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Introduction

The ManageEngine MibBrowser is a complete SNMP MibBrowser that can be used to provide MIB Browsing and related functions to users. SNMP MibBrowsers allow the user to view and operate on data available through an SNMP agent on a managed device, e.g. a router.

Features of ManageEngine MibBrowser :

1. Load and view MIB modules in a MIB tree.
2. SNMP operations like GET and GETNEXT can be performed by right clicking each node of the MIB tree. Definition of each node for a particular object can also be viewed.
3. Enables to perform the basic SNMP operations such as GET, GETNEXT, GETBULK and SET.
4. Display the output of any snmp operations in a tabular fashion with oid and value as columns.
5. upports multi-varbind requests.
6. Enables real-time plotting of SNMP data in a graph. Line graph and bar graph are the two types of graphs that are currently supported.
7. Provides a user-friendly view of SNMP table data. The table data can be viewed in a separate window called SNMP Table UI.
8. Enables to view the incoming traps using Trap Viewer. It also allows parsing of traps.
9. Enables loading of MIBs at startup.

In order to enable a better view of the data available on the SNMP agent a MIB file is usually provided with the managed device. This MIB file contains a description of the object hierarchy on the managed device, as well as the syntax and access privileges for each variable in the MIB. The ManageEngine MibBrowser provides the capability to load and view multiple MIB modules and traverse the MIB tree to look at the definitions for each MIB tree.

It allows "GET", "GETNEXT" and "SET" SNMP requests to a particular variable in the MIB of an SNMP managed device. It also has the capability to view multiple real-time graphs of data on the managed device as it changes over time. It also enables viewing SNMP tables.

Overview

The primary window of the ManageEngine MibBrowser is made up of two frames. The left frame is the MIB Tree in which the MIB files are loaded and the right frame is for setting options and for the result dispaly. The right frame includes fields for

- SNMP agent name or address (Host),
- community name,
- writeCommunity value used for a set request
- The current Node OID that's being operated upon the current MIB module
- context name and context engine ID fields for SNMPV3 request
- A text area to view query results.

Depending on the option selected in the menu bar the following is also visible:

- A checkbox to select multiple request,
- A list to add and delete the varbinds
- Buttons to add and delete the varbinds from the list.

User can show/hide the Toolbar, Mib Description panel, Muti varbind panel and Result display panel.

System Requirements

Hardware

- Minimum 733 MHz Pentium Processor
- Memory: Minimum 256MB RAM
- Disk Space: Minimum 70 MB

Software

- JRE - JRE 1.5 is bundled with the ManageEngine MibBrowser Free Tool package. It is bundled with the EXE for windows.

The following requirements are optional.

- For security and privacy features of SNMPv3, any one of the following products has to be downloaded and used:
  - Cryptix 3.x.x security package available at http://www.cryptix.org.
  - JCE 1.2 (Java Cryptography Extension) Framework available from http://java.sun.com/products/jce. However, Sun JCE comes bundled since JRE 1.4 and higher.

Loading and Unloading MIB's

To load the MIB files in the MibBrowser use the LOAD MIB image button or select the File--> Load MIB menu item. This brings up a dialog box, which prompts you for the URL of the MIB module file you wish to load.

You can load multiple modules and choose any one of them as the current module at any time. When any MIB module is selected, the root node for that module becomes the current OID.

The loading of MIB modules is via URLs. A few MIB modules are provided in the mibs directory, i.e. RFC1213-MIB, HOST-RESOURCE-MIB, SNMPv2-MIB and SNMPv2-SMI. It may be convenient to copy your MIB module files to be loaded into the "mibs" directory.

To unload the loaded MIB select the node of the MIB Tree then click on the UNLOAD MIB image button or select the File --> UnLoad MIB menu item. This will remove the MIB Tree of the MIB unloaded.

Settings

The ManageEngine MibBrowser can be used for MIB browsing, viewing and operate on data available through a SNMP agent. The MibBrowser allows configuration of various options needed for SNMP operations.

To set the various options click on the SETTINGS image button or select the Edit--> Settings menu item. This will bring up a dialog where the following options and its default values are set. The user can modify the default values as per requirements.

Options	Default values	Other options
Snmp Version	V1	V2 / V2c / V3
Snmp port	161	any user defined port
Time out	5 sec	any user defined value
Max repetitions	50	any user defined value for V2c /V3 version
Retries	0	any user defined value
Non-repeaters	0	any user defined value for V2c /V3 version

Options	Default values	Other options
Target host	local host	any host with SNMPV3 agent or proxy agent
Target port	161	any user defined port
User name	null	any user defined value
Security Level	NoAuth,NoPriv	Auth,NoPriv and Auth,Priv
Privacy Protocol	CBC-DES (if privacy is chosen in security level)	not available
Authentication Protocol	MD5 (if authentication is chosen in security level)	SHA
Authentication password	any user defined value	-
Privacy password	any user defined value	-

To set the SNMP V3 parameters click on the V3 SETTINGS tab in the settings dialog box. This will switch to the the screen for setting V3 Parameters. The following values can be set:

In the genral settings tab there is an option provided to enable serialization of V3 details. If this is chosen, then the users added will be serialized in the files UserEntry.ser and EngineEntry.ser. The next time when the MibBrowser is started, v3 details will be deserialized if the serialize V3 Tables is set to true.

SNMP Operations

The MibBrowser allows the user to do the typical SNMP operations such as GET, GET NEXT and SET. It also allows to perform GET BULK for V2 and V3 version.

To do the GET operation, the user has to load the MIB file, select the desired node and press the "get" icon or choose the Operations ---> Get from the menu bar. To fully specify an object to an SNMP agent, both the Object ID (which defines the type of object) and the instance (the specific object of the given type) need to be provided. From the MIB you get the Object ID, to which an instance needs to be added to completely identify the object of interest. For non-tabular (or scalar) objects this is simply an instance of 0 (e.g. sysDescr.0)(this need not be specified). For tabular objects the instance is defined by the MIB, and is a sequence of one or more variables.

We also need to specify the hostname and community string of the SNMP agent you're talking to in the appropriate field.

If you want to talk to a V3 agent, then you have to choose the Version3 in the Settings dialog and also make sure that the v3 parameters are set in V3 Settings Dialog .

Multi-Varbind Request

Select the Multi-Varbind menu item from the View menu to view the Multi varbind panel. To do a multiple varbind request select the leaf node and append the instance and click on the Add button. It will add the OID given in the Object Identifier field and theValue given in the SetValue field both separated with a colon to the list. If value is not given in the SetValue field then NULL value is appended. You can add multiple number of OIDs and values like this. Make sure you have enabled the Multi-var check-box before doing a SNMP operation for multiple varbind SNMP request. Otherwise it will do a request for the OID in the Object Identifier field. To do multiple variable SNMP SET you ensure the OID and the Value are given in the textfields properly before adding to the list. Enable the Multi-Var check-box before doing the multiple variable SET.

To delete the varbind(s) from the list. Select the varbind(s) from the list and click on the Delete button to delete the varbind(s) from the list.

To Edit the varbinds added in the list select a varbind and click on the Edit button. It will show an OID and the Value of the varbind in the TextFields to edit the OID and the Value. Edit it and press OK button to modify the OID and Value or press the Cancel button to restore the old values.

- To do a GET operation click on the GET image button or select Get menu item.This will get all objects under the selected MIB object, or the specific object if the MIB node and instance are specified.
- To do a GETNEXT operation click on the GETNEXT image button or select GetNext menu item. This will get the next object after the specified object, or the specific object instance if a MIB node is specified.
- To do a GETBULK operation click on the GETBULK image button or select GetBulk menu item. This will get a sequence of Next Objects immediately after the specified object. The number of Object instances returned is equal to the Max-Repetitions field.
- To do a SET operation click on the SET image button or select Set menu item. This enables setting the value of the specified object, based on the value in the Set Value field. To do a SET for Octet String Type in hex format enter the bytes in hex format with each bytes separated by a colon and the entire string within single quotes. For example to give 0xff0a3212 enter 'ff:0a:32:12' in the SetValue field.

Trap Browser

TrapBrowser is used for receiving the traps. Using this you can view the incoming traps to the specified port. The traps can be sent from any host. The port number and the community name has to be set in the Trap Browser. The trap originator should send the trap to the port no specified in the Trap Browser.

The Trap Browser displays the trap information in a table format.

The trap browser has the following four columns:

- Class - displays the severity information of the received traps (eg - Info, critical, warning etc)
- Source - source from which the trap originated
- Date - the time stamp of the received trap (date and time)
- Message - the received trap message

All the received traps are displayed in rows. Clicking on any of the column headings pops up a dialog box which contains more additional information on the received trap. Right-clicking on the any of the column headings pops up a menu "Delete the selected Rows", which can be used to delete any of the selected rows. Clicking on the ParserEditor opens up a TrapParser which is used to parse the trap events.

Trap Parser

The configuration of the Trap Parsers can be done by the below steps:

- Create a empty file by the name trap.parser in the MibBrowser directory.
- Load the file in the trap parser by clicking the browse button in the "Load Traps From file" field.
- Configure the trap parser.
- The new trap to be added should not be in the same name of traps already existing in the trap list.
- If the MIB file loaded in the MibBrowser has traps specified in it, then the traps are loaded automatically in the trap list.

The trap parser is used to configure and parse the trap events. Since Traps typically contain cryptic information not easily understandable to the users, trap parsers are required to translate or parse traps into understandable information.

Trap Parsers files

Parsing traps is achieved by configuring a list of trap parser files. Only one trap parser file can be applied to a given trap. The match criteria in a parser determines whether a specific trap matches a trap parser. The search for matching trap parsers is done from the trap parsers list starting at the top. Once a matching trap parser is found, an event is generated and no other trap parsers will be used on that trap.

Match Criteria

The match criteria determines whether the trap will be parsed by the given trap parser. All fields must match for the trap parser to be applied to a trap.

The three fields are:

Enterprise Field

The enterprise field is the SNMP enterprise identifier in the trap, which is used to uniquely identify traps for a particular application. If you specify this field, the parser will only be applied if the trap enterprise field starts with the enterprise field you specify. The only exception is when the enterprise field is left blank, in which case the trap will be allowed to be parsed.

Generic Type

Each trap should specify one among the following:

- Coldstart
- Warmstart
- Linkdown
- Linkup
- Authenticationfailure
- Egpneighborloss
- enterprisespecific

Specific Type

Each trap has a specific type number. This number must be specified for the trap parser, and only when this matches, the trap parser be applied to a trap. The only exception is when the specific field is left blank or filled with negative value , in which case the trap will be allowed to be parsed

Setting Trap Parser Parameters

The following are some important fields and information on how to configure them for a given trap.

- name: The name of the parser
- severity: This is used to specify the state of an event, which determines the severity shown in the ListTraps.This severity determines how a fault may be affected by this event. Any one of the following needs to be assigned.
    - All
    - Critical
    - Major
    - Minor
    - Warning
    - Clear
    - Info , by default info will be assigned.
- textDefn: This is the message text seen for this event in the ListTraps and logs.
- categoryDefn:This is a type of the trap that can be used to categorize trap events.
- nodeDefn: This enables using a node value for the event .
- networkDefn, domainDefn, sourceDefn: These are all typically the source system for a given event.
- helpDefn: The associated document for this trap
- ST: This is the specific type of the trap.
- GT: This is the generic type of the trap.
- enterprise: This is the enterprise oid of the trap.

Trap Parser Customization

In Trap Parser the match criteria can also be customized to parse based on an oid and value or the agent Adress and port number. For example to parse the oid and value:

- Enter the OID and value in the respective field.
- Press Add of the OID lists.
- Parse the agent address and port address by doing the following steps:
    - Enter the ip address and the port number in the respective fields.
    - Press Add to add to the agent list.
      Note : The agent port if zero, will accept all the ports.
- Enter the generic -type and specific -type and enterprise oid if necessary.
- If the above fields are not required to be matched then:
    - generic-type will be "-"
    - specific -type will be 0
    - enterprise oid field will be blank
- Add the trap parser setting in to the Trap Parser list as above. After configuring the parser settings, store the configurations in a file, using the Save option.
- Run the Trap Browser.

Table

The ManageEngine MibBrowser provides an user-friendly of viewing SNMP Table data. The table data can be viewed in a separate window called SNMP Table Panel. The SNMP Table Panel provides various options for table handling such as adding a row to the existing table, viewing graphs, index editor etc.

The following steps should be taken to view the SNMP table in the SNMP Table Panel:

- specify the proper agent hostname or IP address in the host field of the MibBrowser.
- load the MIB in the MibBrowser
- specify a valid OID - the OID needs to be a Table OID
- the OID can be chosen by browsing the MIB in the MibTree

To view the SNMP Table click on the SNMP TABLE image button or select Snmp Table menu item . This brings up an SnmpTable if the selected OID is a table. In the SnmpTable, clicking on the "Start" button will start getting the columnar objects.

The following options are available in the SNMP Table Panel of the MibBrowser:

- Page - it has two options - origin and index. If the option origin is enabled the table retrieval is done from the origin. If the index is enabled, the user can set a index value in the adjacent text field from which the table will be retrieved.
- Host - the host name can be specified here. The value set here overrides the host name set in the MibBrowser settings dialog box.
- Settings - clicking on this pops up another dialog box where the following options can be set
    - Polling Interval - sets the polling interval for the retrieval of the tables. By default it is 5 secs.
    - Page Size (Rows) - sets the number of rows to be retrieved.
    - No of Column View - sets the number of columns to be displayed in the SNMP Table Panel. Default is 5 columns.
    - Port No - sets the port number to which the request is made.
    - SNMP version - allows to select the desired versions of the SNMP.

- o Retrieval Mode - sets the mode of retrieval for fetching the SNMP tables. By default it is by GET NEXT.
  - o Start - the start button starts the retrieval of the table.
- Next, Prev - the next and previous is used to navigate the pages (rows) of the table.
- StartPolling - this is used to start the polling of the table. Based on the polling interval value set in the settings option, it will retrieve the table periodically.
- StopPolling - this will stop the polling.
- Refresh - this is used to refresh the table periodically. This is useful when the polling option is not used.
- Add - the Add option is used to add a row to the table. Selecting this pops up another window through which the table values can be added.
- Delete - the delete option is used to delete a row from the table
- Graph - the graph option pops up the graph window and starts plotting the selected variable.
- Augmented table - selecting this option replaces the existing table data with the augmented table data.
- Index Editor - this is used to edit and set the index value of the table.

Apart from the above options if we right click on the table header (where the column name is displayed) it will display a menu with options

- edit the header name of the selected column
- view Graph for selected cells
- add a new row to the table
- delete the selected rows from the table
- view the not-accessible index

The above options also can be made use of.

Set Operation using SNMP Table Panel

Using SNMP table, the SET operation for the table variables becomes easier. To set values for the table variables the following steps needs to be followed:

For creating a new row in a table

- In your MIB Module include a table with RowStatus object defined.
- Define a column in the table with SYNTAX RowStatus .
- Load the MIB Module in the MibBrowser
  Select the table node from the tree and the table button from the toolbar. It will display the corresponding table
- Right click on the table header (where the name of the column is displayed) it will display a menu with options
  - o view Graph for selected rows
  - o add a new row to the table
  - o delete the selected rows from the table
- Select add a new row to the table. It will display a window for entering the values of the table
- The value for the column with RowStatus syntax should be 4 for creating a new row
- Click ok after entering all the values

If the RowStatus is not present in the table definition then you can only modify the existing row by double clicking the corresponding cell in the table.

Graphs

The ManageEngine MibBrowser enables real-time plotting of SNMP data in a graph. Currently two types of graph are supported - line graph and bar graph. The SNMP data to be polled should be of integer or unsigned integer data type. Typically the values that are plotted will be of type Counter, Gauge or Timeticks.

The following steps should be taken for plotting the SNMP data in the graph:

- specify the proper agent hostname or IP address.
- specify a valid variable - the variable needs to be an integer or unsigned integer (Counter, Gauge or Timeticks)
- include the specific instance of the variable

After selecting the variable from the MibTree, click on the GRAPH image button or select the menu item Line Graph or Bar Graph from the View menu. This brings up an automatically updated graph showing the results of periodically polling the specified agent for the specified OID. By default polling for the graph is done every 5 seconds.

The following options can be configured for the graph:

- Polling Interval - default value is 5 secs - editable, can be given any value.
- Average over Interval - if selected, takes the average of the values otherwise plots the actual value.
- X axis scale - allows to set the X axis scale, the minimum is 300 secs .
- Show Absolute Time - if selected, shows the time in hrs:secs otherwise in seconds.
- Max X value - allows to set the maximum time the graph can plot. The default maximum value is 3600 secs.
- Show Polled Values - if selected, enables to see all the polled values in a particular time period. By default it is disabled.
- Log File Name - the file name for the log file can be set here. By default the log file name is graph.txt. If the adjacent "Log Polled Values" is selected all th epolled values are logged in this file.
- Log Polled Values - if selected, logs the polled values. By default it is disabled.

The "Stop" button can be used to stop the polling of the variable. The "Restart" button can be used to restart the polling. The "Close" button is used to close the graph window.

The MibBrowser can plot multiple graphs showing values for different variables from different hosts . Note that the graphs does not plot the absolute value but only the difference between two values.

Debugging and decoding

The MibBrowser application provides facility to view the debug output of the SNMP operations. To view the debug output the debug window has to be invoked by clicking on the debug icon or by selecting the View --> Debug menu from the menu bar.

As long as this window is opened, debugging is turned on, and debugging output is generated. When this window is closed the debugging is turned off.

The three icons in the debug window provide the following function:

- save - save the debug information to a file
- print - print the debug information to a file
- decoder - decodes the debug information

Decoding

The decoder is used to decode the SNMP debug messages . The decoding can be done in the following ways :

Method - I

- Click on the decoder icon
- Copy the debug information into the "HEX PDU" text area.
- Click on the decode button
- In the bottom panel the decoded message will be displayed

Method - II

- Click on the decoder icon
- Load the file which contains the debug information
- Click on the decode button
- In the bottom panel the decoded message will be displayed

In both the cases the decode information should only contain the HEX dumps and nothing else. Any other information has to be removed manually.