Hewlett Packard
Enterprise

HPE Network Automation Software

Software Version: 10.11
Windows® and Linux® operating systems

Support Matrix

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Acknowledgements

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The title page of this document contains the following identifying information:

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Contents

Requirements

This section provides information about the supported hardware and software that you must have to successfully install and run HP Network Automation Software 10.11.

> **Note:** This document is updated as new information becomes available. To check for recent updates, or to verify that you are using the most recent edition of a document, go to: https://softwaresupport.hp.com/group/softwaresupport
>
> For more information, see "Documentation Updates" on page 2.

Physical Hardware

NA 10.11 is supported on the following hardware:

Windows and Linux

- Processor:

  - Intel® 64-bit (x86-64)

    > **Note:** NA does not support the Intel® Itanium® processor family.

  - AMD 64-bit (AMD64)

- Minimum processor speed: 2.5 GHz
- Minimum CPU size: 1 physical CPU with 6 cores

> **Note:**
>
> - For information about required CPU, RAM, and disk space, see "CPU, RAM, Swap Space, and Disk Space Recommendations" on page 29.
> - The NA core server must have a static IP address.
> - If you are using an external database, for the database server hardware and operating system requirements, see the database documentation.

Operating System

The following table lists the supported operating systems for the NA core and the NA satellite for NA 10.11.

The NA core runs on 64-bit architecture only. For information about upgrading from a 32-bit architecture, see "Upgrading to NA 10.11 from a Different System" or "Upgrading to NA 10.11 on the Same System" in the *NA Installation and Upgrade Guide*.

Supported Operating Systems for NA 10.11

Operating System	NA Core Supported	NA Satellite Supported
Microsoft® Windows Server 2008[1]		
R2 x64 Standard Edition with SP1 (or later service pack)	✓	None
R2 x64 Enterprise Edition with SP1 (or later service pack)	✓	
R2 x64 Datacenter Edition with SP1 (or later service pack)	✓	
Microsoft Windows Server 2012		
Standard Edition	✓	None
Datacenter Edition	✓	
Microsoft Windows Server 2012 R2		
Standard Edition	✓	None
Datacenter Edition	✓	
Note: The Windows Server 2012 and the Windows Server 2012 R2 operating systems do not fully support Expect. If the NA core server or NA client is running on the Windows Server 2012 or the 2012 R2 operating system, Expect scripts do not run correctly. If you need to run Expect scripts, do not install or upgrade to NA 10.11 on the Windows Server 2012 or the 2012 R2 operating system at this time.		
Linux[2]		
Oracle Linux 6.4 (or later minor version) with the Red Hat Compatible Kernel	✓	✓

[1]For recommended steps to install NA on Windows systems, see **"Installing NA on Windows Systems" on the next page**.
[2]See **"Linux: Support for Expect Scripts" on the next page**.

Supported Operating Systems for NA 10.11, continued

Operating System	NA Core Supported	NA Satellite Supported
Oracle Linux 7.1 (or later minor version) with the Red Hat Compatible Kernel	✓	None
Red Hat Enterprise Linux Server 6.4 (or later minor version)	✓	✓
Red Hat Enterprise Linux Server 7.1 (or later minor version)	✓	None
SUSE Linux Enterprise Server 11 SP3 (or later service pack)	✓	✓
Tip: Red Hat does not support direct upgrades from Red Hat Enterprise Linux Server 5.x to 6.0.		

Installing NA on Windows Systems

To install or upgrade NA on Windows systems, it is recommended to use any alternative connection mechanism to the system other than Remote Desktop or the tools that use RDP (Remote Desktop Protocol). Some suggestions are as follows:

- Connect to the console directly with the client of the virtualization software that you use.

   Note: Do not use the `/console` or the `/admin` flag of `mstsc.exe`.

- Use VNC (Virtual Network Computing) to connect to the server where NA is installed.
- Access the console session of the server on which NA is installed. You can access the session by connecting a physical monitor to the server.

Linux: Support for Expect Scripts

To run Expect scripts on Oracle Linux, the following 32-bit libraries must be installed on the NA core server:

- gtk2.i686
- libXtst.i686

Additionally, create symbolic links for the following 64-bit libraries:

```
ln -s /usr/lib64/libcurl.so<.X> /usr/lib64/libcurl.so.3
ln -s /usr/lib64/libssl.so<.X> /usr/lib64/libssl.so.6
ln -s /usr/lib64/libcrypto.so<.X> /usr/lib64/libcrypto.so.6
ln -s /usr/lib64/libexpat.so<.X> /usr/lib64/libexpat.so.0
```

Replace `<.X>` with the extension for the actual file in the `/usr/lib64` directory.

Databases

See the appropriate section for your environment:

Databases for Standalone NA Core

The following table describes the supported databases for NA 10.11 in a standalone NA core environment.

The NA database can be installed on any supported platform.

Supported Databases for NA 10.11 (Standalone NA Core)

Database Version	Supported NA Versions	Notes
Oracle 11g Release 2 (11.2.0.x starting with 11.2.0.3) Standard or Enterprise Edition	10.11	64-bit Oracle is supported. NA supports the use of Oracle Real Application Clusters (RAC) on Oracle 11g Release 2 (11.2.0.x starting with 11.2.0.3) Enterprise Edition.
Oracle 12c Standard or Enterprise Edition	10.11	64-bit Oracle is supported. NA supports the use of Oracle RAC on Oracle 12c Enterprise Edition.
Microsoft SQL Server 2008 Standard or Enterprise Edition SP3 Cumulative Update 4	10.11	64-bit Microsoft SQL Server is supported. NA supports the use of a SQL Server cluster and SQL Server named instances only for the following configurations:
Microsoft SQL Server 2008 R2 Standard or Enterprise Edition with one of the following patch levels: • SQL Server 2008 R2 SP1 Cumulative Update 6 • SQL Server 2008 R2 SP2	10.11	• 64-bit SQL Server Enterprise Edition 2008 SP3 Cumulative Update 4 (or later service pack) running on 64-bit Windows Server 2008 R2 Enterprise Edition SP1 (or later service pack) • 64-bit SQL Server Enterprise Edition 2008 R2 SP2 (or later service pack) running on 64-bit Windows Server 2008 R2 Enterprise Edition SP1 (or later service pack)

Microsoft SQL Server 2012 Standard or Enterprise Edition	10.11	64-bit Microsoft SQL Server is supported.
		
		NA supports the use of a SQL Server cluster and SQL Server named instances only for the following configuration:
		• 64-bit SQL Server Enterprise Edition 2012 with the following features:
		  • Failover Clusters
		  • AlwaysOn Availability Groups

Microsoft SQL Server 2014 Standard or Enterprise Edition	10.11	64-bit Microsoft SQL Server is supported. NA supports the use of a SQL Server cluster and SQL Server named instances only for the following configuration:

Supported Databases for NA 10.11 (Standalone NA Core), continued

Database Version	Supported NA Versions	Notes

		• 64-bit SQL Server Enterprise Edition 2014 with the following features:
		
		   • Failover Clusters
		
		   • AlwaysOn Availability Groups

MySQL 5.0.58	10.11	NA embeds the supported version of MySQL. This version runs on all NA-supported operating systems. Note: When connecting NA to an existing MySQL database, that database must be version 5.0.41 or a later minor version through 5.0.58. The database must use the InnoDB engine.

When using an external database, it is recommended to run the NA core and the NA database on separate physical machines. In addition, the database server should be dedicated to NA, rather than serving multiple applications.

Databases for Multimaster Distributed System

The following table describes the supported databases for NA 10.11 in a Multimaster Distributed System environment.

The NA database can be installed on any supported platform.

Supported Databases for NA 10.11 (Multimaster Distributed System)

Database Version	Supported NA Versions	Notes
Oracle 11g Release 2 (11.2.0.x starting with 11.2.0.3) Enterprise Edition	10.11	No more than five NA cores can be configured together in a Multimaster Distributed System environment.
Microsoft SQL Server 2008 Standard or Enterprise Edition SP3 Cumulative Update 4	10.11	No more than two NA cores can be configured together in a Multimaster Distributed System environment. The maximum number of managed devices should not exceed 6,500. NA does not support the use of Microsoft SQL Server Named Instances for Multimaster Distributed System environments.
Microsoft SQL Server 2012 Standard or Enterprise Edition	10.11	
Microsoft SQL Server 2014 Standard or Enterprise Edition	10.11	
MySQL	None	MySQL is not supported for Multimaster Distributed System environments.

For information about configuring a Multimaster Distributed System environment, see the *NA Multimaster Distributed System on Oracle Guide* or the *NA Multimaster Distributed System on SQL Server Guide*.

Databases for Horizontal Scalability

The following table describes the supported databases for NA 10.11 in a Horizontal Scalability environment.

The NA database can be installed on any supported platform.

Supported Databases for NA 10.11 (Horizontal Scalability)

Database Version	Supported NA Versions	Notes
Oracle 11g Release 2 (11.2.0.x starting with 11.2.0.3) Standard or Enterprise Edition	10.11	No more than five NA cores can be configured together with a single database in a Horizontal Scalability environment. NA supports the use of Oracle Real Application Clusters (RAC) on Oracle 11g Release 2 (11.2.0.x starting with 11.2.0.3) Enterprise Edition.
Oracle 12c Standard or Enterprise Edition	10.11	No more than five NA cores can be configured together with a single database in a Horizontal Scalability environment. NA supports the use of Oracle RAC on Oracle 12c Enterprise Edition.
Microsoft SQL Server 2008 Standard or Enterprise Edition SP3 Cumulative Update 4	10.11	No more than five NA cores can be configured together with a single database in a Horizontal Scalability environment. NA supports the use of a SQL Server cluster and SQL Server named instances only for the following configurations:
Microsoft SQL Server 2008 R2 Standard or Enterprise Edition with one of the following patch levels: • SQL Server 2008 R2 SP1 Cumulative Update 6 • SQL Server 2008 R2 SP2	10.11	• 64-bit SQL Server Enterprise Edition 2008 SP3 Cumulative Update 4 (or later service pack) running on 64-bit Windows Server 2008 R2 Enterprise Edition SP1 (or later service pack) • 64-bit SQL Server Enterprise Edition 2008 R2 SP2 (or later service pack) running on 64-bit Windows Server 2008 R2 Enterprise Edition SP1 (or later service pack)
Microsoft SQL Server 2012 Standard or Enterprise Edition	10.11	No more than five NA cores can be configured together with a single database in a Horizontal Scalability environment. NA supports the use of a SQL Server cluster and SQL Server named instances only for the following configuration: • 64-bit SQL Server Enterprise Edition 2012 with the following features: • Failover Clusters

Supported Databases for NA 10.11 (Horizontal Scalability), continued

Database Version	Supported NA Versions	Notes
		• AlwaysOn Availability Groups
Microsoft SQL Server 2014 Standard or Enterprise Edition	10.11	No more than five NA cores can be configured together with a single database in a Horizontal Scalability environment.
		NA supports the use of a SQL Server cluster and SQL Server named instances only for the following configuration:
		• 64-bit SQL Server Enterprise Edition 2014 with the following features:
		• Failover Clusters
		• AlwaysOn Availability Groups
MySQL	None	MySQL is not supported for Horizontal Scalability environments.

For information about configuring a Horizontal Scalability environment, see the *NA Horizontal Scalability Guide*.

Application Servers

Installing the NA core installs the required application server for NA.

Web Servers

Installing the NA core installs the required web server for NA.

Web Browsers and Plug-ins

The NA console runs in a web browser. Ensure that each NA user's web browser meets the specifications described here.

Web Browser Versions

One of the following supported web browsers with the following plug-ins is required to run NA 10.11:

• Microsoft Internet Explorer (32-bit and 64-bit) version 9

> **Note:** The 64-bit Microsoft Internet Explorer version 9 requires Adobe Flash Player Plug-in version 11.10 or later.

- Microsoft Internet Explorer (32-bit and 64-bit) version 10

  > **Note:** You must configure Transport Layer Security (TLS) manually for Microsoft Internet Explorer (32-bit and 64-bit) versions 9 and 10, to run NA 10.11.
  >
  > To configure TLS for Microsoft Internet Explorer (32-bit and 64-bit) versions 9 and 10, follow these steps:
  >
  > a. On the Internet Explorer, click **Tools** > **Internet Options** > **Advanced**, and then additionally select the **Use TLS 1.1** and **Use TLS 1.2** check boxes.
  >
  > b. Click OK.

- Microsoft Internet Explorer (32-bit and 64-bit) version 11
- Mozilla Firefox 38.x Extended Support Release (ESR) on a Windows or Linux client
  The ESR browser is available from: http://www.mozilla.org/en-US/firefox/organizations/all.html

  To preserve the Firefox extended support release version, disable automatic updating of the browser:

  a. In Firefox, click **Firefox > Options**.

  b. In the **Options** dialog box, select the **Advanced** pane, and the select the **Update** tab.

  c. Under Firefox updates, select **Check for updates**.

  d. Click **OK**.

  When accepting Firefox updates, do not update beyond the supported version.
- Apple Safari version 9.x on an OS X client
- Google Chrome (latest version)

Other Requirements

General web browser requirements:

- Disable all pop-up window blockers for the browser.
- Enable cookies for the browser.
- Enable JavaScript (active scripting) for the browser.
- For proper display of the device selector, install the following Adobe® Flash version:

  - *Windows*: 11.7.700.202 or later

  - *Linux*: 11.2.202.285 or later

  For information about disabling the use of Flash, see the *NA Administration Guide*.

Additional Requirements

The following additional requirements apply to NA10.11:

- "Network Requirements" below
- "Port Utilization" below
- "Additional Applications" below

Network Requirements

When the NA core server and the NA database server are different systems, the following requirements apply:

- The servers should be in the same data center.
- The connection between the servers should be at least 1 Gb/s Fast Ethernet, full duplex.
- The speed of the network interface cards (NICs) on the NA core server must be at least 1 Gb/s.

Port Utilization

NA communicates with devices using a combination of protocols and ports. If you use a given protocol, NA requires access to the corresponding port. Specifically, if NA communicates with devices protected by firewalls, these ports must be open, or you must use an alternative means of communication, such as an NA Satellite server. For information about allocating ports, see "Ports" in the *NA Administration Guide*.

Additional Applications

You might need access to the following optional applications:

- Adobe Reader version 6.0 or later to view the NA documentation
- Microsoft Excel 2000 or later to view Summary Reports
- ActivePerl 5.16.x or later (for Windows)
- Perl 5.16.x or later (for Linux)
- Perl Net::SSH::Expect module (for using the Opsware::NAS::Connect module with SSH), Linux only

> **Note:** SSH connections to the NA Perl API require the Net::SSH::Expect module. Due to limitations of ActiveState ActivePerl on Windows, the NA Perl API does not support SSH connections from Windows systems. As a workaround, install the NA client on a supported Linux system, and run the NA Perl API from that system.

Compatibility

This section provides information about optional software and configurations that are compatible with HP Network Automation Software 10.11.

Languages

NA10.11 is localized in the following languages:

- French
- German
- Japanese
- Korean
- Russian
- Simplified Chinese
- Spanish

NA 10.11 can run on an operating system running under the following character sets:

- GB2312 for Simplified Chinese
- Shift-JIS for Japanese
- EUC-KR for Korean

Note: To switch the locale of an English Windows Server platform to Asian languages, the double-byte character set (DBCS) support must first be installed.

NA accepts a local language in the following places:

- Comment fields
- Description fields
- Custom data labels
- Custom data fields
- Most name and text fields, such as device location and vendor

Tip: NA does not accept the apostrophe character (', unicode 0027) in user input in any language. Instead, use the right single quotation mark (', unicode 2019).

You can search on single and multi-byte character sets, as long as the field being searched accepts them. You can also import and export configuration policies that contain single and multi-byte character sets.

Note: On Windows systems, NA does not support installation using directory paths with localized characters. The path name for the NA installation directory can contain English characters only.

Before using Internet Explorer to access the NA console on an NA core server that is configured to support an Asian Language, install the East Asian Language as follows:

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.

Oracle Localization Considerations

NA supports UTF-8 non-English Oracle locales.

When using NA globalization support with Oracle, specify the appropriate database character set when creating a new Oracle database. In addition, if the language you select is double-byte encoded, for example Chinese, Korean, or Japanese, you might also want to set the NLS_LENGTH_SEMANTICS initialization parameter to CHAR, so that one double-byte character set (DBCS) character is counted as "one" instead of "two."

SQL Server Localization Considerations

During NA installation, you are prompted to select a collation type for configuring a new SQL Server database.

SQL Server collation dictates the character set that is stored in the database. For example, if you select a Chinese collation, you can only enter Chinese characters, not Japanese, Korean, and so on. You can always enter Latin characters regardless of the collation type.

For SQL Server, NA supports the following collations:

- Chinese_PRC_CI_AS
- Cyrillic_General_CI_AS
- Japanese_CI_AS
- Korean_Wansung_CI_AS
- SQL_Latin1_ General_Cp1_CI_AS

For more information about collations, see the documentation for your database.

MySQL Localization Considerations

NA in any of the localized languages is supported with MySQL for an English language MySQL database server only. The use of a non-English MySQL database server installation is not supported.

For MySQL, NA supports the following collations:

- euckr
- gb2312
- latin1
- sjis
- utf8

For more information about collations, see the documentation for your database.

Internationalization Variances

NA10.11 runs on all locales as stated in this document with the following known variances.

Summary Report Generation

The following error indicates that NA does not correctly interpret the date format of the NA core server:

The Generate Summary Reports tasks fail with : There was a problem generating the Summary Reports: javax.ejb.EJBException: RuntimeException

When this error occurs, the `jboss_wrapper.log` file contains the following error:

Caused by: java.sql.SQLException: ORA-01843: invalid month

(The string invalid month is written in the localized language.)

In response to this error, configure NA with the date format that the NA core server is using. Follow these steps:

1. Determine the system date format on the NA core server.

   (On Windows operating systems, use the Short Date on the Formats tab of the Region and Language control panel.)

2. Change to the directory that contains the `.rcx` files:

   - *Windows*: `<NA_HOME>\jre`

   - *Linux*: `<NA_HOME>/jre`

3. Back up the `reporting.rcx` file to a location outside the `<NA_HOME>` directory.

4. In a text editor such as WordPad or vi, open the `reporting.rcx` file.

5. Search for the string `TO_CHAR` to locate the following lines:

```
<value>
    select TO_CHAR(dal.CreateDate, 'MM/DD/YYYY'), count(*)
    from RN_DEVICE_ACCESS_LOG dal, RN_DEVICE dev
    where dal.DeviceID = dev.DeviceID
    and ActionTaken like 'New config id%'
    and (AccessTrigger is NULL or AccessTrigger not like '%user-modified%')
    and TO_DATE(SYSDATE, 'dd-mon-yyyy') - TO_DATE(dal.CreateDate, 'dd-mon-yyyy') &lt;
14
    group by TO_CHAR(dal.CreateDate, 'MM/DD/YYYY'),
TO_CHAR(dal.CreateDate,'DDD')
    order by TO_CHAR(dal.CreateDate,'DDD')
</value>
```

6. Within the identified lines, change each instance of the date format to match the system date format of the NA server. (Change two instances of `MM/DD/YYYY` and two instances of `dd-mon-yyyy`.)

For example, if the system date format is yyyy/MM/dd, update this section to read:

```
<value>
    select TO_CHAR(dal.CreateDate, 'YYYY/MM/DD'), count(*)
    from RN_DEVICE_ACCESS_LOG dal, RN_DEVICE dev
    where dal.DeviceID = dev.DeviceID
    and ActionTaken like 'New config id%'
    and (AccessTrigger is NULL or AccessTrigger not like '%user-modified%')
    and TO_DATE(SYSDATE, 'yyyy-mm-dd') - TO_DATE(dal.CreateDate, 'yyyy-mm-dd') &lt; 14
    group by TO_CHAR(dal.CreateDate, 'YYYY/MM/DD'),
TO_CHAR(dal.CreateDate,'DDD')
    order by TO_CHAR(dal.CreateDate,'DDD')
</value>
```

7. Reload the `.rcx` settings by doing *one* of the following:

   - Run the `reload server options` command from the NA proxy.

   - On the User Interface page (**Admin > Administrative Settings > User Interface**) of the NA console, click **Save**.

   - Restart the NA management engine.

Note: Upgrading NA might overwrite the `reporting.rcx` file. Be prepared to replicate this configuration change after every upgrade.

NNMi Event Rules

The following NNMi Event Rules are used for the HP NNMi-HP NA integration and cannot be localized.

For detailed information about NNMi Event Rules, see the *HP Network Node Manager i Software—HP Network Automation Integration Guide*" which is available from the HP manuals site: https://softwaresupport.hp.com/group/softwaresupport

- NA/NNMi Integration Out Of Service
- NA/NNMi Integration Rediscover Host
- NA/NNMi Integration SNMP Community String Propagate
- NA/NNMi Integration using SNMP Traps (NNMi Server)
- NA/NNMi Topology Synchronization for Device Addition
- NA/NNMi Topology Synchronization for Device Deletion

Entering Non-English Text into the Device Selector from Firefox

If you are using Firefox, you cannot use the Input Method Editor (IME) to enter non-English text into the Device Selector.

Workaround: Enter non-English text into a text editor, and then paste the contents from the text editor into the Device Selector.

Multi-Task Projects Setup

For multi-task projects, if a sub-task completes with a Warning status, you can continue to run subsequent sub-tasks or cancel all of the remaining sub-tasks. This feature enables you to cancel tasks that are running against a device that could be experiencing issues.

To enable this feature:

1. On the **Admin** menu, click **Custom Data Setup**.
2. On the **Custom Data Setup** page, select Tasks from the **Custom Data Setup** list.
3. Under **Tasks**, locate the 6th API Name group. For this group, do the following:
   a. Select the **API Name** check box.
   b. In the **API Name** box, enter:

      `subtask_control`

      > **Note:** subtask_control must be entered in English.

   c. In the **Display Name** box, enter:

      `Cancel remaining tasks that have warning messages`
   d. For **Values**, select the **Limit to:** check box, and then enter:

      `Yes, No`

      > **Note:** Yes, No must be entered in English.

4. Click **Save**.

If this feature is enabled, when you create sub-tasks for multi-task projects, the following field appears under the Comments field on all multi-task sub-task pages:

`Cancel remaining tasks that have warning messages`

This field includes the following options:

- Blank— The remaining sub-tasks continue to run.
- Yes— The remaining sub-tasks are canceled.
- No— The remaining sub-tasks continue to run.

> **Note:** To disable this feature, on the **Custom Data Setup** page, under **Tasks**, clear the **API Name** check box for subtask_control, and then click **Save**.

QCCR1D98865: Using the Device Group Selector

With encoding in a format other than UTF-8, some Chinese characters will not be displayed when using the Device Group Selector.

QCCR1B98842: Some garbage characters in the Search Results CSV file of a report

NA saves search results as a CSV file encoded in UTF-8. Microsoft Office Excel does not correctly display some non-English characters in the CSV file.

Workaround: Open the CSV files in a text editor that can read UTF-8.

Virtualization Products

The following table lists the supported virtual servers for NA10.11. This information applies to the NA core and the NA satellite.

Supported Virtual Servers for NA10.11

Virtual Server	Supported Operating System Types	Notes
VMware®: • ESXi™ 5.0 • ESXi 5.1 • ESXi 5.5 • ESXi 6.x	• Host OS: • Windows • Linux • Guest OS: Any of the operating systems listed in "Operating System" on page 6	The virtual environment must meet the x86-64 or AMD64 hardware requirements listed in "Physical Hardware" on page 5. NA supports live migration of the NA core server using VMware vMotion.
Microsoft Hyper-V 2008 R2 with SP1 (or later service pack)	• Host OS: Windows Server 2008 R2 x64 with SPI (or later service pack) • Guest OS: Any of the Windows Server 2008 operating systems listed in "Operating System" on page 6	The virtual environment must meet the x86-64 or AMD64 hardware requirements listed in "Physical Hardware" on page 5.
Microsoft Hyper-V 2012	• Host OS: Windows Server 2012 • Guest OS: Any of the Windows Server 2012 operating systems listed in "Operating System" on page 6	The virtual environment must meet the x86-64 or AMD64 hardware requirements listed in "Physical Hardware" on page 5.
Microsoft Hyper-V 2012 R2	• Host OS: Windows Server 2012 R2 • Guest OS: Any of the Windows Server 2012 R2 operating systems listed in "Operating System" on page 6	The virtual environment must meet the x86-64 or AMD64 hardware requirements listed in "Physical Hardware" on page 5.
Oracle VM 3.3 or later minor versions	• Guest OS: Any of the operating systems listed in "Operating System" on page 6	The virtual environment must meet the x86-64 or AMD64 hardware requirements listed in "Physical Hardware" on page 5.
Red Hat Enterprise Virtualization 3.5 or later **Note:**	• Guest OS: • Windows • Linux	The virtual environment must meet the x86-64 or AMD64 hardware requirements listed in "Physical Hardware" on page 5.

Supported Virtual Servers for NA10.11, continued

Virtual Server	Supported Operating System Types	Notes
Supported only for entry, small, and medium tiers.		

If you are running NA in a virtual environment, review the follow guidelines:

- Ensure that the NA environment meets the requirements detailed in "Network Requirements" on page 15.

- Because NA can be network intensive, many virtual machines sharing a virtual switch and network interface card could result in unexpected behavior, including time-outs and failed tasks.

- Each virtual environment is different and could function differently under loads with shared VM guests.

- On a virtual server, it is recommended that the disk I/O be split. The virtual server must have two arrays:
  - One array for the host operating system

  - One array for the virtual machines

- If you plan to use virtual machines for both the NA core server and the database server, ensure that they are running on different guests. It is recommended to host the database virtual machine on a different array to avoid conflicting I/O on the array. Verify that the database is supported in a virtual environment.

- With ESX and an NA database running on Oracle, the maximum number of active NA cores in a Horizontal Scalability environment is five.

- When configuring NA on virtual machines in a Multimaster Distributed System environment, the maximum number of NA cores is two.

- Some virtual guests time drift, which can be an issue and should be corrected. Synchronizing the guests to an external time source can solve this issue.

- Each NA core server guest system must be configured with a set reservation for the CPU and memory requirements described in "CPU, RAM, Swap Space, and Disk Space Recommendations" on page 29.
  - Configure the set reservation as the minimum requirements for the NA core server guest system.

  - Ensure that the resource pool containing the NA core server guest system has adequate resources to consistently deliver the CPU and memory reservations to the NA core server guest system.

Performance Issues

To counter performance issues while running NA in a virtual environment, do the following:

- Increase hardware resources on the physical host.
- Ensure that resources are dedicated to the NA core server guest system.
- Decrease the number of guests running simultaneously.
- Add a network interface card dedicated to NA to the virtual server.

Tip: After any configuration change to the NA core server guest system, restart all NA services.

A large number of concurrent tasks increases NA resource demand. If performance issues arise, reduce the number of concurrent tasks or provide more resources to the NA virtual server. (This suggestion also applies to physical servers.)

Troubleshooting and Support

HP Support will endeavor to support NA in a virtual environment, and HP does not require customers to recreate and troubleshoot every product issue in a non-virtual environment. However, HP reserves the right to request that customers diagnose certain issues in a native, certified operating system environment without the virtual image. HP only makes this request when there is strong indication to believe that the virtual environment is a contributing factor to the issue.

High-Availability Products

- High availability of the NA application can be achieved through NA core failover in a Horizontal Scalability environment. For information, see the *NA Horizontal Scalability Guide*.

- High availability of the NA database can be achieved through database clustering. For information about the supported database clustering mechanisms, see "Databases" on page 7.

- High availability of the NA core can be achieved through VMware High Availability (HA). For information about VMware Virtual Machine (VM)-HA testing for NA 10.11, see "Details of VMware Virtual Machine (VM)-HA Testing for NA 10.11" below.

- NA supports live migration of the NA core server using VMware vMotion.

Details of VMware Virtual Machine (VM)-HA Testing for NA 10.11

- NA supports the following HA Scenarios:

  - VMware server/host failure

  - OS failure within a VM

- VMware HA Setup:

  - The VMware server/host failure is configured using the 'Host monitoring' cluster feature. This requires two or more hosts in a cluster.

  - The VMware OS failure, within the VM, is configured using the 'VM monitoring' cluster feature. This requires the VMware tool to be installed on the VMs.

- Test Results summary:

  The estimated time taken for HA is less than two minutes. However, this can vary depending on the configuration and the hardware specifications.

  The behavior of NA, after it is recovered from HA, is identical to the one when NA is restarted abruptly while the tasks are being executed.

  The expected NA tasks, after it is recovered from HA, are as follows:

  - Failed Tasks: All the tasks that were in the RUNNING state before HA, move to the FAILED state post HA and display the following message:

    ```
    This task was interrupted and did not complete successfully. The Core was shut down
    while the task was still running. You will need to run this operation again.
    ```

- Skipped Tasks: All the tasks that were in the WAITING state before HA, move to the SKIPPED state post HA and display the following message:

  This task was skipped because the server shut down while the task was waiting to run.

- Pending Tasks: All the tasks that were in the PENDING state before HA, either continue to stay in the PENDING state or move to the RUNNING state (if the scheduled time becomes current), post HA.

- Running Tasks: A few tasks that were in the RUNNING state before HA, either become erratic or stay in the RUNNING state post HA even after the maximum task length is over. To cancel these tasks, delete them manually from the UI.

- HA on the VM hosting the DB: If NA loses connection with the DB, a number of DB connection errors, such as ResourcePool could not be acquired, can be seen in the jboss_wrapper.log file.

HP Software Integrations

The following table lists the products that have additional functionality available through an integration with NA 10.11. Unless otherwise stated, patched versions of NA also integrate with patched or unpatched versions of the products listed here.

The most current information about HP software that integrates with NA 10.11 can be found at the HP Support web site. See http://support.openview.hp.com/sc/solutions/index.jsp#tab=tab3.

Supported Integrations with NA

Integrating Product	Versions	Notes
HP Business Service Automation Essentials (BSAE)	• 9.11 • 9.20	All versions require the NA-provided hotfix for QCCR1B133534 applied to the BSAE system.
HP Live Network Connector (LNc)	3.40.0 or later	The latest HP Live Network Connector is recommended.
HP Network Node Manager i Software (NNMi)	• 10.00 • 10.01 • 10.10	Documented in the *HP Network Node Manager i Software—HP Network Automation Integration Guide* version 10.00 or later. It is recommended that NA and NNMi each run on a dedicated server.
HP Operations Orchestration Software (HP OO)	• 10.20 • 10.50	For the supported HP OO content packs, see http://support.openview.hp.com/sc/solutions/index.jsp#tab=tab3 .
HP Server Automation Software (SA)	• 10.00 • 10.20 • 10.22	

HP Software Coexistence

NA 10.11 can be installed on the same system with the following HP product:

- HP Network Node Manager i Software (NNMi) version 10.00, 10.01, and 10.10.

> **Note:** Install NNMi before installing NA.

> **Note:** It is recommended that NA and NNMi each run on a dedicated server.

Other Software Coexistence

No coexistence information for NA 10.11 with third-party software is available.

Performance and Sizing

NA10.11 has been tested at scale for several NA deployment tiers. For each tier, the number of tasks for that tier ran to completion within a 24 hour period for the associated hardware environment described in CPU, RAM, Swap Space, and Disk Space Requirements on page 10.

All tests were run with the NA core servers and database servers in the same physical location, resulting in near zero latency. Large scale tests were run with the NA core servers on both physical and virtual hardware using ESX.

The following table describes the tested managed environment for each tier.

- The rows in the *Input: Managed Environment* section define the test environment for each tier.
- The rows in the *Output: Deployment Architecture* section define the tested NA deployment architecture for each tier.
- The row in the *Configuration Environment* section points to the configuration requirements for each managed environment size.

To select the appropriate tier for your environment, follow these steps:

1. For each row in the *Input: Managed Environment* section of the table, determine the current value for your managed environment, and then add an amount that estimates the growth of your network over the next two years.

2. For each row in the *Input: Managed Environment* section of the table, identify the managed environment size (column) that contains the values determined in step 1.

3. If the input values point to different managed environment sizes, implement the larger size.

   For example, a managed environment with 13k tasks per day fits into the medium environment size.

Managed Environment Size

Factor	Small Tier	Medium Tier	Large Tier	Extra Large Tier
Input: Managed Environment				
Number of Managed Devices	Up to 3k	Up to 10k	Up to 50k	Up to 100k
Number of Tasks Per Day[1]	Up to 12k	Up to 45k	Up to 200k	Up to 400k
Output: Deployment Architecture				
Minimum Number of NA Cores	1 small NA core	1 standard NA core	• When using standard NA core servers, 1 NA core per 10k managed devices • When using high powered NA core servers, 1 NA core (to account for user and programmatic interaction with NA) plus 1 high powered NA core per 25k managed devices All NA cores connected to a single database with NA Horizontal Scalability	1 high powered NA core (to account for user and programmatic interaction with NA) plus 1 high powered NA core per 25k managed devices All NA cores connected to a single database with NA Horizontal Scalability
Database	• Size <250 GB: Embedded MySQL[2] • Size >250 GB: Remote Oracle or Microsoft SQL Server	Remote Oracle or Microsoft SQL Server	Remote Oracle or Microsoft SQL Server	Remote Oracle or Microsoft SQL Server

[1]Number of tasks per day includes both scheduled tasks and ad hoc tasks resulting from detected configuration changes. Scheduled tasks were distributed to start throughout the day.
[2]For information about predicting database size, see "Approximating Database Size (MySQL only)" on the next page.

Managed Environment Size, continued

Factor	Small Tier	Medium Tier	Large Tier	Extra Large Tier
Configuration Environment				
System Recommendations	"Small Tier System Configuration Recommendations" on the next page	"Medium Tier System Configuration Recommendations" on page 30	"Large Tier System Configuration Recommendations" on page 31	"Extra Large Tier System Configuration Recommendations" on page 31

File System Layout

This topic describes the NA file system layout.

- Most of the NA core files are installed into the `<NA_HOME>` directory. This folder size grows as you add device software images to NA and as NA collects log data. The default location of the `<NA_HOME>` directory is as follows:

  - *Windows*: `C:\NA`

  - *Linux*: `/opt/NA`

- NA installs a few small files across the operating system. These files do not grow over time, so they do not impact sizing requirements.

- The embedded database is installed into the `/opt/MySQL` directory. This folder size grows with NA data and MySQL logs.

Approximating Database Size (MySQL only)

For MySQL, the size of the NA database can be approximated as follows:

2 * (average device configuration size) * (number of configuration records)

The average device configuration size must be determined specifically for the managed devices in your network.

The number of configuration records can be estimated by using one of the following approaches:

- The average number of device configurations changed every day multiplied by the number of days in the data retention period:

  (average device configuration changes per day) * (days in retention period)

  For example, for a network with 3000 devices, five percent of which are updated daily, and a one year retention period, the expected number of configuration records is 54,750. The calculation is as follows:

  (5% * 3000) * 365 = 54,750

- The number of devices multiplied by the average number of device configuration changes during the data retention period:

  (number of devices) * (average device configuration changes for the retention period)

  For example, for a network with 3000 devices, each of which is updated once every three weeks, and a one year (52 week) retention period, the expected number of configuration records is 52,000. The calculation is

as follows:

3000 * (52/3) = 52,000

CPU, RAM, Swap Space, and Disk Space Recommendations

The topics in this section describe the recommended hardware environment for each of the managed environment tiers defined in "Performance and Sizing" on page 26.

To determine the system recommendations for your environment, see the topic associated with the tier you selected in "Performance and Sizing" on page 26. This section includes the following information:

- "Small Tier System Configuration Recommendations" below
- "Medium Tier System Configuration Recommendations" on the next page
- "Large Tier System Configuration Recommendations" on page 31
- "Extra Large Tier System Configuration Recommendations" on page 31
- "Demonstration System Configuration Recommendations" on page 32

For additional information about sizing and configuring the database server, consult the database manufacturer's documentation.

> **Note:** These recommendations can help you select hardware for a new installation of NA. In an upgrade scenario, if the current NA deployment performs adequately, you do not need to procure new equipment before upgrading to NA 10.11.

Small Tier System Configuration Recommendations

The following table describes the recommendations for the small tier based on performance testing results.

Server	CPU	Memory	Swap Space	Disk Space
Separate Small NA Core Server	6 cores (for example,1 physical CPU with 6 cores)	16 GB RAM	16 GB	40 GB minimum 150 GB recommended (includes space for software images and log files when tracing is enabled)
Separate Database Server (Oracle or SQL Server only)	12 cores (for example, 2 physical CPUs with 6 cores per CPU)	16 GB RAM	16 GB	512 GB, Fibre Channel hard disk drive
Combined NA Core Server and Database Server (MySQL only)	6 cores (for example,1 physical CPU with 6 cores)	32 GB RAM	16 GB	256 GB, Fibre Channel hard disk drive

Medium Tier System Configuration Recommendations

The following table describes the recommendations for the medium tier based on performance testing results.

Server	CPU	Memory	Swap Space	Disk Space
Separate Standard NA Core Server	8 cores (for example, 2 physical CPUs with 4 cores per CPU)	32 GB RAM	16 GB	50 GB minimum 150 GB recommended (includes space for software images and log files when tracing is enabled)
Separate Database Server (Oracle or Microsoft SQL Server only)	• Oracle: 12 cores (for example, 2 physical CPUs with 6 cores per CPU) • SQL Server: 8 cores (for example, 2 physical CPUs with 4 cores per CPU)	32 GB RAM	16 GB	• Oracle: 600 GB, Fibre Channel hard disk drive • SQL Server: 400 GB, Fibre Channel hard disk drive

Large Tier System Configuration Recommendations

The following table describes the recommendations for the large tier based on performance testing results.

Server	CPU	Memory	Swap Space	Disk Space
Separate Standard NA Core Server[1]	8 cores (for example, 2 physical CPUs with 4 cores per CPU)	32 GB RAM	16 GB	50 GB minimum 150 GB recommended (includes space for software images and log files when tracing is enabled)
Separate High Powered NA Core Server[2]	12 cores (for example, 2 physical CPUs with 6 cores per CPU)	64 GB RAM	4 GB	50 GB minimum 150 GB recommended (includes space for software images and log files when tracing is enabled)
Separate Database Server (Oracle or Microsoft SQL Server only)	12 cores (for example, 2 physical CPUs with 6 cores per CPU)	48 GB RAM	16 GB	Depends on database type and managed device count: • Oracle: 600 GB for 10k devices plus 300 GB for each additional 10k devices For example, for 40k devices, provide at least 1.5 TB. • SQL Server: 300 GB for 10k devices plus 150 GB for each additional 10k devices For example, for 40k devices, provide at least 750 GB.

[1]This row describes a standard single NA core server. Each of these NA cores can manage up to 10k devices.

[2]This row describes a high powered single NA core server. Each of these NA cores can manage up to 25k devices. Plan for 1 NA core (to account for user and programmatic interaction with NA) plus 1 NA core per 25k managed devices.

Extra Large Tier System Configuration Recommendations

The following table describes the recommendations for the extra large tier based on performance testing results.

Server	CPU	Memory	Swap Space	Disk Space
Separate High Powered NA Core Server[1]	12 cores (for example, 2 physical CPUs with 6 cores per CPU)	64 GB RAM	4 GB	50 GB minimum 150 GB recommended (includes space

Server	CPU	Memory	Swap Space	Disk Space
				for software images and log files when tracing is enabled)
Separate Database Server (Oracle or Microsoft SQL Server only)	12 cores (for example, 2 physical CPUs with 6 cores per CPU)	72 GB RAM	16 GB	Depends on database type and managed device count: • Oracle: 600 GB for 10k devices plus 300 GB for each additional 10k devices For example, for 70k devices, provide at least 2.4 TB. • SQL Server: 300 GB for 10k devices plus 150 GB for each additional 10k devices For example, for 70k devices, provide at least 1.2 TB.

[1]This row describes a high powered single NA core server. Each of these NA cores can manage up to 25k devices. Plan for 1 NA core (to account for user and programmatic interaction with NA) plus 1 NA core per 25k managed devices.

Demonstration System Configuration Recommendations

The following table describes the minimum recommended hardware environment for a demonstration system. This system can be used for evaluating HP Network Automation Software and is not intended for production use.

Server	CPU	Memory	Swap Space	Disk Space
Combined Application Server and Database Server (MySQL only)	1 physical CPU with 6 cores	4 GB RAM	2 GB	40 GB

Tuning Settings

NA 10.11 recommends the following configurations for performance tuning.

Java Virtual Machine Configuration

The following table lists the recommended initial Java heap size depending on the NA core server size.

NA Core Server Size	Initial Java Heap Size
Small NA Core Server	at least 8 GB (8192)

NA Core Server Size	Initial Java Heap Size
Standard NA Core Server	at least 8 GB (8192)
High Powered NA Core Server	at least 40 GB (40960)

The recommended Java virtual machine (JVM) configuration is:

- Initial Java heap size: from the table
- Maximum Java heap size: the same value as the initial Java heap size
- Young generation size: one-third of the initial Java heap size

For information about how to configure the NA JVM, see *Configuring the Java Virtual Machine* in the *NA Administration Guide*.

For NA installed on a Linux operating system, you must edit the `truecontrol` file (`/etc/init.d/truecontrol`) to avoid any performance issues with JVM. To edit the file, follow these steps:

1. In the truecontrol file, add the following lines after `umask 077`:

   `MALLOC_CHECK_=0`

   `export MALLOC_CHECK_`

2. Save the file.
3. Restart NA.

Maximum Concurrent Tasks

The following table lists the recommended configuration for maximum concurrent tasks depending on the NA core server size.

NA Core Server Size	Maximum Concurrent Tasks
Small NA Core Server	20
Standard NA Core Server	65 on each NA core
High Powered NA Core Server	260 on each NA core

For information about how to configure the maximum concurrent tasks value, see *Tuning the NA Management Engine* in the *NA Administration Guide*.

MySQL

It is recommended to configure MySQL to use an unlimited number of threads. For more information, see *Configuring MySQL for NA* in the *NA Administration Guide*.

Oracle

It is recommended to configure the maximum number of processes, sessions, and transactions for the Oracle database relative to the maximum number of concurrent tasks for NA. For more information, see *Configuring Oracle for NA* in the *NA Administration Guide*.

SQL Server

At this time, there is no recommended tuning for Microsoft SQL Server with NA.

Additional Compatibility Information

NA 10.11 supports the following additional configurations:

- "Disaster Recovery" below
- "Authentication" below
- "HP Network Automation Software Supported Devices Matrix" on the next page

Disaster Recovery

For information, see the *NA Disaster Recovery Configuration Guide*, available from the HP Product Manuals web site at https://softwaresupport.hp.com/group/softwaresupport. Use your HP Passport account to access this site, or register a new HP Passport identifier.

Authentication

The following table lists the authentication components that have been tested with NA 10.11.

Supported Authentication Components for Accessing NA 10.11

Authentication Type	NA Console	NA Command-Line Interface
Microsoft Active Directory on Windows Server 2008 with Domain and Forest function level: Windows 2000	✓	✓
Cisco Secure Access Control System version 3.1 for TACACS and RADIUS	✓	✓
Cisco Secure Access Control System version 5.1 for TACACS and RADIUS (recommended)	✓	✓
OpenLDAP version 2.4.23	✓	✓
Public Key Infrastructure (PKI) user authentication	✓	For NA proxy sessions initiated from the NA console

RSA Authentication Manager version 7.1 with the following token type:
 	
- Token file format: SDTID3
- Software token device type:
  - Generic AES 128
  - (Passcode / Tokencode Only) Desktop PC AES 128-bit 3.0.x
	✓	✓

> **Note:** For RSA authentication to devices from NA, note the following:
>
> - NA must be running on a Windows operating system.
> - RSA SecurID Software Token version 4.1.2 for Microsoft Windows (64-bit) installed in a single database must be installed on the NA core server.
>
>   To install RSA SecurID Software Token in a single database, run the installer from the command line with the SETSINGLEDATABASE property to TRUE. For more information, see the RSA documentation.

Satellite Configuration

NA 10.11 delivers the version gw-50.0.37394.0 of the gateway software.

Satellite configurations use SA tunnels. Sharing Gateways between SA and NA is supported in SA 7.50 and NA 10.11.

To run an NA and SA Satellite co-residency environment, you will need two CPUs, 4 GB RAM, and 128 GB disk space. You can only manage 1,500 servers and 5,000 network nodes. For information about configuring a Satellite environment, see the *NA Satellite Guide*.

HP Network Automation Software Supported Devices Matrix

To access the *NA Supported Devices Matrix*, view the *Supported Devices List- NA 9.1x -10.x* document on the HP Live Network web site: https://hpln.hp.com/hpln-content-catalog/download/28111/7088

Access to this page requires an HP Live Network user account.

Obsolescence Plans

Announced obsolescence for older versions of HP Network Automation Software is as follows:

NA Version	Released	End of Support Notification	End of Committed Support	End of Support
9.0x		Jan 01, 2013	Mar 31, 2015	Mar 31, 2015
9.1x	Jul 11, 2011	Jul 01, 2012	Jul 31, 2015	Jul 31, 2017
9.2x	Aug 28, 2012	Oct 01, 2012	Aug 31, 2016	Aug 31, 2018
10.0x	Sept 23, 2014	Oct 16, 2014	Sept 30, 2018	Sept 30, 2020
10.1x	Jun 06, 2015	Jul 07, 2015	Jun 30, 2019	Jun 30, 2021

For more information, see https://softwaresupport.hp.com/obsolescence-migrations

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