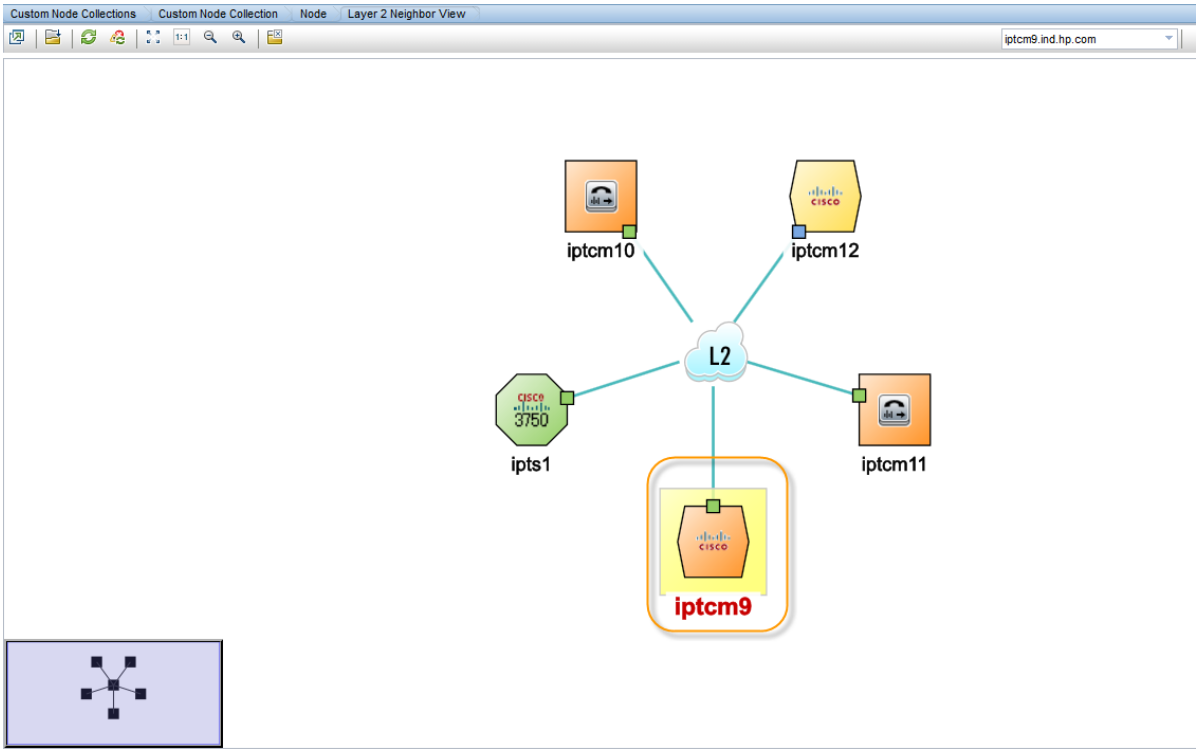
3. Navigate to the Incidents tab to see that an incident was generated.
   The Incident message presents the various names used in creating the Custom Poller Collection. You can change this message by editing the Incident Configuration.



4. To view the listing of possible Custom Attributes, open a Custom Poller incident and select the **Custom Attributes** tab.

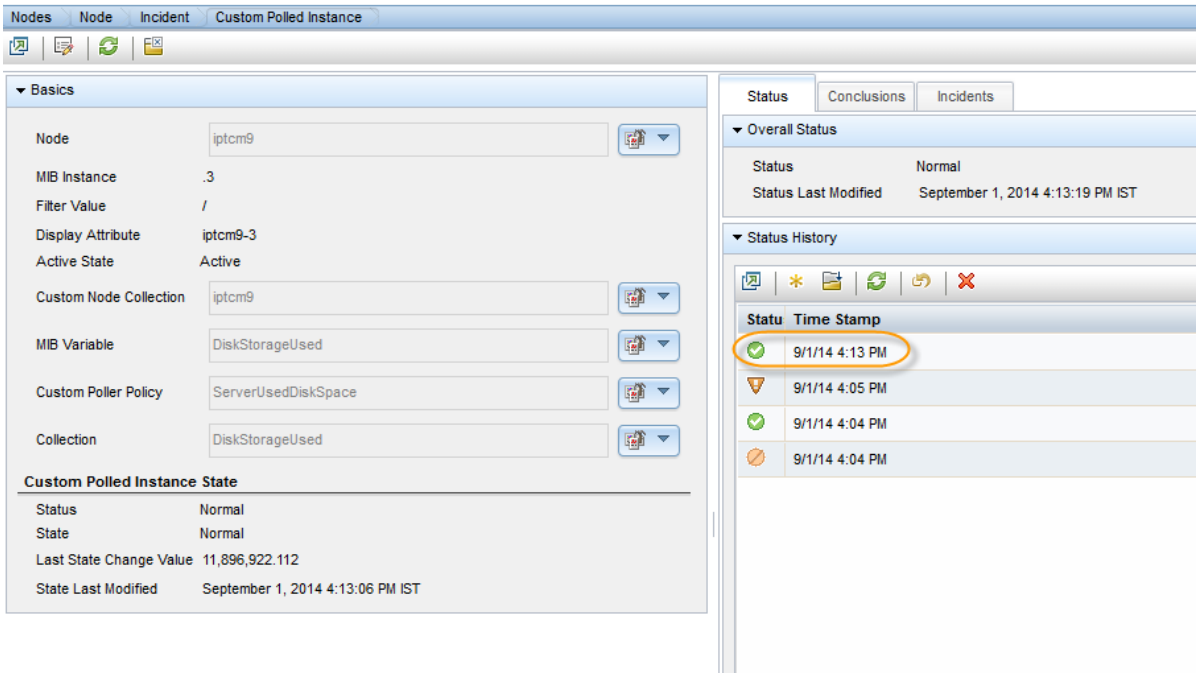


5. For example, to display the most recent value that caused the Custom Node Collection Status to change, you might want to include the Custom Attribute **cia.custompoller.lastValue** in your message.
6. To verify that the Status of the Source Node has changed to Major, open the Source Node or select a Node View or Map.

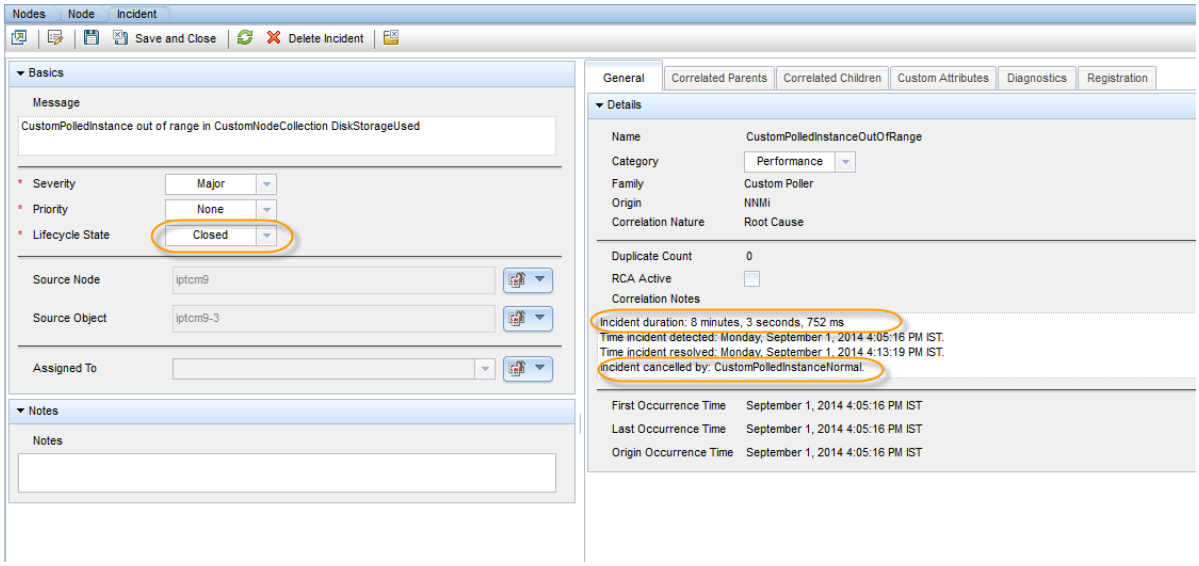


After you verify that the Custom Poll is successful and NNMi properly indicates that the disk space is Major, return the disk to its previous State.

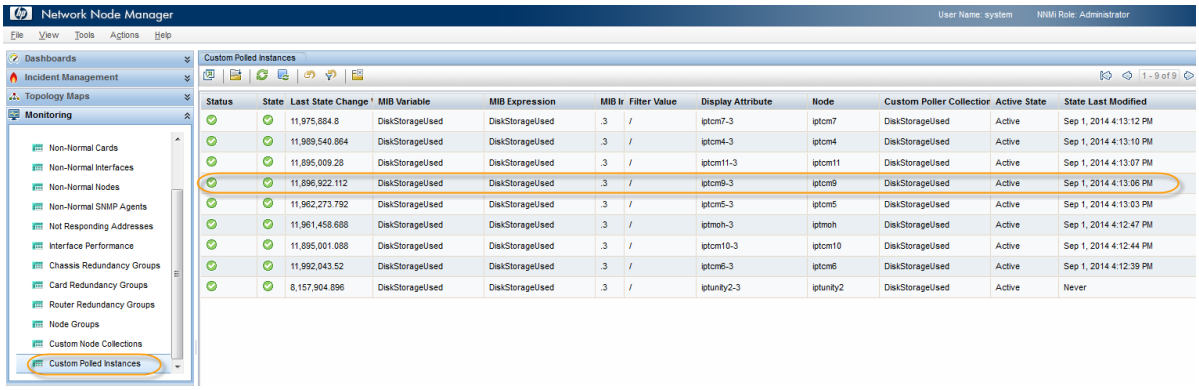
7. Delete the large file from the Server.
Verify the Custom Node Collection's Status has returned to Normal, by opening the Custom Node Collection form and navigating to the **Status** tab.



8. Verify that the incident has been closed by returning to the Incident form for the generated incident.



9. Return to the Custom Polled Instances view to verify the value of the MIB Poll Variable is below the **High State** threshold.

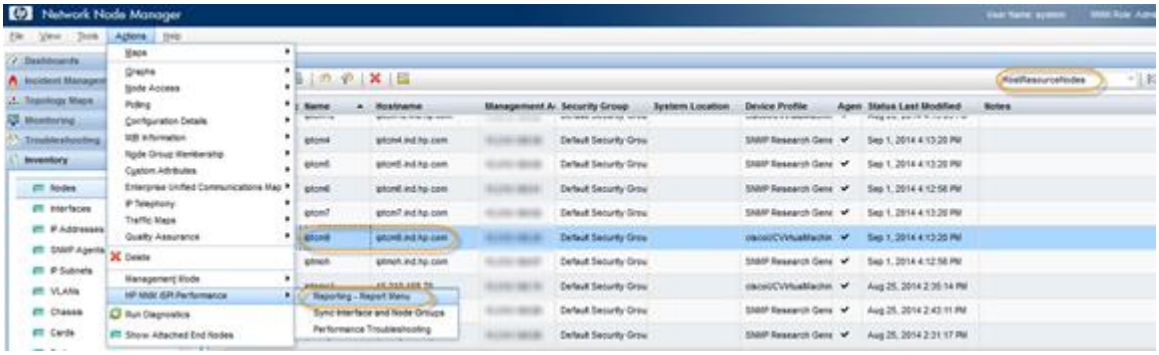


10. After completing your initial testing, set the poll rate back to the desired value; for example, 5 minutes.

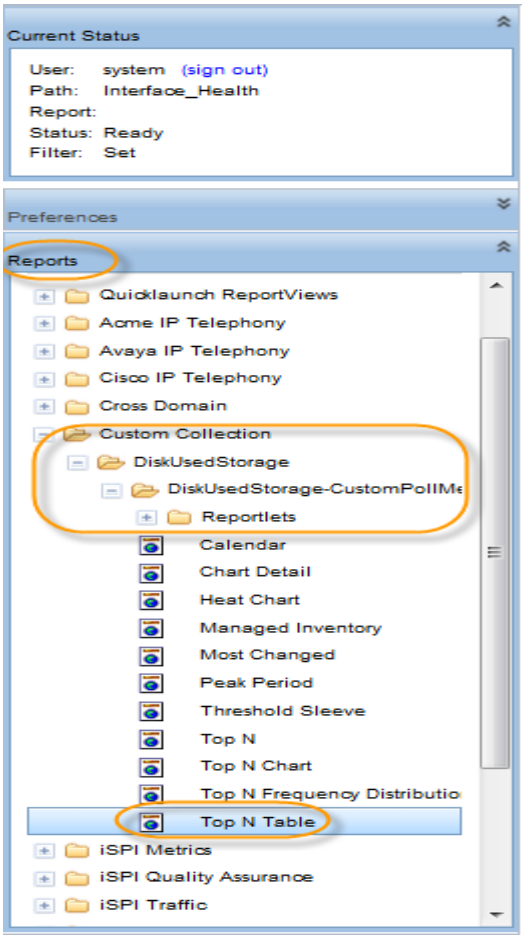
Step 5: View the custom collection(s) as Reports

To ensure that the exported collections are showing up in the iSPI Performance for Metrics Reports, do the following:

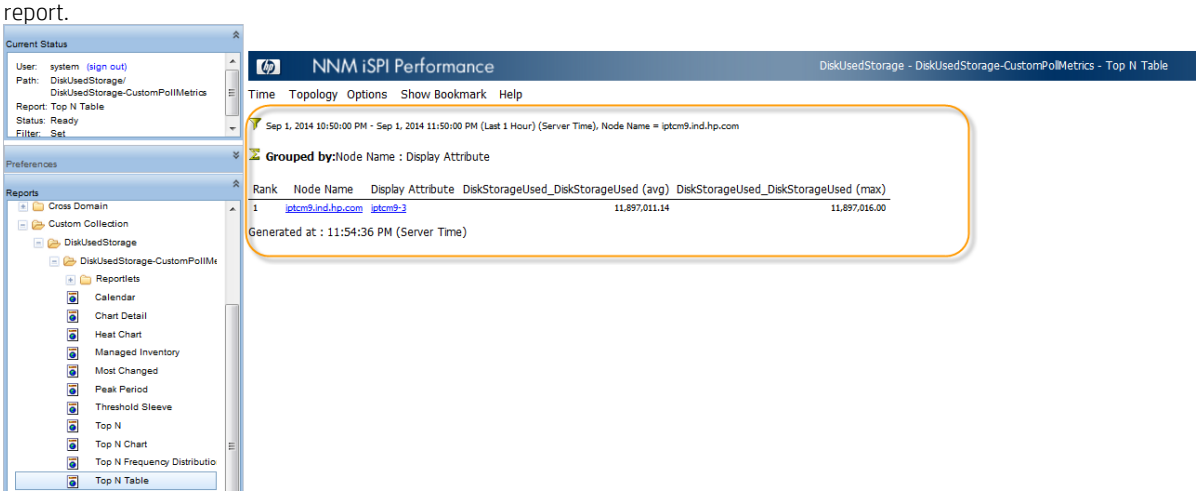
1. Select one of the Servers from node group **HostResourceNodes**
2. Click **Action > HP NNM iSPI Performance > Reporting – Report Menu**



3. You can see a new item `DiskUsedStorage` in the Reporting Tree.



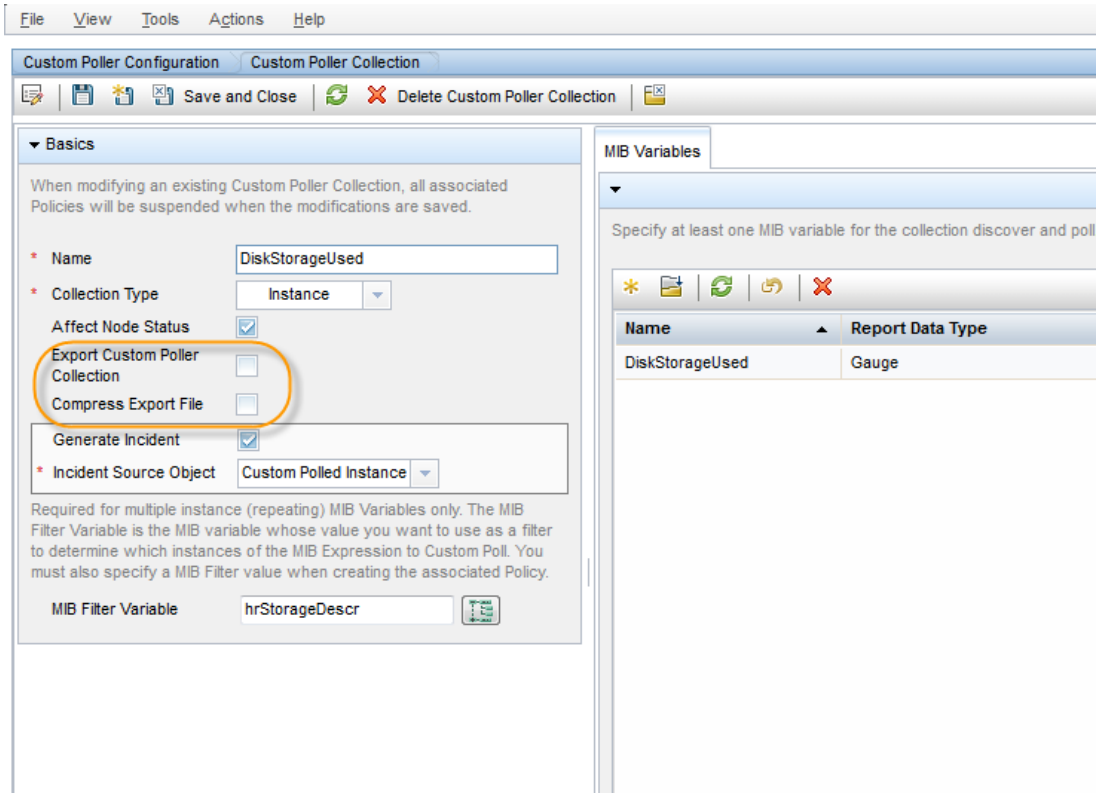
4. Select a desired template (Top N Table in this example) and launch the report by selecting the right dimensions for the report.



Export the Custom Poller Collection

NNMi enables you to store all the Custom Poller samples to a Command Separated Values (CSV) file.

To enable this feature, check to enable Export Custom Poller Collection. This causes NNMi to generate CSV files for each collection. One can compress the exported CSV files by enabling Compress Export File.



Note: The exported CSV file contains all samples, not just the samples that trigger a state change.

If the Export Custom Poller Collection attribute is enabled, NNMi exports the Custom Poller Collection to a comma-separated values (CSV) file that is written to the following directory (Periodic clean-up of this directory is recommended once the CSV files are consumed to avoid higher disk space utilization):

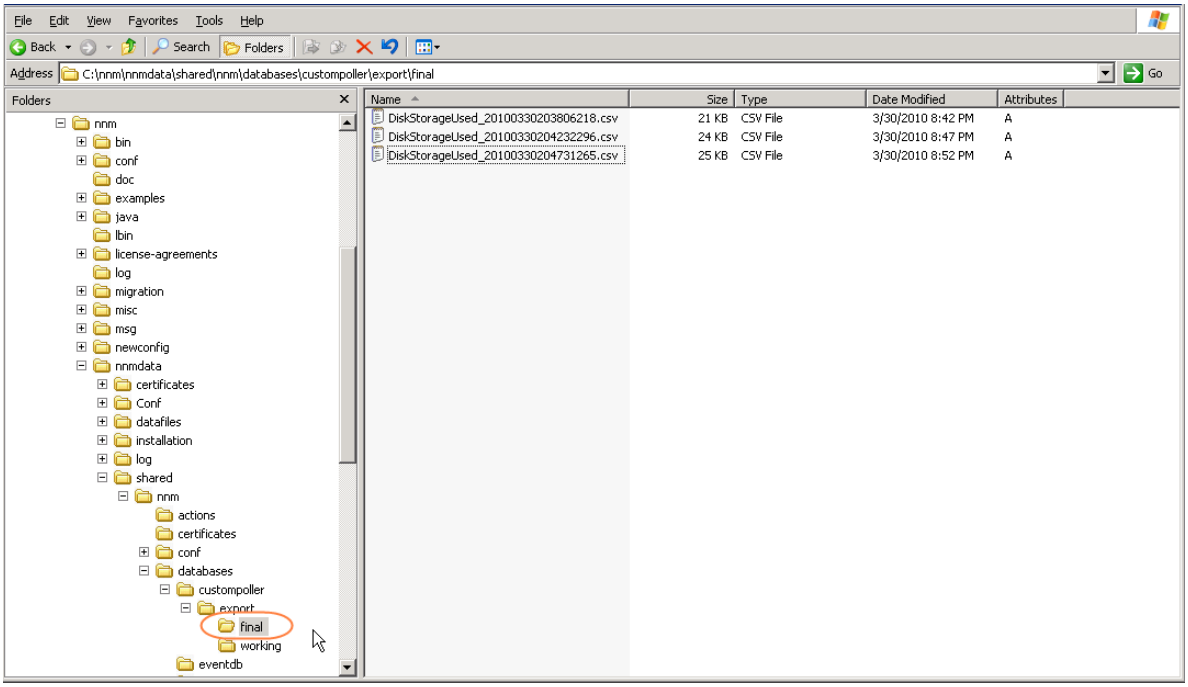
- Windows:

  %NnmDataDir%\shared\nnm\databases\custompoller\export\final

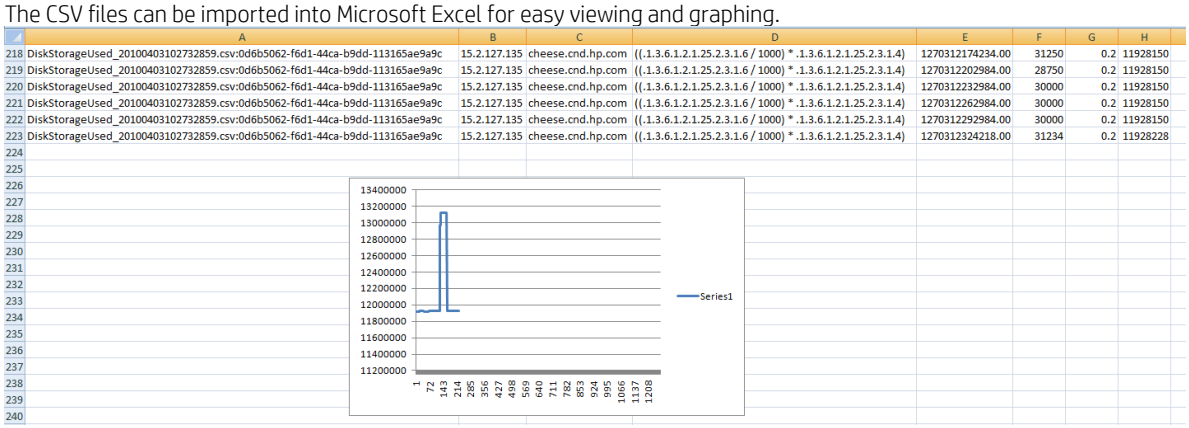
- Linux:

  $NnmDataDir/shared/nnm/databases/custompoller/export/final

NOTE: Note that these flags are NOT required for exporting a custom collection as a Report Group in the iSPI Performance for Metrics (NPS). One must use these flags only if there is any third-party application or any other reason for analyzing the custom collected data.



The CSV files can be imported into Microsoft Excel for easy viewing and graphing.



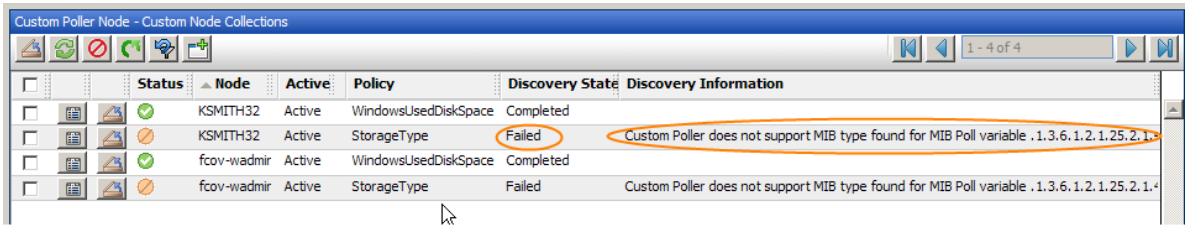
Troubleshooting Tips

NNMi provides feedback on common errors. This section describes some common types of feedback.

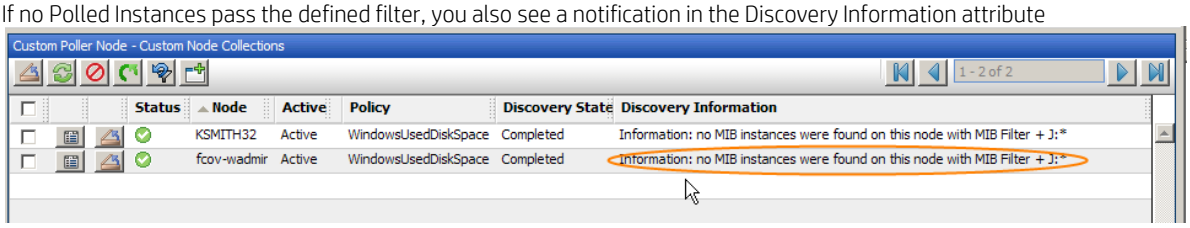
For Custom Poller Collections, NNMi supports queries of the following types (as defined in the MIB). Watch for possible aliases on the types.

Supported MIB Poll Variable Type	Supported MIB Filter Variable Type
INTEGER, Integer32	INTEGER, Integer32
Unsigned32	Unsigned32
Counter, Counter32, Counter64	Gauge, Gauge32
Gauge, Gauge32	OCTET STRING
TimeTicks	IpAddress
OCTET STRING	

If you set up a Custom Poller Collection using a MIB Poll Variable or MIB Filter Variable of an unsupported type, NNMi displays an error in the Discovery State. NNMi also provides some additional information about the failure in the Discovery Information attribute.



If no Polled Instances pass the defined filter, you also see a notification in the Discovery Information attribute



Custom Poller log messages can be found in the `nnm.*.log` and `nnm-trace.*.log` files.

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