**Technical white paper**

**HP Network Node Manager i Software 10.00**

**Step-by-Step Guide to Custom Poller**

**Table of Contents**

Setting Up Your MIB .................................................................................................................................................. 2  
  Step 1: Identify the MIB Variable You Want to Poll ................................................................................................. 2  
  Step 2: Ensure the MIB Includes Supported Types ..................................................................................................... 2  
  Step 3: Load the Required MIB ................................................................................................................................... 3  
  Step 4: Use the MIB Browser to View Current MIB Variable Values ........................................................................... 4  

Setting Up a Custom Poll ............................................................................................................................................. 5  
  Step 1: Enable Custom Poller ...................................................................................................................................... 5  
  Step 2: Create a Custom Poller Collection .................................................................................................................... 6  
  Step 3: Create a Policy for a Custom Poller Collection .................................................................................................. 12  
  Step 4: Create a Report Group for Custom Collection(s) .............................................................................................. 14  

View the Results of Your Custom Poll .......................................................................................................................... 15  
  Step 1: View the Node Collections Associated with Custom Poller Policies ................................................................. 15  
  Step 2: View the Details of a Custom Node Collection .................................................................................................. 16  
  Step 3: View Details of a Polled Instance ....................................................................................................................... 16  
  Step 4: Evaluate the Results of the Custom Poll ........................................................................................................... 17  
  Step 5: View the custom collection(s) as Reports ......................................................................................................... 20  

Export the Custom Poller Collection ............................................................................................................................. 21  

Troubleshooting Tips ..................................................................................................................................................... 23
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\NNMI
- 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
```
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 nmmloadmib.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.

   ![Network Node Manager Interface](image)

   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

   ![Expanded MIB Browser](image)

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.
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:

\[
((\text{hrStorageSize} / 1000) \times \text{hrStorageAllocationUnits})
\]

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 define 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.

![Image of technical whitepaper content]

**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.

![Image of technical whitepaper content]

**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.)

![Image of technical whitepaper content]

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.

![Image of technical whitepaper content]
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.

<table>
<thead>
<tr>
<th>Supported MIB Poll Variable Type</th>
<th>Supported MIB Filter Variable Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTEGER, Integer32</td>
<td>INTEGER, Integer32</td>
</tr>
<tr>
<td>Unsigned32</td>
<td>Unsigned32</td>
</tr>
<tr>
<td>Counter, Counter32, Counter64</td>
<td>Gauge, Gauge32</td>
</tr>
<tr>
<td>Gauge, Gauge32</td>
<td>OCTET STRING</td>
</tr>
<tr>
<td>TimeTicks</td>
<td>IpAddress</td>
</tr>
<tr>
<td>OCTET STRING</td>
<td></td>
</tr>
</tbody>
</table>
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 nnn.*.log and nnn-trace.*.log files.
Legal Notices

Warranty

The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein. The information contained herein is subject to change without notice.

Restricted Rights Legend

Confidential computer software. Valid license from HP required for possession, use or copying. Consistent with FAR 12.211 and 12.212, Commercial Computer Software, Computer Software Documentation, and Technical Data for Commercial Items are licensed to the U.S. Government under vendor's standard commercial license.

Copyright Notices

© Copyright 2009–2014 Hewlett-Packard Development Company, L.P.

Trademark Notices

Adobe® is a trademark of Adobe Systems Incorporated. Apple and Safari are trademarks of Apple Inc. registered in the US and other countries. Microsoft® and Windows® are U.S. registered trademarks of Microsoft Corporation. Oracle and Java are registered trademarks of Oracle and/or its affiliates.

Oracle Technology — Notice of Restricted Rights

Programs delivered subject to the DOD FAR Supplement are 'commercial computer software' and use, duplication, and disclosure of the programs, including documentation, shall be subject to the licensing restrictions set forth in the applicable Oracle license agreement. Otherwise, programs delivered subject to the Federal Acquisition Regulations are 'restricted computer software' and use, duplication, and disclosure of the programs, including documentation, shall be subject to the restrictions in FAR 52.227-19, Commercial Computer Software-Restricted Rights (June 1987). Oracle America, Inc., 500 Oracle Parkway, Redwood City, CA 94065. For the full Oracle license text, see the license-agreements directory on the NNMi product DVD.

Acknowledgements

This product includes software developed by the Apache Software Foundation. (http://www.apache.org)
This product includes software developed by the Indiana University Extreme! Lab. (http://www.extreme.indiana.edu)

Support

Visit the HP Software Support web site at:

www.hp.com/go/hpsoftwaresupport

This web site provides contact information and details about the products, services, and support that HP Software offers. HP Software online support provides customer self-solve capabilities. It provides a fast and efficient way to access interactive technical support tools needed to manage your business. As a valued support customer, you can benefit by using the support web site to:

- Search for knowledge documents of interest
- Submit and track support cases and enhancement requests
- Download software patches
- Manage support contracts
- Look up HP support contacts
- Review information about available services
- Enter into discussions with other software customers
- Research and register for software training

Most of the support areas require that you register as an HP Passport user and sign in. Many also require a support contract. To register for an HP Passport ID, go to:

http://h20229.www2.hp.com/passport-registration.html

To find more information about access levels, go to:

http://h20230.www2.hp.com/new_access_levels.jsp
We appreciate your feedback!

If you have comments about this document, you can contact the documentation team by email. If an email client is configured on this system, click the link above and an email window opens with the following information in the subject line: Feedback on White Paper (Network Node Manager i Software 10.00)

Just add your feedback to the email and click send. If no email client is available, copy the information above to a new message in a web mail client, and send your feedback to docfeedback@hp.com.