Monitor Extreme Management Center Server Health

The following sections provide detailed information on how to use specific Extreme Management Center reports and Management Center features to monitor your Management Center Server's health. These reports provide you with the information you need to monitor, analyze, and troubleshoot Management Center server problems.

Track Extreme Management Center Server CPU/Memory Trends

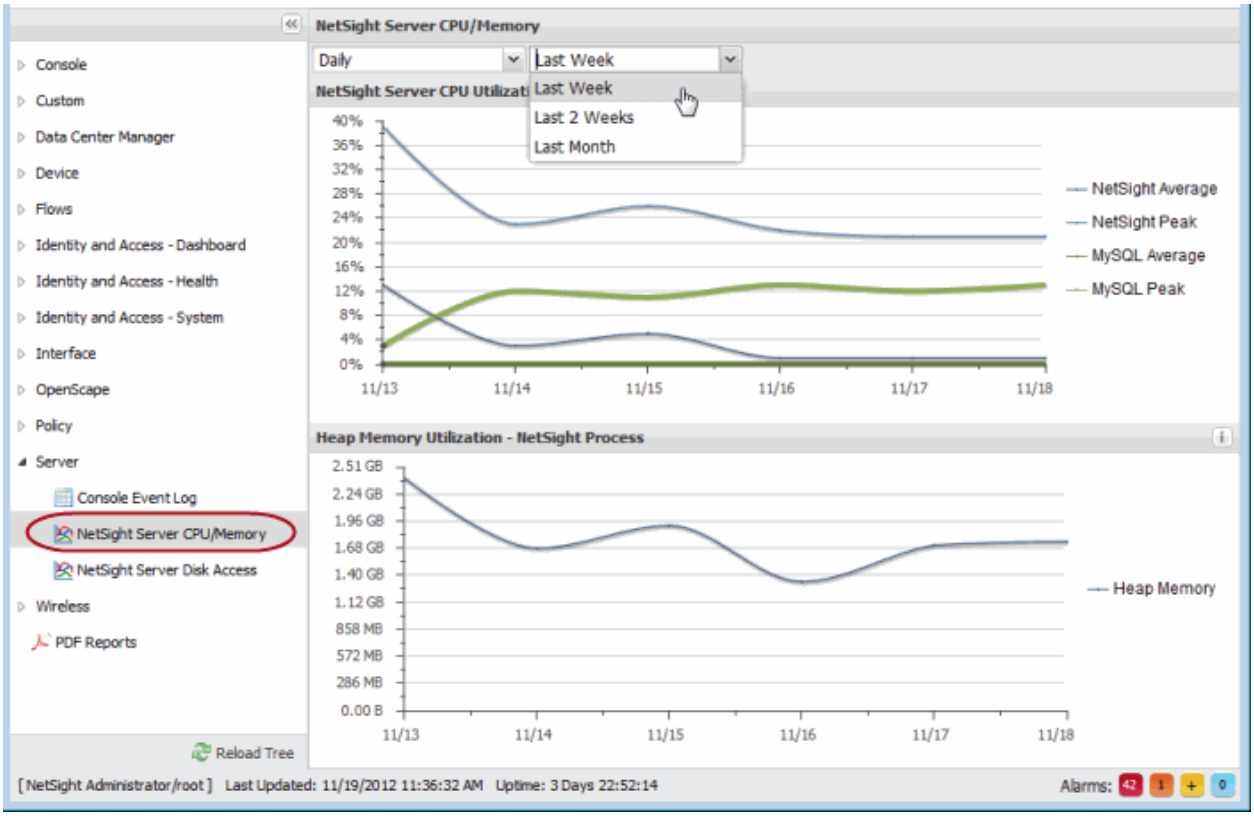
The Extreme Management Center report on Management Center Server CPU/Memory utilization provides trending information on server performance over a period of time. Use this information to establish a baseline and identify changes in the system.

Knowing the system's normal operating behavior makes it easier to identify when the server's behavior deviates from the norm and when exactly the change occurred. It also makes it easier to identify whether the deviation corresponds to a recent change on the system or network.

If a change in CPU/memory usage is identified, real-time CPU and memory data can be used to further investigate which specific processes are consuming system resources. For more information, see the Management Center Server Real-Time CPU and Memory Usage section under Management Center Troubleshooting.

To access the Management Center Server CPU/Memory report, launch Management Center and select the **Reports** tab. Expand the Server folder and select the report, as shown below.

Management Center Server CPU/Memory

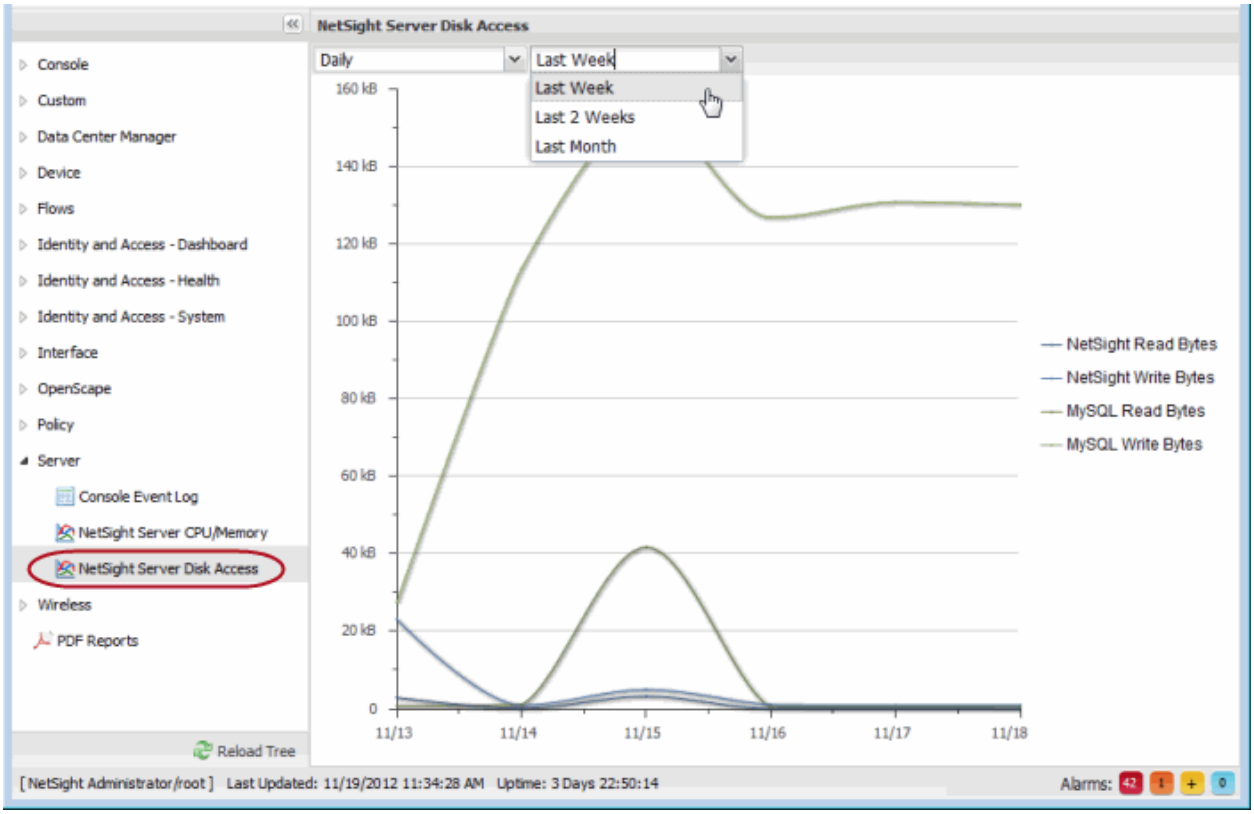


Monitor Extreme Management Center Server Disk Access

The Extreme Management Center Server Disk Access report provides information about disk activity levels on the server. Consistently heavy disk activity causes server performance issues and requires further investigation. Use this report to track read and write operations for both the Management Center server and the mySQL database.

To access the Management Center Server Disk Access report, launch Management Center and select the Reports tab. Expand the Server folder and select the report, as shown below.

Management Center Server Disk Access Report



Monitor Server and Database Connectivity

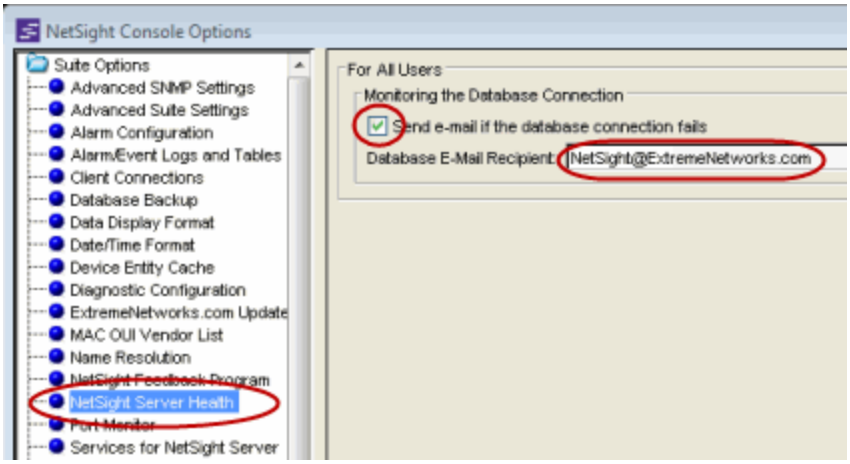
The Management Center server has a built-in mechanism that issues an alert in the event the server is unable to communicate with the database. This alert can be configured to trigger an email notification to be sent to a defined email address, so that network administrators can be alerted to the problem in a timely manner.

It is important to configure this email notification, because the Management Center server is central for monitoring, alerting, and diagnosing problems that may arise on the network.

NOTE: In the event communication between the server and database is lost, refer to the Management Center server.log (see Accessing the Server Log File) for troubleshooting information, as well as other troubleshooting tools that diagnose server CPU, memory, and current disk utilization (see Management Center Troubleshooting for more information).

Use the Management Center Suite options to configure the email notification. From any Management Center application, select Tools > Options from the menu bar. Expand the Suite Options folder and select Management Center Server Health. Select the **Send email** checkbox and enter an email address that will be notified in the event of a database failure.

Management Center Server Health Options



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Extreme Management Center Performance Tuning

The following sections provide detailed information on how to use specific Extreme Management Center tools and features to monitor and improve Management Center server performance.

Tuning NetFlow Collection Settings

NetFlow is a data collection protocol that provides details and analysis of protocol information derived from monitoring flow-based traffic as it traverses a network. K-Series, S-Series, and N-Series devices support NetFlow flow collection. The Management Center server can be configured as a flow collector for the devices on your network using the Flow Sensor Configuration window in Console.

Enabling NetFlow collection on your network can add significant overhead to Management Center server operation. Incoming flow data collection consumes a large portion of server memory and impacts the overall disk utilization footprint of the Management Center server. It can also lead to extended time required to perform a Management Center server backup, if reporting data is included in the backup.

In addition, name resolution for NetFlow traffic displayed in Management Center adds overhead to the server. NetFlow traffic bursts can lead to a spike in name resolution traffic which also adds to the overall load on the network.

You can adjust NetFlow collection settings using Management Center options. From the Console menu bar, select Tools > Options to open the Console Options window. Expand the Console folder and select NetFlow Collection. The NetFlow

Collection options are displayed. Click the Advanced Settings button to open the NetFlow Collection Advanced Settings window.

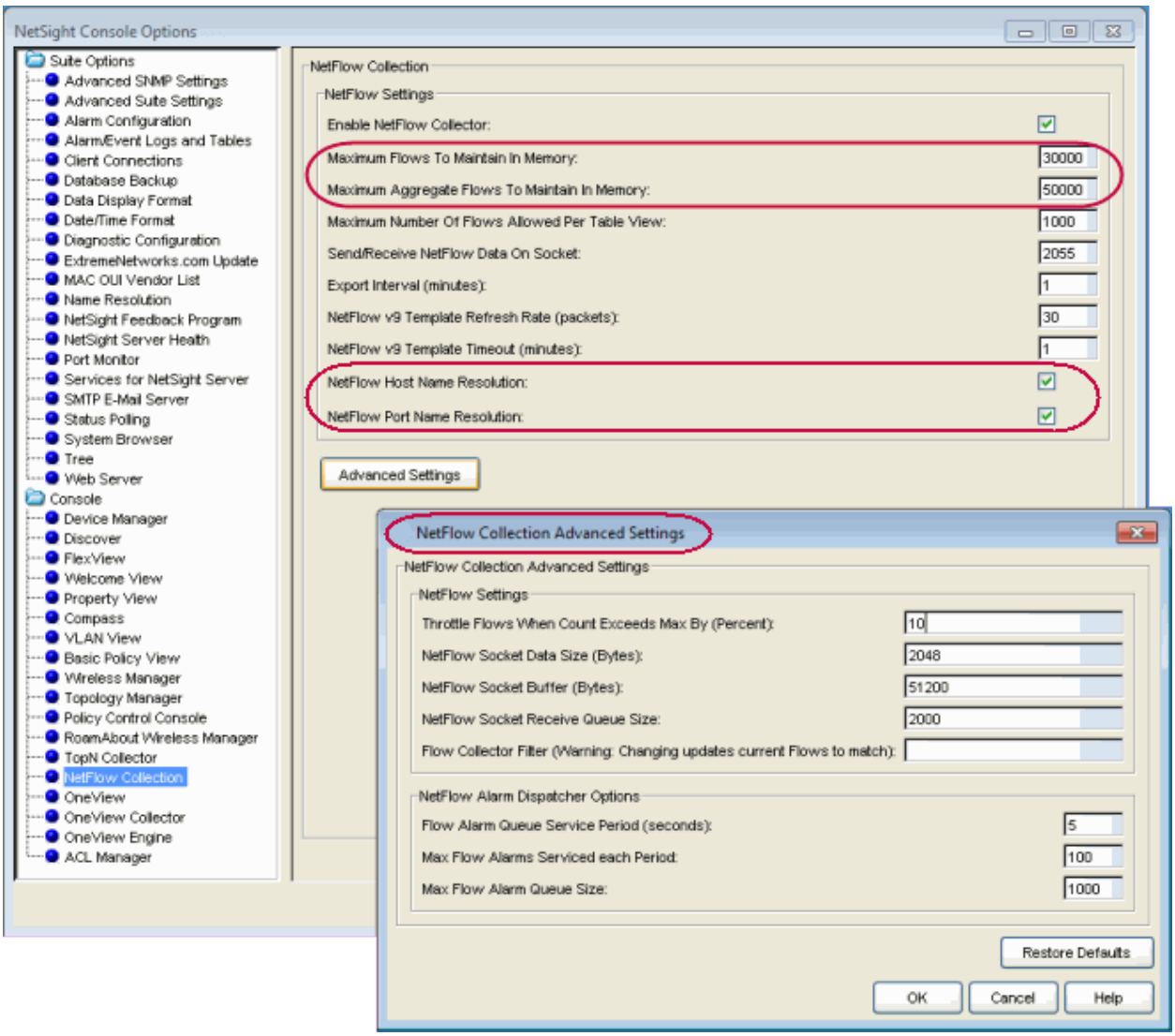
For most implementations, the default settings are recommended. However, in some cases, these settings can be adjusted to improve Management Center server performance. For example, you can change the maximum number of flows and aggregate flows to maintain in memory. Changing this number would adjust the amount of memory used to store flows.

You can also disable host and port name resolution for NetFlow. Disabling name resolution would affect the display of Management Center data because IP addresses would not be resolved to names. Other than that, the Management Center data is not impacted. Disabling name resolution would also reduce the DNS traffic on the network and to the DNS server(s).

The Advanced settings for the NetFlow flow collection let you limit resources used by Management Center Flow Alarm handling.

NOTE: Perform any change in the default flow collection parameters with caution and make adjustments taking into account items such as the size of the network and features enabled in Management Center. Advise all Management Center users of changes to the default flow collection parameters so that they can monitor any changes in server performance.

NetFlow Collection Options



Server Database and Memory Tuning

The following instructions provide options for fine-tuning the Management Center Server database and memory based on your server system and network configuration.

Changing the MySQL my.ini File

Management Center ships with three additional MySQL configuration files that can be used to fine-tune Management Center database memory usage: my-

small.ini, my-large.ini, and my-huge.ini. By default, the Management Center database uses the my.ini file. The my-small.ini, my-large.ini, and my-huge.ini files are copies of the my.ini file, tuned for small, large, or very large (huge) systems. The my-small.ini file uses less memory but runs slower and the my-huge.ini file uses more memory but runs faster, with the my-large.ini file somewhere in between. Use the my-huge.ini file if your database is very large with lots of connecting end-systems. Use the my-small.ini file if your system has limited resources or if you need to conserve resources because of other applications and processes running on the system.

The following instructions show how to change the my.ini file, using the my-large.ini file as an example.

1. Stop the Management Center Server and the Management Center database.
2. In the Management Center install directory, copy `mysql/my.ini` to `mysql/my.ini.orig`
3. Copy `mysql/my-large.ini` to `mysql/my.ini`
4. Rename `mysql/data/ib_logfile0` to `mysql/data/ib_logfile0.orig`
5. Rename `mysql/data/ib_logfile1` to `mysql/data/ib_logfile1.orig`
6. Start the Management Center database and then the Management Center Server.

Increasing JBoss Memory

You can make changes to the nsserver.cfg file on the Management Center Server to increase JBoss memory and improve performance.

1. Stop the Management Center Server.
2. In the <install directory>\services directory, open the nsserver.cfg file in a text editor.
3. Edit the file using the parameter information below. Here is an example of the file:
   `-Xms128m -Xmx1024m -XX:PermSize=64m -XX:MaxPermSize=128m -P ../../appdata/NSJBoss.properties`
4. Save and close the file.
5. Restart the Management Center Server.

The following information on the -Xmsn and -Xmxn options is from http://java.sun.com/javase/6/docs/technotes/tools/windows/java.html:

-Xmsn

Specifies the initial size, in bytes, of the memory allocation pool. This value must be a multiple of 1024 greater than 1MB. Append the letter k or K to indicate kilobytes, or m or M to indicate megabytes. The default value is chosen at runtime based on system configuration. For more information, see HotSpot Ergonomics:
Examples:

```
-Xms6291456
-Xms6144k
-Xms6m
```

-Xmxn

Specifies the maximum size, in bytes, of the memory allocation pool. This value must a multiple of 1024 greater than 2MB. Append the letter k or K to indicate kilobytes, or m or M to indicate megabytes. The default value is chosen at runtime based on system configuration. For more information, see HotSpot Ergonomics:
Examples:

```
-Xmx83886080
-Xmx81920k
-Xmx80m
```

The -XX: commands are Java HotSpot VM Options that are connected to performance tuning. For a general overview, refer to http://java.sun.com/javase/technologies/hotspot/vmoptions.jsp

-XX:MaxPermSize (from the above website)

Size of the Permanent Generation. [5.0 and newer: 64 bit VMs are scaled 30% larger; 1.4 amd64: 96m; 1.3.1 -client: 32m.]

-XX:PermSize

Initial size for PermGen memory.

Tuning Database Backup Storage

The Management Center Server can be configured to run an automated backup on the day(s) of the week and time of your choosing. An up-to-date database

backup is an important component to ensuring that critical information pertaining to all Management Center applications is saved and readily available, if needed.

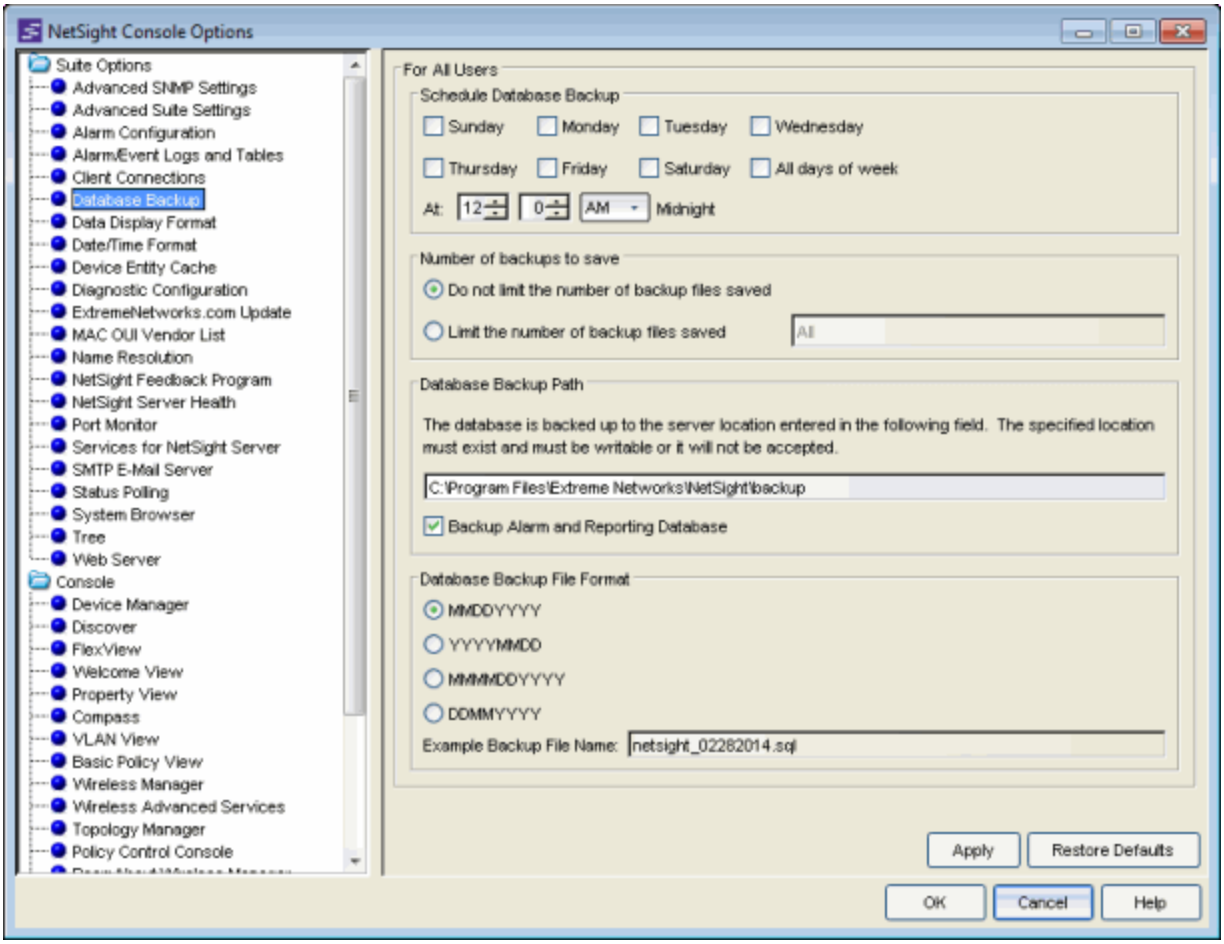
However, while scheduling regular server backups is a best practice, it can lead to unintended side-effects in some environments. For example, backing up multiple copies of the database consumes disk space on the server. Ensuring there is plenty of free space prior to enabling this feature as well as checking the overall size of each backup is helpful in determining whether space issues may become a problem. (See Management Center Server Disk Utilization for more information.)

Another option is to save backups to a separate location such as a network share. It is important to verify periodically that the backups are running as expected and actually completing. You might also schedule quarterly database restores on a lab server to ensure the integrity of the backups.

In addition, the size of the database backup should be checked after major changes to the environment, for instance enabling Management Center data collection or implementing Extreme Access Control on the network. If there are concerns regarding the available disk space, place limits on the number of backups saved and/or adjust the frequency of backups.

Database backups are configured in the Management Center Suite options. From any Management Center application menu bar, select Tools > Options to open the Options window. Expand the Suite Options folder and select Database Backup. For more information on each option, see Database Backup under the Options section in the Suite-Wide Tools User Guide.

Database Backup Options



Binding the Server to One Interface

If the Management Center server has multiple NICs (Network Interface Cards) installed, it is a good practice to configure the server to always bind to the preferred IP address. If the server does not bind to the correct interface, local and remote clients and Extreme Access Control engines are unable to connect to the Management Center server.

During the startup process, the Management Center server automatically binds to the first available NIC, which may not be the correct interface for the server to use. In addition, changes on the network can cause the server to bind to an incorrect interface, should the server restart during a change.

You will need to make configuration changes in order to bind the server to the correct interface. On Windows systems, you need to set the binding order of the

network interface cards and configure the Management Center server to bind to the correct IP address. On Linux systems, you need to configure the Management Center server to bind to the correct IP address.

For instructions, see the Management Center Installation Guide section on Systems with Multiple NICs.

Extreme Management Center Troubleshooting

The following sections provide information on tools that can be used when troubleshooting Extreme Management Center server issues.

System-Wide Extreme Management Center Server Diagnostics

The Administration tab in Extreme Management Center provides detailed statistical and diagnostic information regarding the overall performance and operation of significant Management Center server functions. It is important to review all the reports available on the Administration tab (Diagnostics sub-tab) so that they can be leveraged when diagnosing and troubleshooting problems.

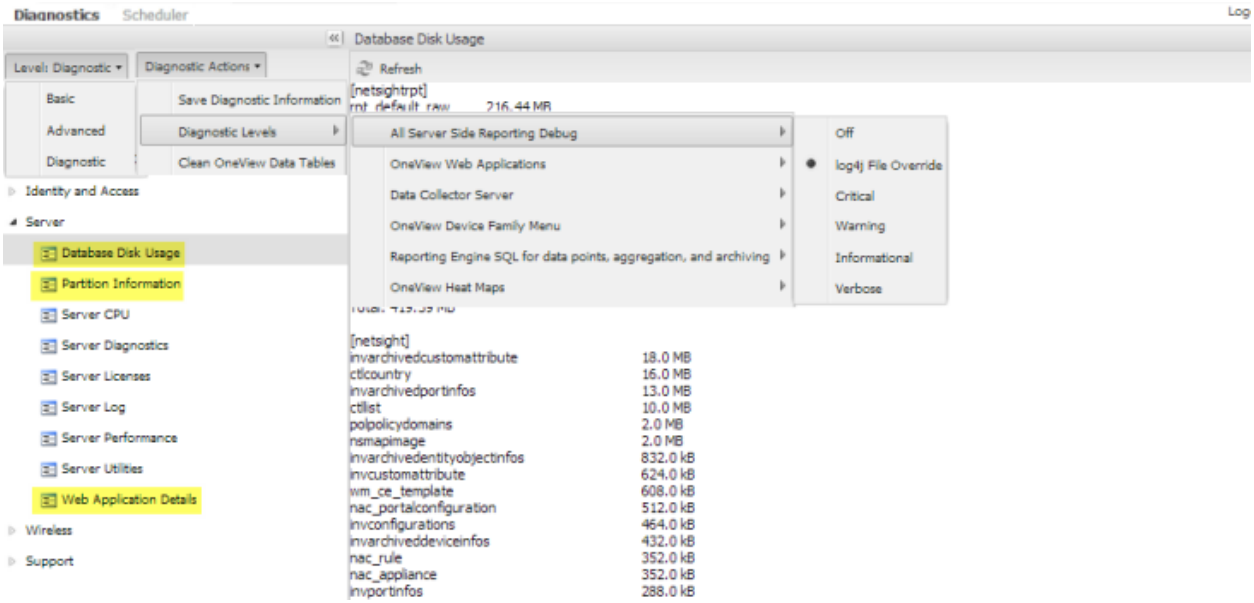
There are three levels of information available: Basic, Advanced, and Diagnostic. The Basic level provides reports indicating the overall status of the server. Increasing the level to Diagnostic adds additional reports providing more granular insight into the overall operation of the server.

For example, the Diagnostic level adds reports on Database Disk Usage, Partition Information, and Web Application Details, providing in-depth information such as how much each Management Center component contributes to the overall size of the server database, and DWR statistics including the number of calls made and the average time to complete.

The Diagnostic level also includes a menu of Diagnostic Actions which provide the ability to Save Diagnostic information (similar to the Show Support function) and also enable additional advanced diagnostic logging levels. (Note: As with any diagnostics, care should be taken when enabling increased diagnostic

logging and is advised only with the guidance of an Extreme Networks Support Engineer.)

Administration Tab Diagnostics



Extreme Management Center Server Real-Time CPU and Memory Usage

Troubleshooting Extreme Management Center server performance issues related to CPU and memory utilization is easier when you can refer to a CPU utilization baseline that was charted over a period of time.

Knowing the system's normal operating behavior makes it easier to identify when the server's behavior deviates from the norm and when exactly the change occurred. It also makes it easier to identify whether the deviation corresponds to a recent change on the system or network.

For more information on how to establish a baseline, see the Track Management Center Server CPU/Memory Trends section under Monitor Management Center Server Health.

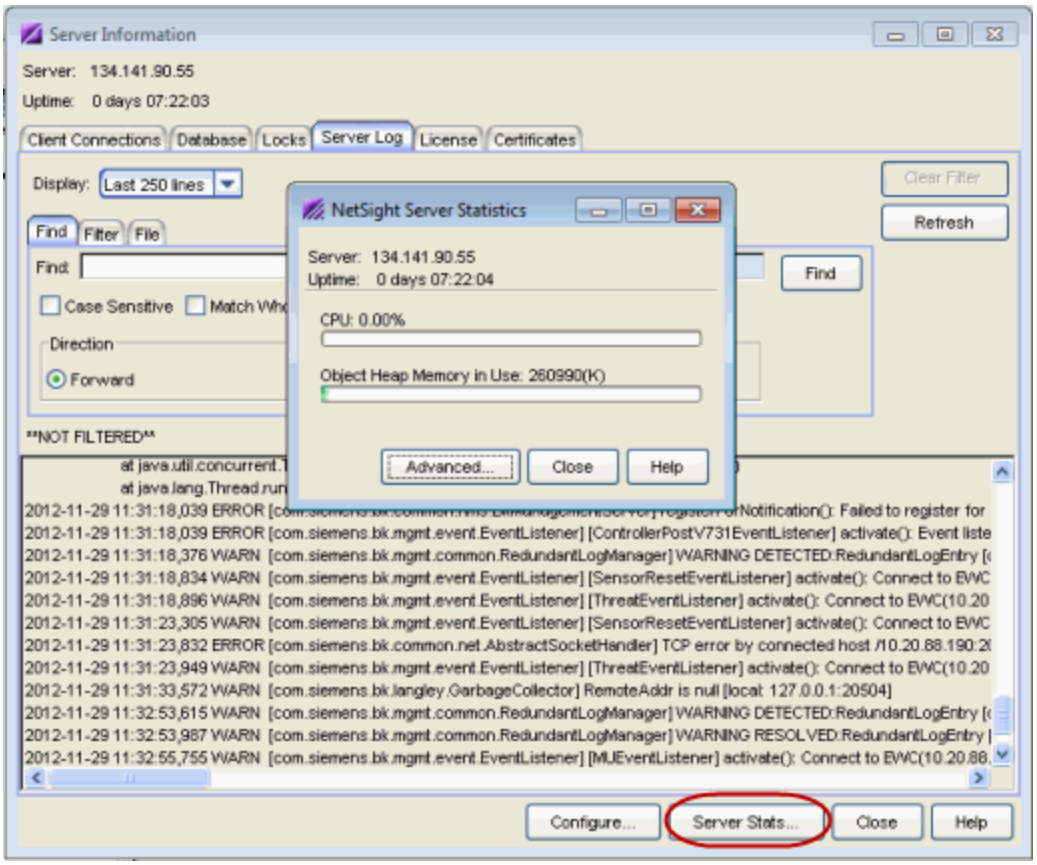
Once you have your baseline, use these four tools to monitor the Management Center server CPU and memory usage in real-time and compare that data to the baseline.

Server Statistics Window

The Server Statistics window provides a real-time view of server CPU and memory usage. Access the window by clicking the Server Information icon on the toolbar of any Management Center application, or by selecting Tools > Server Information from the menu bar. In the Server Information window, click on the Server Stats button to open the Management Center Server Statistics window, as shown below.

The window shows real-time CPU and Object Heap Memory usage. (Heap memory refers to the amount of free memory available to the Management Center server program.) Consistently high CPU usage and/or memory usage that continues to steadily increase are indicators that the system may be under duress. This would typically manifest through degraded performance or server stability issues. Both provide valuable data points when trying to understand the root cause of an issue, for example, whether performance is tied to a CPU spike, and whether that spike is specific to Management Center or the overall system.

Management Center Server Statistics Window



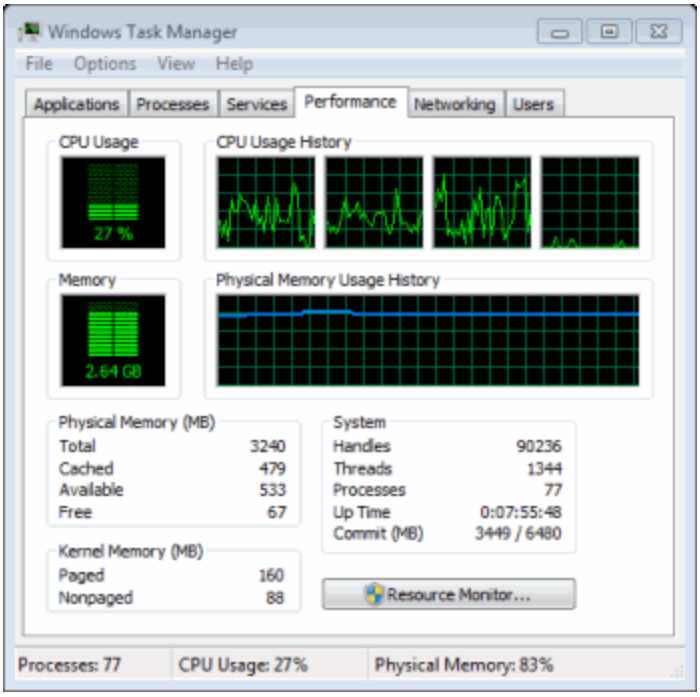
Windows Task Manager

Windows Task Manager is a utility on Windows-based systems that provides a real-time view of system CPU and memory utilization. It monitors the entire system's performance to help identify whether an issue is specific to Management Center or a side effect of another process running on the system.

On the Processes tab, sorting the CPU and Memory columns lets you monitor the activity of the individual active processes, giving a real-time picture of the specific processes that may be consuming a larger than normal share of resources.

The Performance tab is an excellent overview of global CPU and Memory trends, providing a view into whether elevated usage has been sustained for a period of time or whether it changes at regular intervals, perhaps as the result of performing a specific task or action.

Windows Task Manager



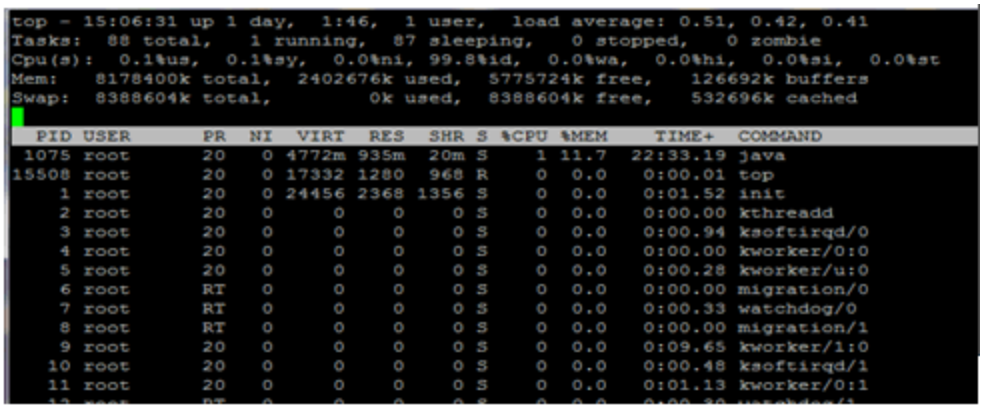
Linux "top" Command

The Linux equivalent of Windows Task Manager is the "top" command, which displays the most CPU-intensive processes on the system and provides an ongoing look at processor activity in real-time.

The command displays system summary information as well as the processes currently being managed by the Linux kernel. The display continuously refreshes, providing valuable insight into the processes that are consuming the most resources and the ability to quickly monitor incremental usage of specific processes that may be slowly consuming resources over time. The output contains useful information such as CPU, Memory, Process Time, and Process ID.

Refer to Linux operating system documentation for more information about the "top" command.

Linux "top" Command Display



Linux "vmstat" Command

The Linux "vmstat" (virtual memory statistics) command displays summary information about operating system memory, processes, interrupts, paging and block I/O. The first report displayed provides the averages since the last reboot.

If you want to use the command to monitor the virtual memory activity on your system, it is best to specify a sampling interval. Executing the command at predefined intervals helps to identify the rate of change in specific values. The command "vmstat -an 10 15" executes with a display that runs every 10 seconds for 15 iterations, and includes active and inactive memory usage.

Of particular interest would be whether the system is using swap memory, and if so, how frequently and what are the overall memory conditions when this occurs. Keep in mind that it is normal for Linux-based systems to have higher memory consumption due to the operation of the OS, but further investigation is warranted when swap memory is being used.

Refer to Linux operating system documentation for more information about the "vmstat" command.

Linux "vmstat" Command Display

```
root@NS-Dev.Dev.com:~$
root@NS-Dev.Dev.com:~$ vmstat
procs -----------memory---------- ---swap-- -----io---- -system-- ----cpu----
 r  b   swpd   free   buff  cache   si   so    bi    bo   in   cs us sy id wa
 1  0      0 5775760 126772 532744    0    0     1     2   91   75  0  0 100  0
root@NS-Dev.Dev.com:~$
```

Extreme Management Center Server Disk Utilization

Unmanaged log data or backup files can quickly consume disk space, creating a disk space problem on the Extreme Management Center server. Disk space issues can cause problems such as an upgrade that fails to execute due to inadequate disk space or, more seriously, a Management Center server crash.

For information on managing Management Center database backup files, see Tuning Database Backup Storage. For information on managing log files, see Management Center Log Files in the Reference Information section of the Console User Guide.

Here are three tools you can use to troubleshoot disk usage problems on the Management Center server.

Windows OS Properties

For Windows-based systems, access the Properties window to view disk usage data. In Windows Explorer, right-click on the drive where the Management Center server is installed and select the Properties option from the menu.

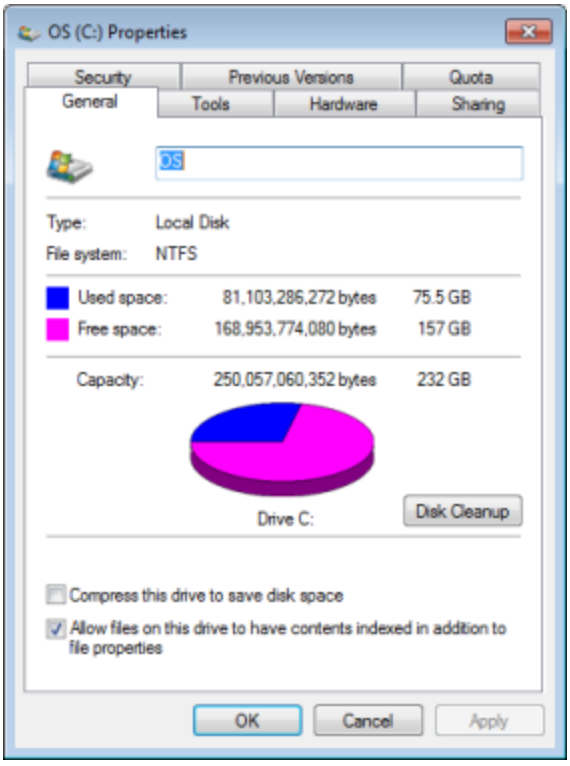
Use the data in the window to verify that there is adequate space available for normal Management Center server logging and operations, and investigate low disk availability immediately. There are two Management Center-specific directories that you can check for excessive disk space consumption:

<install directory>\backup

<install directory>\appdata\logs

You can control the automatic file size management of these directories using Management Center options. For more information, see Tuning Database Backup Storage under Management Center Performance Tuning and Tuning Data Persistence under NAC Performance Tuning in the NAC Technical Reference.

Windows Properties



Linux "vmstat -D" and "vmstat -d" Commands

The Linux "vmstat" (virtual memory statistics) command with the "-D" or "-d" option displays disk read and write activity. The "-D" option provides a summary of total disk activity for the entire system, while the "-d" option displays individual disk activity statistics for each disk on the system.

These commands are useful when monitored disk activity (see Monitor Management Center Server Disk Access) indicates an abnormal change that corresponds with performance-related issues on the Management Center server. The disk statistics provide a real-time view into disk activity that can perhaps be tied to specific actions.

Refer to Linux operating system documentation for more information about the "vmstat" command.

Linux "vmstat -D" Command Display

```
root@NS-Dev.Dev.com:~$
root@NS-Dev.Dev.com:~$ vmstat -D
           28 disks
            3 partitions
        36531 total reads
         9025 merged reads
      1657216 read sectors
       173536 milli reading
       123437 writes
        21262 merged writes
      2933468 written sectors
       533064 milli writing
            0 inprogress IO
           53 milli spent IO
```

Linux "df" and "du" Commands

The Linux "df" command displays how much free disk space is available on the file system. Use "df" to view the overall system disk utilization and identify whether certain directories are at or near full capacity. Use the "-h" option to display the statistics in human readable format.

The "du" command can be used to identify the size of specific files or directories within a parent directory. This command is useful when trying to narrow down specific areas of the file system that are consuming large amounts of disk space.

NOTE: Running the "du" command from a parent directory with the "-ha" option may return a large amount of data. Use the "|more" option or redirect to a file to view the total results for the command.

Refer to Linux operating system documentation for more information about the "df" and "du" commands.

Linux "df -h" Command Display

```
root@NS-Dev.Dev.com:~$ df -h
Filesystem                Size  Used Avail Use% Mounted on
/dev/mapper/systemvg-root  52G  8.3G   41G  17% /
udev                      3.9G  4.0K  3.9G   1% /dev
tmpfs                     1.6G  244K  1.6G   1% /run
none                      5.0M     0  5.0M   0% /run/lock
none                      3.9G     0  3.9G   0% /run/shm
/dev/sda1                 228M   25M  192M  12% /boot
root@NS-Dev.Dev.com:~$
```

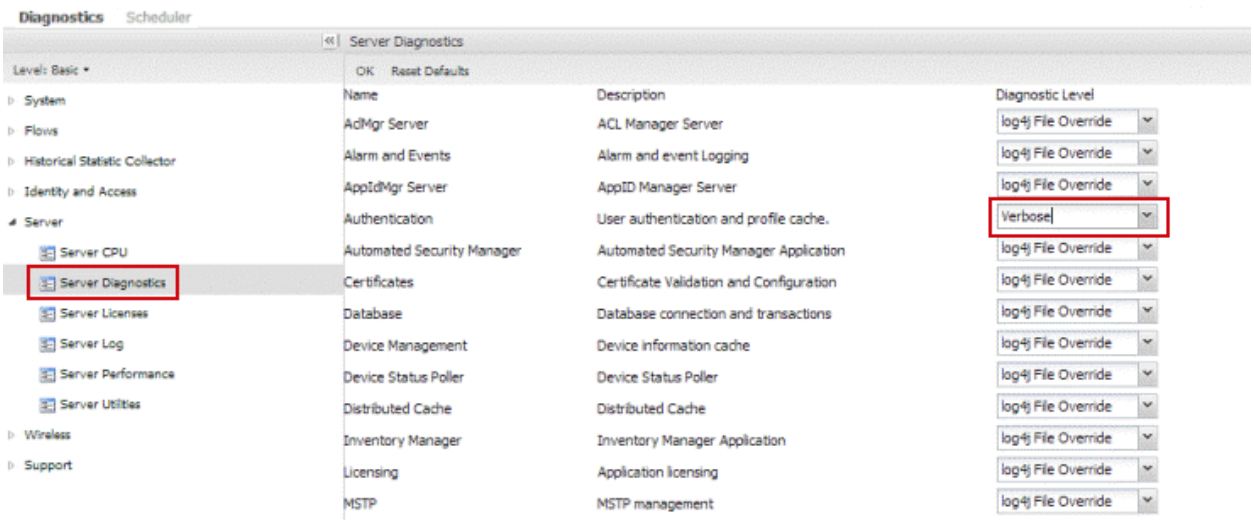
Extreme Management Center Server Diagnostics

Use the Administration tab (Diagnostics sub-tab) to obtain detailed debug information for Extreme Management Center server processes and applications. Select from a list of diagnostic options to enable targeted debugging of specific system functions. This allows for the collection of relevant data and also helps to limit the overall impact to the system when debugging is enabled.

CAUTION: Management Center server diagnostics should only be enabled when a specific area of an issue has been identified, or under the guidance of Extreme Networks Support. Certain debug options generate verbose output and could cause adverse effects to the system if enabled for extended periods of time. Debug options should only be enabled long enough to capture data from the behavior under investigation.

Access Server Diagnostics in Management Center by clicking the Administration tab and then expanding the Server section on the Diagnostics sub-tab. Enable the different diagnostic groups by setting the Diagnostic Level to "Verbose" for the applications and processes of interest. Debug diagnostic information is mainly saved to the active server.log file on the Management Center server.

Server Diagnostics



Accessing the Server Log File

The server log file records server activity such as start-up log data, unexpected behavior messaging, and server debug diagnostic log data when enabled.

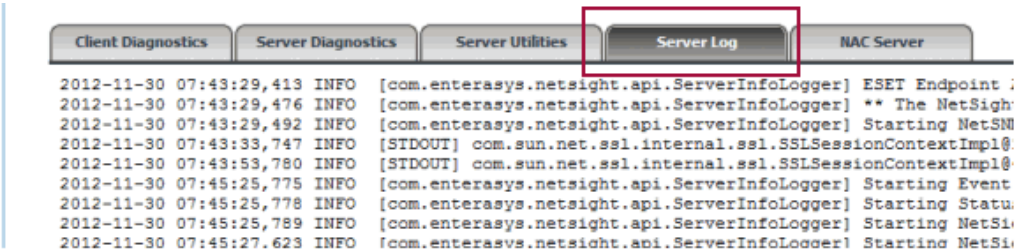
Reviewing previous server log file output can be helpful for determining when a specific issue started to occur or for uncovering additional system issues that may be contributing to a current problem.

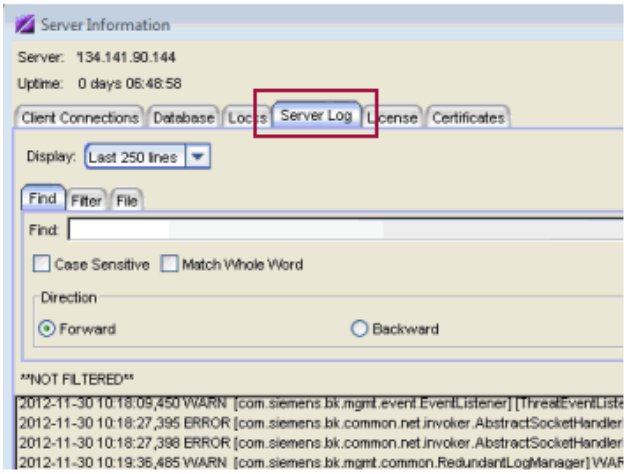
The file is archived daily into the same directory and is generally named in the server.log.date format.

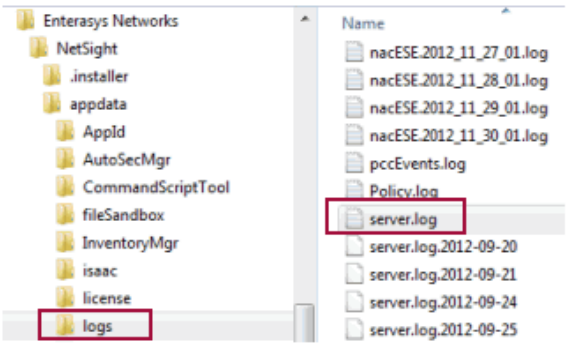
The server log file can be accessed from the Management Center Launch page by clicking the Administration tab and then the Server Log tab. You can also view the Server Log in the Server Information window, which can be launched from the Tools menu or toolbar in every Management Center application. The Server Log can also be accessed from the <install directory>\appdata\logs directory on Windows-based systems or from the /usr/local/Extreme_Networks/NetSight/appdata/logs directory on Linux-based systems.

Examples of the server log file locations are shown below.

Server Log File Locations







Extreme Management Center Client Diagnostics

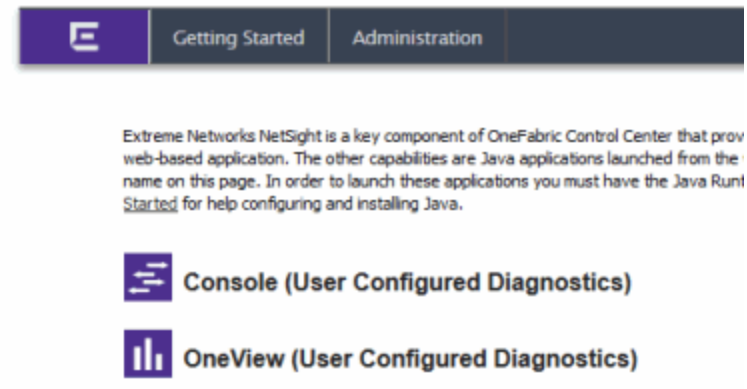
Troubleshooting unexpected behavior encountered while running applications in Extreme Management Center is not limited to server-side investigations. Some

behavior may be specific to individual end-systems or may be the result of a configuration on an end-system.

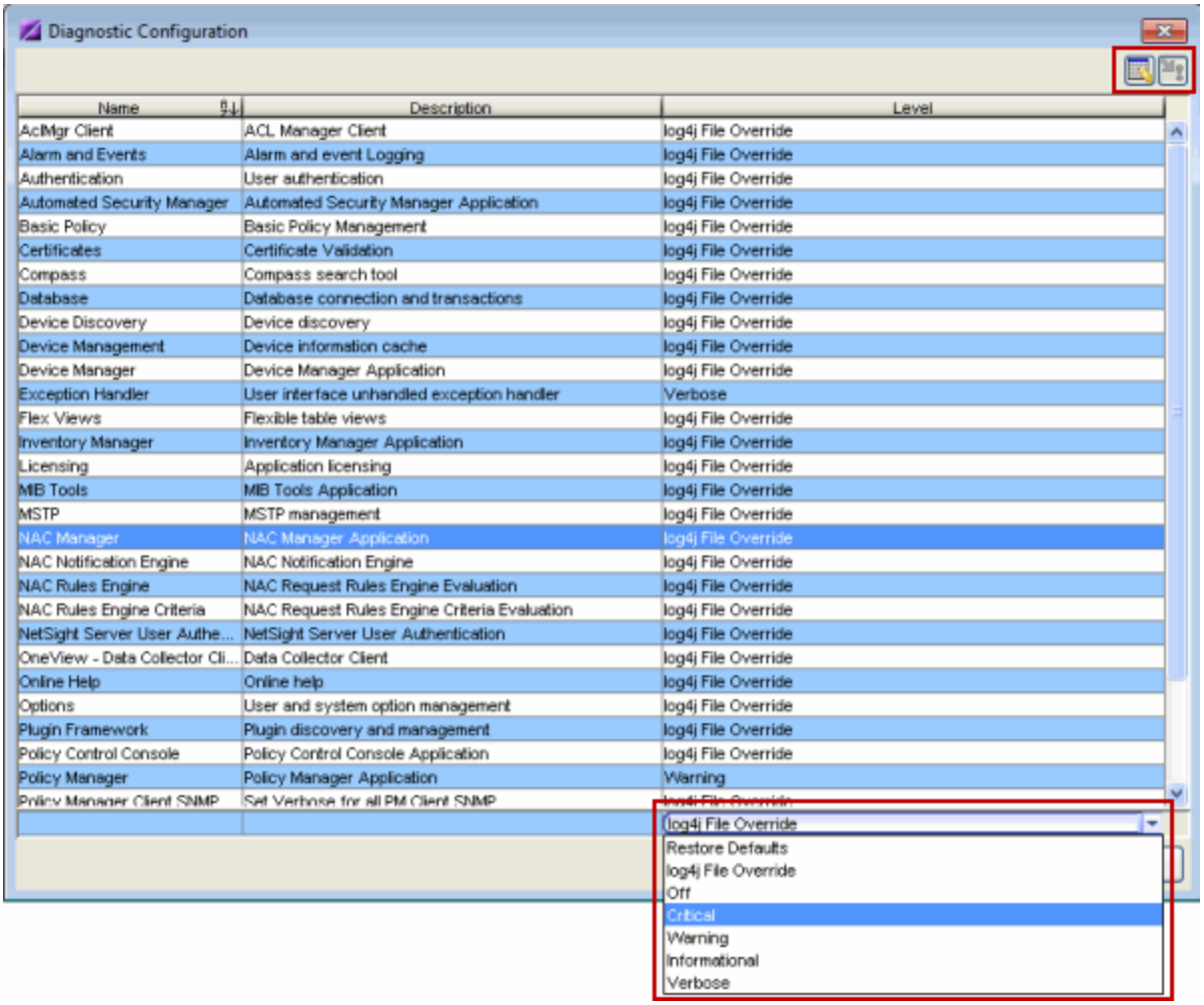
Use the following steps to enable diagnostics for Management Center client-specific debugging of individual Management Center applications.

1. From the Management Center Launch page, click on the Administration tab. Click on Client Diagnostics. You need to log in with your username and password. Select the User Configured Diagnostics radio button and click Apply.

2. Once client diagnostics are enabled, the Launch page displays "(User Configured Diagnostics)" following each application name. Launch the desired application (for example, Console or Policy Manager).



3. The Diagnostics Configuration window opens where you can enable diagnostic message logging for a specific application or process. Click on the table entry for the application or process and open the table editor using the Table Editor button in the upper right corner. In the Table Editor row at the bottom, set the diagnostic level. Be sure to apply your changes using the Apply button in the upper right corner. Click OK to close the window.



4. Perform the action that generates the undesirable/unexpected behavior. The relevant debug is saved to the corresponding application log file on the client machine, located in the \Users\<user>\AppData\Roaming\NetSight\logs directory on Windows 7 or the \Documents and Settings\<user>\Application Data\NetSight\logs directory on Windows XP.

Extreme Management Center Certificates

Extreme Management Center uses server certificates to provide secure communication for application web pages and for internal communication between server components.

On the Management Center server, use the Server Utilities page to view Management Center server communication certificates. Access the page from

the Management Center Launch page by clicking the Administration tab. Click on Server Utilities. You need to log in with your username and password. Click on the Certificates link to open a new window that displays the Server Certificate Chain.

For more information on updating and configuring the Management Center server certificate, see the top-level Help topic Management Center and NAC Secure Communication and the How to Update the Management Center Server Certificate Help topic in the Server Information section of the Suite-Wide Tools User Guide.

Server Utilities

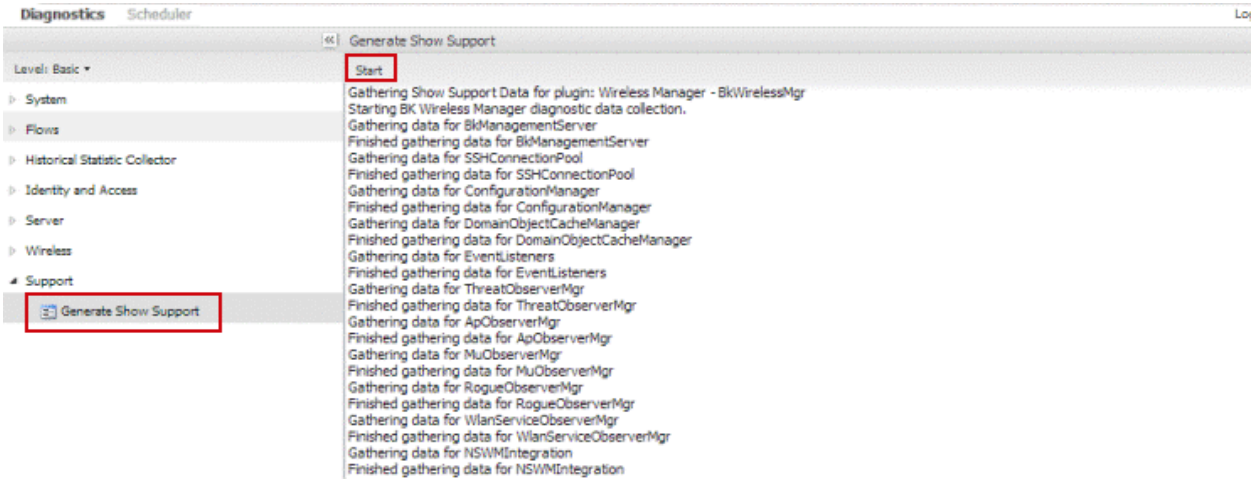
Generate a Show Support Report

It is helpful to generate a Show Support report to provide to GTAC when requesting assistance with Extreme Management Center. The report collects important statistical and diagnostic data pertaining to each of the applications within Management Center and creates a single archive that your support technician can review.

This data helps to answer many of the up-front questions typically asked when opening a support case, and also provides a comprehensive collection of key data that can reduce follow-up requests for more data and expedite a resolution to the issue.

The Show Support report is generated from the Administration tab. Click the Diagnostics sub-tab and then expand the Support section. Click the Start button to start generating the report.

Administration Tab Generate Show Support



Upon completion, archived data is stored on the Management Center server in the <install directory>\appdata\ShowSupport folder in a single zipped archive that can be sent to update an open support case.

Management Center Show Support Folder