HP Network Node Manager i Software System and Device Support Matrix

Software Version: 9.10

This document provides an overview of the system requirements and supported devices for HP Network Node Manager i Software (NNMi) version 9.10.

For the latest additions to the system requirements and device support, see sg-pro-ovweb.austin.hp.com/nnm/NNM9.10/supportmatrixupdate.htm. For the list of supported network devices, see the NNMi Device Support Matrix at sg-pro-ovweb.austin.hp.com/nnm/NNM9.10/devicematrix.htm.

This document is intended to augment the Release Notes.

Installation Guide

Pre-installation requirements, as well as instructions for installing NNMi, are documented in the installation guide provided in Adobe Acrobat (.pdf) format. The document file is included on the product's installation media as: `install-guide_en.pdf`. After installation, this document can be found from the NNMi user interface by selecting **Help → Documentation Library → Installation Guide**.

Hardware and Software Requirements

Before installing NNMi, verify that your system meets the following minimum requirements:

Hardware

- Intel 64-bit (x86-64) or AMD 64-bit (AMD64)

  - Only supported for the Windows or Linux operating systems.

  Itanium Processor Family

  - Only supported for the HP-UX operating system.

  Oracle SPARC

  - Only supported for the Solaris operating system.

  - NNMi supports the following Solaris processors:
    UltraSPARC IIIi, IV, IV+
    SPARC64 V, V+
    SPARC64 VI, VII (M-class)

  - NNMi does **not** support the following Solaris T series processors:
    UltraSPARC T1, T2, and T2+

  Virtualization

  - VMware ESX Server 3.5, ESX 4.0 or later minor version, ESXi 4.1 or later minor version.

    o Only supported for the Windows or Linux operating systems.

    o Virtual environment must meet the x86-64 or AMD64 hardware requirements listed here.

    o Bridged network environment required. NAT'ed network environments are **not** supported.

  - Microsoft Hyper-V R2

    o Host OS: Windows Server 2008 R2 x64

    o Guest OS: Only supported for the Windows operating systems.

  - Oracle Solaris Zones (Solaris 10)

  - HP Integrity Virtual Machines

    o Only supported for the HP-UX operating system.

CPU, RAM, and Disk Space Requirements / Maximum Supported Managed Environment

The recommendations listed in this support matrix apply to NNMi running under the default settings. NNM iSPIs might require additional hardware beyond what NNMi requires. If you intend to run any of the NNM iSPIs, review each NNM iSPI support matrix before determining the total hardware requirements for your environment.

The following table describes tiers of managed network environments and the hardware requirements for supporting these tiers. The values stated here are approximate and reflect levels tested by HP. If you have a particularly complex environment, poll objects at a higher frequency, or poll more objects than stated in a given tier, you might need to increase the Java heap size, provision more powerful hardware as indicated by the next higher tier, or both. The number of discovered objects and polled object counts appear in the NNMi console **Help → System Information** window. All polled counts in the tables below reflect both performance and fault polling. Managed environments larger than these tiers are not supported without additional HP approval.

Single System Managed Environment Size								Recommended Hardware System Requirements				
Approximate managed environment tier[1]	Number of discovered nodes	Number of discovered interfaces	Number of polled addresses	Number of polled interfaces	Number of custom polled objects	Number of polled node components	Number of concurrent users	CPU (64-bit) IPF x86-64 AMD 64 SPARC[2]	RAM[3]	Recommended Java heap size (see Tuning the jboss Memory Size)[4]	Disk space for application installation ($NnmInstallDir)[5]	Disk space for database and data during execution ($NnmDataDir)[6]
Entry	Up to 250	15k	500	2500	1200	500	5	2 CPU cores	4 GB	2 GB (-Xmx2g)	3 GB	10 GB
Small	250 - 3k	120k	5k	10k	30k	40k	10	4 CPU cores	8 GB	4 GB (-Xmx4g)	3 GB	30 GB
Medium	3k – 8k	400k	10k	50k	50k	60k	25	4 CPU cores	16 GB	7 GB (-Xmx7g)	3 GB	40 GB
Large	8k – 18k	900k	20k	70k	75k	80k	40	8 CPU cores	24 GB	10 GB (-Xmx10g)	3 GB	60 GB
Very Large	18k - 25k	1mil	30k	200k	100k	100k	40	8 CPU cores	32 GB	16 GB (-Xmx16g)	3 GB	80 GB

[1] To view discovered object counts and polled object counts, see the **Database** and **State Poller** tabs in the **Help → System Information** window.

[2] Minimum of 2.5GHz for x64 and 1.4GHz for IPF or RISC.

[3] If you are running additional applications, increase resources appropriately. (For example, when the Network Performance Server (NPS) component of the NNM Performance iSPIs is installed on the same system as NNMi, the NPS uses half of the system RAM, and NNMi plus other products must fit into the other half, requiring at least double the amount of RAM stated here.) If you are planning to use any of the NNM iSPI Performance products (NNM iSPI Performance for Metrics, NNM iSPI Performance for Traffic, or NNM iSPI Performance for Quality Assurance) and are managing at the Large tier or above, it is recommended that the NPS component of the NNM Performance iSPIs be installed on a separate server from NNMi.

[4] These recommendations are based on the environment size and polled object counts stated in this table. Polling fewer of a given object type might use less Java heap. Polling more of a given object type might require increased Java heap size as well as HP approval.

[5] $NnmInstallDir is configured during installation on Windows Server 2008 (C:\Program Files (x86)\HP\HP BTO Software\ by default), or on UNIX® by creating a symlink to /opt/OV/. NOTE to NNM 7.x customers: /etc/opt/OV/ is no longer used on UNIX except for one configuration file.

[6] $NnmDataDir is configured during installation on Windows Server 2008 (C:\ProgramData\HP\HP BTO Software\ by default), or on UNIX by creating a symlink to /var/opt/OV/. See Disk Space Considerations before proceeding.

Global Network Management Environment Size[1]				Recommended Hardware System Requirements				
Approximate managed	Number of	Number of	Number of concurren	CPU (64-bit)	RAM	Recommended Java heap	Disk space for application	Disk space for database and

environment tier	regionally managed nodes	regional managers [2]	t users	IPF x86-64 AMD64 SPARC [3]		size (see Tuning the jboss Memory Size)	installation ($NnmInstallDir)	data during execution ($NnmDataDir) [4]
Medium Global Manager [5]	25k - 40k	Up to 30	20	8 CPU cores	24 GB	8 GB	3 GB	60 GB
Large Global Manager	40k - 65k	Up to 30	40	8 CPU cores	32 GB	12 GB	3 GB	80 GB

[1] See Global Network Management Recommendations.
[2] To view discovered object counts and polled object counts, see the **Database** and **State Poller** tabs in the **Help → System Information** window.
[3] Minimum of 2.5GHz for x64 and 1.4GHz for IPF or RISC.
[4] See Disk Space Considerations before proceeding.
[5] Most NNMi customers with fewer than 25k nodes to manage realize the lowest Total Cost of Ownership with a single server solution. If redundancy is required for a single server solution, a High Availability or NNMi Application Failover solution can be deployed with a clustered primary and standby server. Customers with fewer than 25k nodes who are considering a GNM solution should contact their HP representative to discuss whether GNM is right for their environment.

Disk Space Considerations

Before allocating disk space for NNMi, consider the following:

- The recommendations in the tables above are the recommended minimum disk space amounts based on HP's average test environment. More complex environments might require more disk space.

- Disk performance is extremely important for high scale environments that are Medium tier or higher. HP strongly recommends RAID 1+0 (10) with write cache on discs of 10,000 rpm or better.

- Increasing log file size from the default settings uses more disk space. Before increasing log file size, validate that you have adequate disk space.

- During high scale testing, HP has not seen tablespace sizes larger than 16 GB (Oracle or embedded Postgres) - either single system or global manager in a Global Network Management environment. If using Oracle in a high scale environment, configure for incremental table space growth beyond this size.

- For Large and Very Large scale environments running NNMi application failover with Postgres, the NNMi management server must have at least 40 GB more disk space than the recommended amount for application failover logs. For these scaled environments, it is recommended that you allocate disk space separate from $NnmDataDir for the application failover logs. The location of the failover logs can be configured in the `nms-cluster.properties` file.

- For Global Network Management environments, the global manager running NNMi application failover with Postgres must have at least 140 GB more disk space than the recommended amount for application failover logs. For these scaled environments, it is recommended that you allocate disk space separate from $NnmDataDir for the application failover logs. The location of the failover logs can be configured in the `nms-cluster.properties` file.

- Suggested Partitioning on UNIX Platforms. The following table presents the suggested disk partitioning on UNIX platforms.

Partition	Suggested Size
/	5 GB
/tmp	1 GB
/var/tmp/	1 GB
/opt/OV/	5 GB
/var/opt/OV/	See Recommended Hardware System Requirements for $NnmDataDir for your managed environment tier in the above tables.

Maximum Limits for Correlation Rules and Causal Rules

To ensure adequate performance, NNMi supports the following maximums:

- 10 Correlation Rules

- 10 Causal Rules

- 5 Filter String entries for each of the following filters:

  - Child Incident

  - Parent Incident

  - Source Object

  - Source Node

  Valid Filter String entries include logic operators (AND, OR) and comparison operations (Attribute, Operator, Expression). NNMi displays each entry on a separate line above the Filter String output.

Global Network Management Recommendations

- Each regional manager can forward information to a supported limit of two global managers.

Recommended Soft Limits for Trap Burst Throughput Rate

NNMi has been tested with the following incoming SNMP trap rates. These rates assume a well-configured system and are supported independent of the hardware tier:

- 1,000 SNMP traps/second for up to 1 minute.

- 200 SNMP traps/second for up to 5 minutes.

- A sustained average of 50 SNMP traps/second. The database limit for storing traps is 95,000, after which traps are no longer persisted in the database, but are still available for subsequent investigation or archiving purposes. For more information, see the *nnmtrapdump.ovpl* and *nnmtrimincidents.ovpl* reference pages, or the UNIX manpages.

Other Recommended Limits

- NNMi supports a maximum of 2000 Node Groups, with a maximum hierarchy of 5 Node Groups deep.

- NNMi supports a maximum of 100 Interface Groups.

- NNMi supports a maximum of 20 monitoring configuration groups. A monitoring group can be either a Node Group or an Interface Group. Go to the **Interfaces Settings** and **Node Settings** tabs of the **Monitoring Configuration** form to see the number of configured groups.

- NNMi supports a maximum of 250 configured Users, 500 User Groups, and 1000 Security Groups. Each user is limited to a maximum of 32 User Groups.

Operating System

Windows

Supported Versions

- Windows Server 2008 x64 Datacenter Edition with Service Pack 2

- Windows Server 2008 R2 x64 Datacenter Edition

- Windows Server 2008 x64 Enterprise Edition with Service Pack 2

- Windows Server 2008 R2 x64 Enterprise Edition

- Windows Server 2008 x64 Standard Edition with Service Pack 2

- Windows Server 2008 R2 x64 Standard Edition

Notes

- Windows operating systems on Itanium Processor Family (IPF) are **not** supported.

- Windows 32-bit operating systems are **not** supported.

- IPv6 is **not** supported on Windows operating systems.

- The Windows SNMP Trap service (or any other service that takes UDP Port 162) must be disabled. For more information, see the Installation Guide.

- Anti-virus and backup software can interfere with NNMi operation if this software locks files while NNMi is running. Any application that locks files should be configured to exclude the NNMi database directory (on Windows Server 2008, `C:\ProgramData\HP\HP BTO Software\databases`).

HP-UX

Supported Version

- HP-UX 11i v3

Installation Prerequisites

- Kernel Configuration (verify with `/usr/sbin/smh`)

- Verify kernel parameters in the "Kernel Configuration/Tunables" section:

    o nproc: add 50

    o max_thread_proc = 2048

    o nkthread = 10000

  System Configuration

- Verify using swapinfo that the system has a sufficient amount of swap as documented in [Virtual Memory / Swap Space.](#)

  Operating System Kernel Patches. The following HP-UX 11i v3 operating system patches are required (or later if the patch has been superseded).

- PHKL_36054

- PHKL_36261

- PHKL_36872

- PHKL_37184

On HP-UX run the following command to verify patches:
```
    /usr/sbin/swlist -l fileset -a patch_state *.*,c=patch | grep
-v superseded
```

Java Patches. Run the *HPjconfig HP-UX 11i system configuration tool* to validate the system configuration. HPjconfig can be downloaded from www.hp.com/go/java. To install:

- On your HP-UX system, unpack the .tar.gz file as follows:
```
    gunzip HPjconfig-3.1.00.tar.gz
    tar -xvf HPjconfig-3.1.00.tar
```

- Start HPJconfig:
  Change to the directory where you installed the HPjconfig files. Enter one of the following commands:

    o `java -jar ./HPjconfig.jar` (The default HPjconfig graphical user interface.)

    o `java -jar ./HPjconfig.jar -nogui -help` (The -help option lists the options for command-line mode.)

- To list missing patches in command-line mode, run the following command:
```
        java -jar ./HPjconfig.jar -nogui -patches -listmis
```
  This command validates kernel configuration and patch levels.

Linux

Supported Versions

- Red Hat

  - Red Hat Enterprise Server AS 5.2 (or later minor version through 5.x)

  - Red Hat Enterprise Server ES 5.2 (or later minor version through 5.x)

- NOTE: Red Hat 5.5 is required for CPU chips with more than 4 cores on a single chip (Do not confuse this number with the total number of cores; this number is just the cores per chip.)

  SUSE Linux Enterprise Server 11 SP1

Installation Prerequisites

- The 32-bit and 64-bit libstdc++ libraries are required before installing NNMi.

  1. Select the option to install a custom set of packages.

  2. Select the package labeled `Compatibility Arch Developer Support`.

  3. Complete the operating system installation.

- Required Libraries. NNMi requires the following exact library versions:

  - /usr/lib64/libstdc++.so.5

  - /usr/lib64/libstdc++.so.5.0.7

  - /usr/lib64/libXtst.so.6

  - /usr/lib/libstdc++.so.5

  - /usr/lib/libstdc++.so.5.0.7

  - /lib64/libc-2.5.so

  Before installing NNMi on a 64-bit Linux server, verify that the following library files are installed. Repeat the following procedure for each of the required library files listed above:

  7. To see if these libraries are installed, run the following command:
     ```
     yum list compat-library_name
     ```
     where *library_name* is the name of the library, for example: libstdc++-33

     The results should resemble the following text:
     ```
     Installed Package
     compat-libstdc++-33.i386 3.2.3-61 installed
     compat-libstdc++-33.x86_64 3.2.3-61 installed
     ```

  8. If the results show **available** instead of **installed**, install the libraries before installing NNMi. Complete the following procedure:

     a. Locate the libraries:

        - If the Red Hat installation disks are available, insert Red Hat installation disk 3 into the drive, and then change to the `/media/cdrom/RedHat/RPMS` directory.

        - If you cannot locate the proper installation disk, install the 32-bit and 64-bit RPMs that contain the /usr/lib/libstdc++.so.5.0.7 (32-bit) and /usr/lib64/libstdc++.so.5.0.7 (64-bit) libraries by running the following command:
          ```
          yum install compat-libstdc++-33
          ```
          NOTE: You will need a Red Hat support key.

b. Run the following commands:
```
rpm -i compat-libstdc++-33-3.2.3-*.i386.rpm
rpm -i compat-libstdc++-33-3.2.3-*.x86_64.rpm
```

9. Repeat this procedure for other library dependencies.

Kernel Tuning. NNMi requires that some kernel tunable options be changed from their default settings.

- The default size of kernel.shmmax on an upgraded operating system might be too small for the embedded database to operate after a reboot (as reported by `ovstatus -c nmsdbmgr`). Configure this value before installing NNMi.
  To validate, run `/sbin/sysctl -q kernel.shmmax`.
  Depending on the memory tier for your installation, this value might need to be as large as 12GB. In most cases, it is best to reset this value to 64GB, which is the default value for new Red Hat installations.

  To make this change permanent (after a reboot), edit the `/etc/sysctl.conf` file to add the following entry:
  ```
  # NNMi settings for embedded database
  kernel.shmmax = 68719476736
  ```
  Then run `/sbin/sysctl -p` to immediately apply the changes without requiring a reboot.

- SNMP utilizes UDP (User Datagram Protocol) for sending and receiving SNMP request and response Protocol Data Units (PDUs). The operating system utilizes UDP buffering to match the arrival rate of UDP packets with their consumption rate by NNMi. To minimize the chances for lost SNMP request or response packets, a sufficient amount of memory is required for UDP buffering. NNMi requests 8MB for the UDP receive buffer (for incoming responses) and 2MB for the UDP send buffer (for outgoing requests). Linux systems typically reserve only 128 KB for each of these buffers.
  To make this change permanent (after a reboot), edit the `/etc/sysctl.conf` file and add the following entry:
  ```
  # NNMi settings for UDP receive and send buffer sizes
  net.core.rmem_max = 8388608
  net.core.wmem_max = 2097152
  ```
  Then run `/sbin/sysctl -p` to immediately apply the changes without requiring a reboot. If ovjboss is running, restart the process to benefit from these changes:
  ```
  ovstop ovjboss; ovstart ovjboss
  ```

- The number of open files per process must be increased. To increase the number of files:

  0. Edit the `/etc/security/limits.conf` file to add (or update if the existing value is less than 2048) the following lines:
  ```
  # Increase the default max open files for NNMi
  *      soft    nofile    2048
  *      hard    nofile    2048
  ```

  1. Save your changes.

  2. Log off from the Linux system, and then log back on, as the change to the limits.conf file only applies to new shells.

  3. When you start installing NNMi, the installer inherits the new file limits.
  NOTE: If you have already installed NNMi, do the following to restart NNMi so it inherits the new file limits:
  ```
  ovstop; ovstart
  ```

Solaris

Supported Version

- Oracle Solaris 10 SPARC

Note

- Solaris on Intel Architecture is **not** supported.

Installation Prerequisites

- Operating System Patch. The Solaris patch 142242-04 (or later if the patch has been superseded) is required.

- The shared memory value must be updated. Edit the `/etc/system` file to change or add the following line:
  ```
  set shmsys:shminfo_shmmax=1073741824
  ```

Virtual Memory / Swap Space

- Recommended size is at least equal to physical memory.

- Verify and adjust the virtual memory:

  - Windows: Use **System Properties**.

  - HP-UX: To verify, use the `swapinfo` command. To adjust, use the `shm` or `swapon` command.

  - Linux: To verify, use the `cat /proc/meminfo | grep Swap` command. To adjust, use the `parted` and `mkswap` commands.

  - Solaris: Use the `swap` command.

Database

NNMi can store its data in an embedded Postgres database or in an external Oracle database. You must choose the database type at installation time.
NOTE: You cannot change the database type after NNMi installation.

- Embedded database on the NNMi management server:

  - NNMi automatically installs, initializes, and maintains the embedded database.

  - NNMi provides tools for re-initializing, backing up while online, and restoring the embedded database.

  - The embedded database performs well for most deployments.

  Oracle 10g Release 2 (10.2.0.x) or Oracle 11g Release 2 (11.2.0.x) installed on a remote system:

  - It is recommended that the network connection between the NNMi management server and the database server be at least 1 GB.

- The Oracle database user must be created with an appropriate tablespace before NNMi installation (see the [Installation Guide](#)).

High Availability

NNMi can run on certain high availability systems with additional configuration. See the [Deployment Reference](#) for information on how to install and configure NNMi with high availability systems. The following configurations are supported on [NNMi Supported Operating Systems](#):

- Microsoft Windows: Microsoft Failover Clustering for Windows Server 2008

- HP-UX: HP Serviceguard version 11.18 or later

- Red Hat Linux:
  - Veritas Cluster Server (VCS) version 5.0 or 5.1

    Notes

    - Some disk types require the use of Veritas Storage Foundation (VSF) version 5.0 or 5.1.

    - VCS 5.1 and VSF 5.1 require Linux 5.3 or later and might require operating system patches. For specific information, see the appropriate Veritas product documentation.
  - The corresponding version of Red Hat Cluster Suite (RHCS) for the supported versions of the Red Hat Enterprise Server operating system

  SUSE Linux: High Availability for SUSE Linux is not supported.

  Oracle Solaris: Veritas Cluster Server (VCS) version 5.0 or 5.1

  Notes

  - When using Solaris Zones in a Veritas HA cluster, only VCS 5.0 is supported.

  - Some disk types require the use of Veritas Storage Foundation (VSF) version 5.0 or 5.1.

  - VCS 5.1 and VSF 5.1 might require operating system updates, patches, or both. For specific information, see the appropriate Veritas product documentation.

Web Browser

- **General Web Browser Requirements**

  - Disable all pop-up window blockers for the browser (see instructions on the NNMi console sign-in page or in the [Installation Guide](#)).

  - Enable cookies for the browser (see instructions on the NNMi console sign-in page or in the [Installation Guide](#)).

  - Enable JavaScript for the browser.

  - Enable VML for Internet Explorer browsers (for proper display of Maps).

  - Install [Adobe Flash](#) (for proper display of Real-Time Line Graphs and the MIB Browser).

  - The resolution of the client display should be at least 1024x768.

- **Caution:** The following browsers are **not** supported:

  o Microsoft Internet Explorer version 9

    Internet Explorer 9 (RC) has many known issues, including non-functioning menus, no map display, and table columns cannot be selected

  o Microsoft Internet Explorer version 8 when running in Compatibility View mode

    Be sure to disable Compatibility View in Internet Explorer 8 using **Tools → Compatibility View Settings** (clear all check boxes).

  o Microsoft Internet Explorer version 7

    Internet Explorer 7 (or Internet Explorer 8 in Compatibility View mode) has many known issues, including many layout issues, no ability to close the **Help → System Information** window, and inability to change selections for CSV export.

  o Microsoft Internet Explorer version 6

  o Apple Safari (all versions)

  o Opera (all versions)

  o Google™ Chrome (all versions)

Supported Web Browsers on a Remote Client System (for operational use)

- Microsoft Internet Explorer version 8 (not running in Compatibility View mode).

- Mozilla Firefox version 3.6.13 or later minor version on a Windows or Linux client. The Firefox browser is available from www.mozilla.org/firefox. The Firefox browser works best if new windows are opened as separate windows, not tabs. For information, see [Mozilla Firefox Known Problems](#) in the NNMi Release Notes.

Supported Web Browsers on the Local NNMi Management Server System (for initial installation and configuration use)

- Any browser supported for operational use (see above) when running on the NNMi management server.

- Mozilla Firefox version 3.0.10.00 or later minor version for HP-UX 11.31 on IPF server. This Firefox browser is available from www.hp.com/go/firefox.

- Mozilla Firefox version 3.6.0 or later minor version for Solaris SPARC 10. This Firefox browser is available from releases.mozilla.org/pub/mozilla.org/firefox/releases/3.6.15/contrib/solaris_pkgadd/.

Adobe Flash Player Plug-in

The Real-time Line Graphs (**Actions → Graphs**) and the SNMP MIB Browser (**Tools → Browse MIBs**) require the Adobe Flash Player Plug-in version 10.1.53.64 or later. The Adobe Flash Player is available from www.adobe.com/go/getflash/.

Microsoft Visio (NNM iSPI NET only)

The NNM iSPI Network Engineering Toolset Software feature to export map views to Visio (**Tools → Visio Export**) requires Microsoft Visio 2007 or Microsoft Visio 2010.

Tuning the jboss Memory Size

During installation, the recommended default maximum memory size of the jboss application server is configured in the `ovjboss.jvmargs` file. For improved performance in larger environments, it is recommended that you can increase this value as documented in [CPU, RAM, and Disk Space Requirements](#).

The current Maximum Attemptable Memory value (adjusted with -Xmx) and a memory region report are available in the NNMi console with **Help → System Information**. It is recommended that this -Xmx value not exceed the amount of unused physical RAM. If the jboss JVM's entire virtual memory space does not fit in physical memory, the operating system thrashes as jboss randomly accesses its memory. For more information about tuning the Java 5.0 JVM, see http://www.oracle.com/technetwork/java/gc-tuning-5-138395.html.

You can approximate the amount of unused physical RAM available to jboss as follows: From the amount of physical memory, subtract the following amounts:

- Memory for the operating system: 1 - 2 GB

- Memory for the nmsdbmgr process: 1 - 8 GB

- Memory for any other applications, including NNM iSPIs, that are running on the server

During installation, NNMi configures the -Xmx value for by examining the amount of physical RAM and selecting the value for the closest tier.

NNMi continues to monitor the jboss memory regions during operation. If jboss memory resources are getting low, a message appears on the NNMi console sign-on page, at the bottom of the NNMi console, and at the top of NNMi forms. When jboss is running low on memory, it spends more time performing garbage collection, reducing overall system performance. Some of the possible memory region messages and suggested fixes include:

- [Critical] The region 'PS Old Gen' is at 100.00% usage
  Fix by increasing the **–Xmx** value in ovjboss.jvmargs.

- [Critical] The region 'Tenured Gen' is at 100.00% usage

  Fix by increasing the **–Xmx** value in ovjboss.jvmargs.

- [Major] The region 'PS Perm Gen' is at 92.66% usage
  [Critical] The region 'Perm Gen' is at 96.32% usage
  Perm Gen memory area is the area used for on-demand loading of Java classes. PS Perm Gen is the name of the memory area used with multiple CPU systems. This warning can occur if additional NNMi functionality has been added or if components have been redeployed. Fix by restarting ovjboss. If the problem continues, fix by increasing the –XX:MaxPermSize such as changing **–XX:MaxPermSize=128m** to **–XX:MaxPermSize=256m**.

To change the jboss Maximum Java Heap Size (–Xmx) or other Java Virtual Machine parameters:

1. `ovstop -c ovjboss`

2. Edit the `ovjboss.jvmargs` file:

   - Windows Server 2008: `C:\ProgramData\HP\HP BTO Software\shared\nnm\conf\props\ovjboss.jvmargs`

   - UNIX: `/var/opt/OV/shared/nnm/conf/props/ovjboss.jvmargs`

Change the Maximum Java Heap Size to the required amount. For example, a snippet of the `ovjboss.jvmargs` file looks like this:

```
#
# JVM Memory parameters
#   -Xms: Initial Java Heap Size
#   -Xmx: Maximum Java Heap Size
#   -Xss: Java stack size (default to OS-supplied value)
#
-Xms128m
-Xmx2048m
#-Xss128m

    ovstart -c ovjboss
```

Internationalization and Localization Support

NNMi is internationalized and can be used on operating systems configured for non-US-English locales that are supported by the operating systems. Those locales include variants of Japanese, Korean, Simplified Chinese, Traditional Chinese, Western and Central European locales, and Russian.

On Windows systems, NNMi does not support installation using directory paths with localized characters; path names for $NnmInstallDir and $NnmDataDir can contain English characters only.

NNMi is localized (or translated) to Japanese and Simplified Chinese. When those localized packages are installed, Japanese or Simplified Chinese are displayed (as output) and NNMi accepts non-English characters as input. With all other locales, English strings appear as output while NNMi accepts non-English characters as input.

The following table lists the localized languages and supported locales for each operating system.

Operating System	Localized Languages	
	Japanese	Simplified Chinese
Windows	Japanese	Chinese_PRC
HP-UX	ja_JP.SJIS ja_JP.eucJP	zh_CN.hp15CN
Linux	ja_JP	zh_CN
Solaris	ja_JP.PCK ja_JP.eucJP	zh

Before using Internet Explorer to access an NNMi management server that is configured to support the Asian Languages, install the East Asian Language with the following procedure:

1. In the **Control Panel**, select **Regional and Language Options**.

2. On the **Languages** tab, select **Install files for East Asian Languages**, and then follow the instructions.

Integration and Coexistence with Other Products

Network Node Manager i Smart Plug-ins

The following HP Network Node Manager i Software Smart Plug-ins (NNM iSPIs) are available to add on to NNMi 9.10:

- HP Network Node Manager iSPI Network Engineering Toolset Software version 9.10

- HP Network Node Manager iSPI Performance for Metrics Software version 9.10
  Caution: (Windows only) NNMi must be installed before the HP Network Node Manager iSPI Performance for Metrics.

- HP Network Node Manager iSPI Performance for Quality Assurance Software version 9.10

- HP Network Node Manager iSPI Performance for Traffic Software version 9.10

- HP Network Node Manager iSPI for IP Multicast Software version 9.10

- HP Network Node Manager iSPI for IP Telephony Software version 9.10

- HP Network Node Manager iSPI for MPLS Software version 9.10

Coexistence

The following products can coexist on the same system as NNMi 9.10:

- HP Operations Agent (OMW/OMU/OML 64 bit HTTPS Agent) version 8.60.501, Agent One 11.0 (Windows Server 2008, HP-UX 11i v3, Solaris 10, Red Hat 5.2+)

  Caution: (Windows only) NNMi must be installed before the HP Operations Agent, because the HP Operations Agent always installs in a predetermined folder, and you will not be able to install NNMi in a different folder if you need additional disk space.

- HP Performance Agent version 5.00 (Windows Server 2008, HP-UX 11i v3, Solaris 10, Red Hat 5.2+) with patch OVPANT00009 (Windows), PACPTHP_00002 (HP-UX), OVPASOL00008 (Solaris), or OVPALX00010 (Linux)

- HP Performance Insight version 5.41, 5.41.002 (HP-UX 11i v3, Solaris 10)

  Caution: HP Performance Insight must be installed before NNMi. If NNMi is installed before HP Performance Insight, note the following:

  - You will see the following message:
    ```
    Failure: Could not load
    \"/var/opt/OV/share/snmp_mibs/Standard/rfc1213-MIB-II\": MIB file cannot
    be accessed"
    ```

  - To prevent this failure, copy the `/var/opt/OV/misc/snmp-mibs` folder to `/var/opt/OV/share/` before running the HP Performance Insight installer.

  Caution: Uninstalling NNMi from the HP Performance Insight system causes an exception when running the HP Performance Insight MIB Browser. To prevent this exception, do the following:

  3. Uninstall NNMi.

4. Recreate the snmpmib MIB database by entering the following commands:
    ```
    mkdir -p /var/opt/OV/shared/nnm/conf/
    /opt/OV/lbin/nnmloadmib -load /usr/OVPI/mibs/GENMIB2IF.mib
    ```

5. Use the nnmloadmib command to load additional MIBs as needed.

    HP Performance Manager version 8.20, 9.00 (Windows Server 2008, HP-UX 11i v3, Solaris 10)

    HP Extensible SNMP Agent version 4.21 (HP-UX 11i v3, Solaris 10)

    HP Network Automation (NA) version 9.10 (Windows 2008 R2, Solaris 10, Red Hat 5.2+)

    xMatters, inc. (formerly AlarmPoint Systems) xMatters lite and xMatters mobile access version 4.0, 4.1

    IBM Tivoli Netcool/OMNIbus SNMP Probe version 7.2.1

Integrations

The following products have additional functionality available through an NNMi 9.10 integration. For updates to this list, see
sg-pro-ovweb.austin.hp.com/nnm/NNM9.10/supportmatrixupdate.htm. For information on specific features, see the Deployment Reference.

- HP Network Node Manager versions 6.x and 7.x (Integration built into NNMi; see *NNM 6.x/7.x Management Stations* in the NNMi help.)

- HP Asset Manager version 5.20 (with HP Connect-It 4.10), 5.21 (with HP Connect-It 4.11), 5.22 (with HP Connect-It 9.20), 9.30 (with HP Connect-It 9.30)

- HP Business Availability Center (BAC) Real User Monitor, My BAC, My BSM version 7.54, 8.03, 8.04

- HP Business Service Management (BSM) Real User Monitor (RUM), Run-time Service Model (RTSM), Operations Management (OMi), My BSM version 9.01

- HP Network Automation (NA) version 9.10

- HP Operations Manager for Windows (OMW) version 8.10, 8.16, 9.00

- HP Operations Manager for UNIX (OMU) version 8.30, 9.00, 9.10

- HP Operations Manager for Linux (OML) version 9.00, 9.10

- HP Operations Orchestration (HP OO) version 7.60.01, 8.1x, 9.00

    NOTE: NNM iSPI NET provides a different integration with HP OO. An embedded package of the required HP OO version is included with the NNM iSPI NET media. For specific information, see the NNM iSPI NET support matrix.

- HP Performance Insight (PI) version 5.31, 5.41, 5.41.002

    NOTE: The HP Performance Insight version 5.31 MIB browser does not work correctly when NNMi 9.1x is installed on the same system. For this reason, NNMi 9.1x does not support coexistence on a single server with HP Performance Insight version 5.31.

- HP ProCurve Manager Plus (PCM Plus) version 3.20

- HP Route Analytics Management Software (RAMS) version 9.00 for DL3x0 G7 (requires an NNMi Advanced license)

- HP SiteScope version 11.10

- HP Systems Insight Manager (SIM) version 5.30, 6.00, 6.10, 6.20, 6.30

- HP Universal CMDB (UCMDB) version 8.03, 8.04, 9.02 with patch, 9.03

  NOTE: NNMi cannot simultaneously integrate with HP Business Service Management (BSM) topology and HP UCMDB. If you want NNMi information in both databases, configure the HP NNMi–HP BSM Topology integration, as described in *HP Business Service Management Topology* in the [Deployment Reference] and the BSM integration with UCMDB, as described in the *UCMDB Data Flow Management Guide*, which is included on the UCMDB product media.

- xMatters inc. (formerly AlarmPoint Systems) xMatters lite, xMatters workgroup, xMatters enterprise, and xMatters mobile access version 4.0, 4.1

- Cisco Systems CiscoWorks LAN Management Solution (CiscoWorks LMS) version 3.2 SP1, 4.0.1

- Clarus Systems ClarusIPC$^+$ version 2.6.1 and later

- IBM Tivoli Netcool/OMNIbus version 7.2.1 (requires an NNMi Integration Module for Netcool Software license)

- NetScout nGenius Performance Manager version 4.7, 4.7 MR2, 4.8, 4.9 MR1

Supported Network Devices

For the list of supported network devices, see the NNMi Device Support Matrix at [sg-pro-ovweb.austin.hp.com/nnm/NNM9.10/devicematrix.htm].

This device support information is based on the latest information available to HP at the time of publication. Note that device vendors can at any time alter a device's MIB usage (for example, in newer IOS or system software versions) and invalidate NNM's interpretation of that device's MIB data.