Network Automation

Software Version: 10.30

Install and Upgrade guide

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Introduction

This guide includes information on upgrading to or installing Network Automation (NA) on a single NA Core. Distributed System and Satellite configurations require additional information before upgrading. Please consult the Distributed System and Satellite documentation before following the instructions in this guide.

This chapter contains the following topics:

- "HPE Network Automation Support Matrix" below
- "Installation Overview" on the next page
- "Pre-Installation Checklist" on the next page
- "Additional NA Configurations" on page 12
- "HPE Marketplace Service" on page 12
- "Summary Reports" on page 13

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HPE Network Automation Support Matrix

For information on hardware and software requirements, database requirements, integrations with other products, coexistence with other products, additional required applications, internationalization and localization support, and other installation requirements, see the *Support Matrix*.

Installation Overview

NA 10.21 and NA 10.11 Users

You can upgrade from NA 10.21 or NA 10.11 directly to NA 10.30 as described in "Upgrading to NA 10.30 on the Same System" on page 34 or "Upgrading to NA 10.30 from a Different System" on page 14.

> **Note:** Before upgrading NA, move any existing `*.backup` files from the `<NA_HOME>/server/lib/scripts/Database/Truecontrol` directory to a location outside the NA directory structure.

NA 10.30 Users

For a new NA 10.30 installation, see "Installing NA 10.30" on page 53.

Pre-Installation Checklist

To successfully install HPE Network Automation (NA), you should review the pre-install checklist in Table 1.

> **Note:** When upgrading NA, all of the wrapper configuration files (files such as `jboss_wrapper.conf` and `syslog_wrapper.conf`) will be overwritten. It is recommended that you take a back up of these files before upgrading.

Table 1 Pre-Installation Checklist

Area	Consideration
User Information	How many users will be using NA?
	How many different roles will NA users represent?
	Are you using individual credentials for tasks or single sign-on?

Table 1 Pre-Installation Checklist, continued

Area	Consideration
Installation Information	What is the FQDN of the server on which NA will be installed?
	What OS will be running on the server onto which NA will be installed?
	What path will NA be installed into?
	Are there other applications running on the server on which NA will be installed?
	What database will you be using (PostgreSQL, Oracle, or Microsoft® SQL Server)? **Note**: If you are using Oracle, you will need to create an Oracle database. For information on configuring an Oracle database, see the Oracle documentation.
	What is the fully qualified domain name of the database server?
	For the database server, the user must have privileges to create users and databases. **Note**: This information is needed during NA install to create the appropriate users and databases.
	What TCP port is the database listening on for remote connections?
	If NA installs PostgreSQL as part of the installation, what directory will PostgreSQL be installed into? **Note**: If PostgreSQL is not installed on the same system as NA, what port is PostgreSQL running on and what is its fully qualified domain name?
	Do you have the proper device credential information to access devices? **Note:** Devices can be grouped by credential.
	Do any access-lists need to be modified for the NA server to access devices?
	Do you have a device group plan?
	Do you plan to use dynamic device groups?
	Do you plan to create groups during a bulk import via a CSV file?
	Do you plan on using detect network devices and do you have your IP address range(s)?

Table 1 Pre-Installation Checklist, continued

Area	Consideration
Distributed System Configurations (See the *Multimaster Distributed System on Oracle* or the *Multimaster Distributed System on SQL Server.*)	Are you using Oracle or Microsoft SQL Server?
	Are there firewalls or ACLs between the database servers?
	What is the approximate bandwidth between database sites?
	Are all NA servers and database servers configured for the same time zone and synchronized by a common time source?
	Are you using the distributed system configuration for failover or load balancing (or both)?
	What is the total number of NA Cores you are planning to configure? Note: An NA Core is a single NA server and its attached database.
Syslog	Is there a Syslog server to which devices are sending messages?
	Do you want devices to send Syslog messages to the NA server?
	What is the fully qualified domain name of the Syslog server?
	What OS is the Syslog server running?
	What is the name and version of the Syslog server?
Authentication	What type of authentication will be used for NA (Local, TACACS+, SAML, RADIUS, SecurID, TWIST, or LDAP)? Are you using HPE Server Automation (SA)? What type of authentication will be used for devices (Local, TACACS+, RADIUS, or SecurID)? • If you are using TACACS+ or RADIUS for authentication, what is the fully qualified domain name or IP address of the primary and secondary TACACS+ or RADIUS server? What is the shared secret for the NA host configured on the TACACS+ or RADIUS server? What type of authentication method is being used to encrypt the TACACS+ or RADIUS communication: PAP (the default), CHAP, or MSCHAP? • If you are using LDAP for application authentication, what is the fully qualified domain name of the LDAP server? What is the LDAP port? What type of connection should be made to the LDAP Server (Regular or SSL)? What is the Domain User Account or User Principal Name of the user being used to make the connection to LDAP? What is the password for the user being used to make the connection to LDAP? What is the Search Base? What are the LDAP security groups that are allowed to access NA?

Table 1 Pre-Installation Checklist, continued

Area	Consideration
	• If you are using HPE Server Automation (SA) integrated authentication, what is the SA Twist Server fully qualified domain name? What is the HPE SA Twist Username/Password? What is the OCC Server name?
Device Connection	What types of connection are permitted to and from your devices? Possibilities are: • Telnet • SSH • SNMP • SNMPv3 • SCP • FTP • SFTP • HTTP • HTTPS • Console • Bastion Host • Rlogin • TFTP • NAT
Email	What is the fully qualified domain name of your SMTP server?
	What email address should NA use for an SMTP "From" address when sending email reports?
Workflow	Will workflow be enabled? If so: • What group(s) need approval? • What tasks need approval? • Who can approve tasks?
Satellite Gateways	Are you using Satellite Gateways? If so: • What is the design goal for the Satellite Gateways (simplified network traffic, NAT'ed / overlapping IP addresses)? • What OS will be used for each Satellite Gateway (For supported operating

Table 1 Pre-Installation Checklist, continued

Area	Consideration
	systems, see the Support Matrix.)?
Sizing Information	How many nodes do you plan on managing with NA and over what period of time?
	How long would you prefer to store old configuration files?
	On average, how many lines are there in the configuration file.
	The default database pruning options include: • Configurations — saved for 365 days • Diagnostics — Saved for 45 days • Events — Saved for 45 days • Tasks — Saved for 365 days • Sessions — Saved for 45 days • Log files — Saved for 30 days • Task log files — Saved for 7 days • Topology Data — Saved for 45 days • Diagram files — Saved for 1 day • All data — Saved for 365 days

Additional NA Configurations

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

For information on configuring a Horizontal Scalability system environment, see the *Horizontal Scalability guide*.

For information on configuring a Gateway and Satellite agent environment, see the *Satellite guide*.

HPE Marketplace Service

HPE Marketplace is a complementary content delivery service that is integrated into Network Automation for the delivery of free NA driver updates and subscription-based network security and

compliance content updates. The Security and Compliance service enables immediate assessment of network security and policy violations, as well as recommended remediation options.

The NA core server accesses the HPE Marketplace service through the HPE Live Network Connector (LNc), which is a separate installation.

> **Note:** LNc requires Internet access.

The LNc and the *HPE Live Network connector User Guide*, which includes installation and configuration instructions, are available on the HPE Marketplace web site https://marketplace.saas.hpe.com/itom/content/hpe-live-network-connector.

Summary Reports

The Summary reports are generated in the Microsoft Office 2007 - Office Open XML (OOXML) file format. You require Microsoft Excel 2010 or above to open these files. You can either run the Summary reports from a Windows client computer connected to your NA server or you can use another program to view the Summary reports if you are running NA on a Linux platform.

Upgrading to NA 10.30 from a Different System

NA 10.30 must run on a 64-bit operating system.

This chapter describes the procedure for upgrading a standalone NA core server to NA 10.30 from the following versions running on a 64-bit operating system or on a 32-bit operating system that can be upgraded to a 64-bit operating system on the same hardware:

- NA 10.11 or later patches

- NA 10.21 or the later patches

Note: Always apply the latest available patch before you begin to upgrade NA.

For information about upgrading other NA environments, see the appropriate documentation:

- NA Multimaster Distributed System

  For information about upgrading NA in a Distributed System environment, do the following:

  a. Follow the upgrade procedures till step 13 of "Upgrade Procedure" on page 19.

  b. See *Upgrade the NA Mesh* in the *Multimaster Distributed System on Oracle* or the *Multimaster Distributed System on SQL Server*, as appropriate.

  c. Come back to this chapter when directed to do so in the upgrade procedure.

- NA Horizontal Scalability

  For information about upgrading NA in a Horizontal Scalability environment, see *Upgrading Horizontal Scalability* in the *Horizontal Scalability guide*. Come back to this chapter when directed to do so in the upgrade procedure.

- NA Satellites

  If you are using NA Satellites, after installing the current version of NA, run the *Deploy Remote Agent* task to re-install the upgraded Satellite agent on all of the remote Gateways. For information, see the *Upgrading the Satellite* section of the *Satellite guide*.

NA services are not available during the upgrade process. In addition, after you run the NA Service Pack Installer, you cannot roll back to the previous version of NA.

During the NA upgrade, the NA Setup program automatically backs up critical NA files.

After upgrading NA, the installer automatically restores the following files:

- Device software images from the backup directory are copied to `<NA_HOME>/server/images`.

- Summary reports from the backup directory are copied to `<NA_HOME>/addins`.

- NA LiveNetwork content files are copied to `<NA_HOME>/content`.

- If you selected the use the previous administrative settings option during installation, the `site_options.rcx` and `adjustable_options.rcx` file from the backup directory are copied to `<NA_HOME>/jre`.

- The SecurID token file is restored.

- The Gateway encryption key is restored.

- The Truecontrol key store, Truecontrol trust store that contain the SSL key used by the NA web server are restored.

- The license.dat file is restored if you do not have a new license file.

The following files are backed up. However, they are **not** restored during the NA upgrade:

- The Java CA certificate (cacerts) store is not restored. To import them, follow the steps in "Configuring the cacerts for User-Added CA-Signed Certificate in NA post upgrade" on page 44.

   Most `.rcx` files in the `<NA_HOME>/jre` folder.

   - Aside from the `site_options.rcx` and `adjustable_options.rcx` files, changes in other `.rcx` files will not be preserved.

   - If you have customized the NA summary reports template or specification, such as adding additional report tabs, manually update the customized settings from the backed up version of the `reporting.rcx` file to the new version of the `reporting.rcx` file.

   - If you changed other `.rcx` files in the previous installation and want to keep those changes after upgrading, add those changes into the new `adjustable_options.rcx` file. You cannot use the previous `.rcx` file to overwrite the new version. Doing so could cause the application to fail.

- `<NA_HOME>/server/ext/jboss/server/default/conf/log4j.xml` file.

   - The `log4j.xml` file is no longer used. The comparative file is `<NA_HOME>/server/ext/jboss/server/default/deploy/jboss-logging.xml`.

   - To restore previous settings, manually edit the `jboss-logging.xml` file with the customizations in the `log4j.xml file`. Note that the configuration formats differ between the two files.

- Wrapper configuration files in `<NA_HOME>/server/ext/wrapper/conf`.

  - If you selected the use the previous administrative settings option during installation, the upgrade installer attempts to merge the settings from the backed up version of the `jboss.conf` file to the new `jboss.conf` file. Verify the configuration in the new file.

  - To restore previous settings in other `.conf` files, manually edit the corresponding file after upgrading. You cannot use the previous file to overwrite the new version. Doing so could cause the application to fail.

Before You Upgrade (if you are using MySQL Database)

The procedure to upgrade NA 10.11 to NA 10.30 involves replacing MySQL with the PostgreSQL database. Therefore, before you upgrade from NA 10.11 with a PostgreSQL database, note down the MySQL database details such as the user name and the password. These details are required while running the Postgres migration tool. For more information, see .

The following diagram illustrates the upgrade and data migration procedure with a PostgreSQL database:

Do you have an existing PostgreSQL Server?

No → Upgrade → Install PostgreSQL Software → Upgrade Complete → Run the Postgres migration tool

Yes → **Do you want to run the Postgres Migration tool now?**

No → Upgrade → Create a new PostgreSQL database → Upgrade Complete → Run the Postgres migration tool

Yes → Create a separate user and database instance for NA → Run the Postgres migration tool → Upgrade → Choose the 'Use existing Postgres server' option → Upgrade Complete

Upgrade Procedure

The following steps provide an outline for upgrading NA from a standalone NA core server to a different standalone NA core server. In this procedure, Server X identifies the source (existing) NA core server and Server Y identifies the target (new) NA core server.

> **Caution:** Do *not* upgrade Oracle or SQL Server while upgrading the NA core software across servers. If you need to upgrade the database product for a standalone NA core server, complete this procedure, and then upgrade the database product as described in "Database Upgrades" on page 74.

1. Verify the current NA version:

   ○ If the NA core version is NA 7.xx, 9.0x, 9.1x, or 10.0x, follow the appropriate upgrade procedure in version 9.22.x or 10.10.x of the Install and Upgrade guide before completing this procedure.

   ○ If the NA core version is currently NA 10.11 or 10.21, continue with this procedure.

2. Obtain new NA 10.30 license keys. See "Obtaining an NA License" on page 28.

3. Determine the NA database name and database user name.

   In the NA console, on the **Admin > System Status** page, locate the **DatabaseMonitor** row, and then click **Run Now** in that row.

   On the **Monitor Details** page, locate the values for `Database catalog` (the database name) and `Database user name`.

4. Prepare Server Y with a supported operating system.

5. On Server X, stop all NA services. See "Start, Stop, or Restart All NA Services" on page 69.

6. On Server X, if a core gateway is installed on the NA core server, stop that gateway:

   /etc/init.d/opswgw-*<gateway_name>* stop

7. On Server X, back up the following files:

   ○ *Windows*:

     • <NA_HOME>\jre*.rcx

     • <NA_HOME>\server\ext\wrapper\conf\jboss_wrapper.conf

- `<NA_HOME>\server\ext\jboss\server\default\deploy\db-ds.xml`
  - *Linux:*
    - `<NA_HOME>/jre/*.rcx`
    - `<NA_HOME>/server/ext/wrapper/conf/jboss_wrapper.conf`
    - `<NA_HOME>/server/ext/jboss/server/default/deploy/db-ds.xml`

8. NA versions older than 10.0x provided a mechanism to create duplicate command scripts (command scripts with identical names and drivers). If your NA system was once upgraded from a version older than 10.0x, and therefore, contains residual duplicate command scripts, make sure to modify the duplicate command scripts (by renaming them) before the upgrade begins.

   > **Tip:** If you do not modify the duplicate command scripts at this stage, they are all converted to change plans after NA is upgraded. Running and scheduling of duplicate change plans fail. To address this issue, rename each duplicate change plan with a new and unique name.

9. Back up all of the data in the database. For instructions, see the database documentation or contact your database administrator (DBA).

   For MySQL, use a command similar to the following example:

   ```
   mysqldump -u root -p -h 127.0.0.1 --database NA > NAdump.sql
   ```

   For the MySQL examples in this procedure, the database user name is root, and the database name is NA.

10. On Server Y, install the same NA version as on Server X.

    For example, if Server X has NA 10.11 plus one hotfix, install NA 10.10, the NA 10.11 patch, and then the hotfix.

    > **Note:** Because you will not be running this NA version in production on Server Y, it is acceptable to install the current NA version on the operating system of Server Y.

    During installation, note the following:

    - If you are using the embedded database, choose to install MySQL. Specify the same database name, user name, and password as on Server X.
    - If you are using a remote database, provide the information for connecting to the existing NA database.

11. On Server Y, stop all NA services. See "Start, Stop, or Restart All NA Services" on page 69.

12. Replicate the NA configuration of Server X as follows:

    a. Copy the backed up `*.rcx` files from Server X to the same location on Server Y.

       > **Tip:** In a multiple NA core environment, consider whether the `*.rcx` files contain NA core-specific settings. In this case, copy the `*.rcx` files in a way that replicates the existing NA configuration onto the new servers.

    b. On Server Y, manually edit the `jboss_wrapper.conf` and `db-ds.xml` files to restore any customizations made on Server X.

13. If you are using the embedded database, do the following:

    a. If the MySQL configuration for the NA database has been modified on Server X, replicate the configuration changes on Server Y.

       MySQL provides configuration files at several levels. You must know which, if any, have been changed. The global configuration file is commonly located as follows:

       - *Windows*: `<Drive>:\MySQL\my.ini`
       - *Linux*: `/etc/my.cnf`

       Determine which MySQL configuration files have been modified for the NA database, and then do one of the following:

       - Copy these files from Server X to the same location on Server Y. Retain permissions on the files.
       - Edit the MySQL configuration files on Server Y to match those on Server X.

    b. Copy the database backup file from Server X to Server Y.

       Ensure that the database user has read access to the database backup file.

    c. On Server Y, import the data from the NA database backup into the new database instance created during installation of NA. For example:

       ```
       mysql -u root -p NA < NAdump.sql
       ```

14. Ensure that the database server is running.

15. *Optional*. Verify the authenticity of the NA 10.30 Service Pack Installer as described in "Optional. Verify the Signature of the NA Installer" on page 29.

16. On Server Y, run the NA 10.30 Service Pack Installer as described in "Running the NA 10.30 Service Pack Installer" on page 29.

> **Note:** If the upgrade fails, save all log files to a location outside the NA directory structure before re-running the upgrade.

17. *Linux only*. Set the open file limit for NA sessions as described in "Set the ulimit Values for Running NA (Linux only)" on page 31.

18. Disable the JCS disk cache as described in "Disabling the JCS Disk Cache" on page 31.

19. *Optional*. Use the optimized Data Pruning task as described in "Data Pruning" on page 32.

20. On Server Y, install the latest NA Driver Pack as described in "Install the Latest NA Driver Pack" on page 33.

21. On Server Y, if a core gateway was installed on Server X, install the core gateway as described in the *Satellite guide*.

Migrating NA Data from a MySQL Server to a PostgreSQL Server

You can migrate NA data from an existing MySQL server to a new PostgreSQL server by using the Postgres migration tool. The tool uses JDBC (Java Database Connectivity) to connect to the MySQL and PostgreSQL servers, and requires Java 1.8 or a newer version of JRE. You can find the tool at the following location of the NA install directory:

<NA_HOME>/migration

The Postgres migration tool reads the required arguments from the NAPostgresMigration.properties file. Therefore, make sure that you modify the source and destination server details in the property file. However, if the migration tool is run on a system where the PostgreSQL software is installed, make sure that, in the NAPostgresMigration.properties file, you mention localhost as the value for the postgres.db.server field (**postgres.db.server=localhost**).

The tool looks for the following details:

- NA user name and password of the MySQL database

- NA user name and password of the PostgreSQL database

- Total database size

> **Note:** The migration tool resets the PostgreSQL dataset in the NA database. The time taken to

> migrate the data depends on the size of the database.

Setting up a Database in the PostgreSQL Server

If you choose to migrate the NA data before upgrading to NA 10.30, you must set up a database in the PostgreSQL server. When you do so, make a note of the following:

- Substitute the DBUSER, DBPWD, and DBNAME values with the valid values of your organization
- By default Postgres is case-sensitive to all entities; therefore, create database instance in lower case

To set up a database the PostgreSQL server, follow these steps:

1. Log on as the PostgreSQL administrator, create a separate database user and a database instance. To achieve this, do the following:

   ```
   CREATE USER "DBUSER" WITH CREATEDB PASSWORD 'DBPWD';

   CREATE DATABASE DBNAME WITH OWNER = "DBUSER" ENCODING = 'UTF8';

   GRANT ALL ON DATABASE DBNAME TO "DBUSER";
   ```

2. *Optional, but recommended.* Log on as the database user and modify permissions to the database instance. To achieve this, do the following:

   ```
   CREATE SCHEMA nas AUTHORIZATION "DBUSER";

   GRANT ALL ON SCHEMA nas TO "DBUSER";

   ALTER ROLE "DBUSER" IN DATABASE DBNAME SET search_path = nas;
   ```

3. *Optional, but recommended.* Log on as the PostgreSQL admin user and remove public schema in the database instance. To achieve this, do the following:

   ```
   \c DBNAME;

   DROP SCHEMA public;
   ```

To migrate data from the exisiting MySQL server to a new PostgreSQL server, follow these steps:

1. Stop all NA services. See Start, Stop, or Restart All NA Services.

2. If the MySQL database is on a different server, do the following:

   a. Comment out the `bind-address=127.0.0.1` line.

      For Windows:

      In the `[$MYSQL_HOME]\my.ini` file, comment out the following line:

```
bind-address=127.0.0.1
```

Here, [$MYSQL_HOME] is the MySQL install folder.

For Linux:

In the /etc/my.cnf file, comment out the following line:

```
bind-address=127.0.0.1
```

> **Note:** After a successful migration of data, make sure that you revert to the original settings.

   b. Restart the MySQL service on the remote server.

3. Enable the PostgreSQL server to allow connection from the server on which the migration tool is running. By default, PostgreSQL allows only local host connections. For more information, see "Connecting to a Remote PostgreSQL Server" on page 54.

4. From the *<NA_HOME>*/migration directory, run the following command:

   java -jar postgresMigration.jar

   > **Note:** To run the Postgres migration tool, use Java 1.8 or higher.

5. Restart both the database servers.

6. Restart NA services. See Start, Stop, or Restart All NA Services.

After you upgrade to NA 10.30, run the following script to migrate Command Script to Change Plan:

1. Stop all NA services. See Start, Stop, or Restart All NA Services.

2. From the <NA_HOME>/client directory, run the following command:
   For **Windows**: MigrateCMDScriptToChangePlans.bat
   For **Linux**: MigrateCMDScriptToChangePlans.sh

3. Restart NA services. See Start, Stop, or Restart All NA Services.

Troubleshooting

If the data migration fails, you can verify the 'Failed Data Records' in the SQL dumps. In case of failure, the SQL dumps are available in the same directory where you run the migration tool. You can either use these dumps to troubleshoot or import them into the PostgreSQL server.

Configuring the cacerts for User-Added CA-Signed Certificate in NA post upgrade

The upgrade process of NA does not restore the Java CA certificate (cacerts) store. It creates a copy of the old files in the `backup` directory.

After upgrade, you must import the user-added CA-signed certificate and its corresponding server certificate from the `backup` directory to the cacert store.

To import these certificates after upgrade, follow these steps:

1. Export the user-added CA-signed certificate from `cacerts` store to a backup certificate file using the following:

   a. Change to the directory that contains the backed up `cacerts` file:

      - **Windows:**

        `<NA_HOME>\backup`

      - **Linux:**

        `<NA_HOME>/backup`

   b. Use the keytool command to find out the alias of the CA-signed certificate present in the trust store. For example,

      - **Windows:**

        `<NA_HOME>\jre\bin\keytool.exe -list -keystore cacerts`

      - **Linux:**

        `<NA_HOME>/jre/bin/keytool -list -keystore cacerts`

      When prompted for the trust store password, type **changeit**.

      Note down the aliases for certificates added by the user.

   c. Use the keytool command to export the CA-signed certificate to a backup file. For example,
      - *Windows:*

        `<NA_HOME>\jre\bin\keytool.exe -export -alias <CA_alias> -file <CA.crt> -keystore cacerts`

      - *Linux:*

```
<NA_HOME>/jre/bin/keytool -export -alias <CA_alias> -file <CA.crt> -
keystore cacerts
```

When prompted for the key store password, type **changeit**.

The CA-signed certificate is stored in the `<CA.crt>` file.

2. Import the backed up CA-signed certificate (`<CA.crt>`) file to the latest `cacerts` store using the following:

   a. Move the exported file from its current location to the directory that contains the `cacerts` file:

      - **Windows**: `move <CA.crt> <NA_HOME>\jre\lib\security`

      - **Linux**: `mv <CA.crt> <NA_HOME>/jre/lib/security`

   b. Change to the directory that contains the `cacerts` file:

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

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

   c. Create a backup copy of the `cacerts` file.

   d. Use the `keytool` command to import the new certificate into the cacerts store file. For example:

      - **Windows**:

        ```
        <NA_HOME>\jre\bin\keytool.exe -import -alias <CA_alias> \
        -file <CA.crt> -keystore cacerts
        ```

      - **Linux**:

        ```
        <NA_HOME>/jre/bin/keytool -import -alias <CA_alias> -file <CA.crt> \
        -keystore cacerts
        ```

      When prompted for the password, enter: **changeit**

      When prompted to trust the certificate, type **yes**, and then press **Enter**.

      > **Tip:** Specify the file (for example, `<CA.crt>`) created in **step 1**.
      >
      > The alias is the identifier of the new certificate in the `cacerts` file. It does not need to match the alias in the `truecontrol.keystore` file.

Configuring PKI After Upgrade

The upgrade process of NA includes the latest self-signed certificates in the Truecontrol key store, Truecontrol trust store, and the CAcerts key store and backs up the older files of these key stores in the `backup` directory. However, after upgrade, you must add the certificate for the Public Key Infrastructure (PKI) user authentication to the latest trust store. To do so, follow these steps:

1. Export the certificate that was added for PKI configuration, from the `truecontrol.truststore` to a backup certificate file. To export the certificate, follow these steps:

   a. Change to the directory that contains the backed up `truecontrol.truststore` file:
      - *Windows:*`<NA_HOME>\backup`

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

   b. Use the keytool command to find the alias of the PKI certificate present in the trust store.

      - *Windows:*

        `<NA_HOME>\jre\bin\keytool.exe -list -keystore truecontrol.truststore`
      - *Linux:*

        `<NA_HOME>/jre/bin/keytool -list -keystore truecontrol.truststore`

        When prompted for the trust store password, type **sentinel**.

   c. Use the keytool command to export the PKI certificate to a backup file. For example,
      - *Windows:*

        `<NA_HOME>\jre\bin\keytool.exe -export -alias <pki_alias> -file <root.crt> -keystore truecontrol.truststore`
      - *Linux:*

        `<NA_HOME>/jre/bin/keytool -export -alias <pki_alias> -file <root.crt> -keystore truecontrol.truststore`

        When prompted for the key store password, type **sentinel**.

      The PKI certificate is saved in the `<root.crt>` file.

2. Import the backed up certificate (`root.crt`) into the latest Truecontrol trust store. For more information about the procedure to import a certificate to the trust store, see the *Adding a CA Root Certificate to NA for Enabling PKI* topic in the *Administration guide*.

3. Restart the NA server.

Obtaining an NA License

> **Tip:** In a multiple NA core environment such as Multimaster or Horizontal Scalability, use the same license keys on all NA cores.

NA supports the following license types:

- InstantOn — InstantOn licenses are shipped with the product. Each InstantOn license is limited to 250 devices and 60 days of use after installing the product.

- Permanent — Permanent licenses must be obtained through the HPE License Key Delivery Service. Permanent licenses do not have an expiration date.

- Evaluation — Evaluation licenses are temporary licenses with customized capacity and duration. For more information, contact your NA Sales Representative.

To obtain NA 10.x permanent license keys, follow these steps:

1. Log on to https://softwaresupport.hpe.com/.

2. From the **Products** menu, select **Software Updates**.

3. On the **My Software Updates** page, do one of the following:

    - Select the Service Agreement ID (SAID) from the pull-down menu

    - Enter the SAID

4. Agree to the terms and conditions, and then click **View Available Products**.

5. Expand the **Network Management Center** node.

6. Select the HPE NA version 10.30 line.

7. Click the **Get Software Updates** button.

8. Click the **Get Licensing** tab.

9. Verify the selected product name.

10. Click the **Get License** link.

11. Complete your profile by entering the required information, and then click **Continue**.

12. On the Search Entitlements to Activate page, verify the selected entitlement, and then click

Activate.

13. Save the NA license file and then transfer it to a location accessible from the NA core server.

Optional. Verify the Signature of the NA Installer

A Gnu Privacy Guard (GPG) signature file (`.sig`) is included with all NA installers on the NA installation media. HPE recommends that you verify the authenticity of the NA installer before installing NA. To verify the validity of a file, follow the instructions for *Verification using GPG* at:

https://h20392.www2.hp.com/portal/swdepot/displayProductInfo.do?productNumber=HPLinuxCodeSigning

This process is valid for all operating system platforms supported by NA. File verification can be done on any system that supports running gpg. Because the verification process might vary depending on the gpg version and operating platform, consult the documentation for your version of gpg.

Running the NA 10.30 Service Pack Installer

Before running the NA Service Pack Installer, ensure that the database server is running.

The NA Service Pack Installer sets the Java virtual machine (JVM) heap size in relation to the amount of system RAM and the number of processors. Generally speaking, the installer sets the JVM heap size to half of the RAM. (The NA installer does not explicitly set the size of the young generation, so this value defaults to 1/3 of the JVM heap size.) Note the following exceptions:

- If the heap size is already set to a larger value than the NA Service Pack Installer would set, the NA Service Pack Installer does not change that value.

- If the NA core server has more than 64GB of RAM, the NA installer sets the JVM heap size to 32GB.

- If HPE Network Node Manager i Software is already installed on the NA core server, the NA installer sets the JVM heap size to 512MB regardless of the system RAM size.

Read the section appropriate to your operating system type.

Running the Service Pack Installer on a Windows Operating System

For upgrading on a Windows platform, do the following:

1. Copy the NA service pack installer zip file and extract the installation files to the local host server.

2. Navigate to the **bin** folder.

3. Run `setup.exe` from the local folder to start the installation process manually.

   For example, `<drive>:\<extracted location>\bin\windows_[nnn]-[mmddyy]_spi_setup_64.exe`, where `[nnn]-[mmddyy]` is the build number.

4. Follow the instructions on the screen. For more information, see "Installation Tutorial" on page 89.

   > **Caution:** *Oracle only*. In a Multimaster Distributed System environment, do not enable case-insensitive search while upgrading NA.

Running the Service Pack Installer on a Linux Operating System

If you are installing the NA Service Pack Installer on an NA Linux server, you must have root access to run the NA Service Pack Installer.

1. Copy the NA service pack installer tar.gz file and extract the installation files to the local host server.

2. Navigate to the **bin** directory.

3. Set the open file limit for this session:

   a. Determine the open file limits by running the following commands:

      ```
      ulimit -Sn
      ulimit -Hn
      ```

      The soft file limit must be at least 32768.

      The hard file limit must be at least 32768.

   b. If necessary, update the soft file limit by running the following command:

      ulimit -n 32768

4. Run the installer:

   `./linux_[nnn]-[mmddyy]_spi_setup_64.bin`, where `[nnn]` is the build number and `[mmddyy]` is the build date.

5. Follow the instructions on the screen. For more information, see "Installation Tutorial" on page 89.

> **Caution:** *Oracle only*. In a Multimaster Distributed System environment, do not enable case-insensitive search while upgrading NA.

Set the ulimit Values for Running NA (Linux only)

ulimit, which indicates **User limits**, is a Linux command used to limit the use of system-wide resources.

On the NA core server, ensure that the open file limits are set appropriately for each NA session.

1. Change to the following directory:

    `/etc/init.d`

2. Back up the `truecontrol` file to a location outside the `/etc` directory.

3. In the `truecontrol` file, add the following line as the first non-commented line:

    `ulimit -n 32768`

4. In an NA Horizontal Scalability environment, repeat all of the previous steps on each NA core server.

5. On each NA server, restart all NA services. See "Start, Stop, or Restart All NA Services" on page 69.

> **Tip:** You can wait to restart the NA services until after disabling the JCS disk cache (next).

Disabling the JCS Disk Cache

To disable the JCS disk cache, follow these steps:

1. Change to the following directory:

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

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

2. Back up the `cache.ccf` file to a location outside the `<NA_HOME>` directory.

3. In a text editor such as WordPad or vi, open the `cache.ccf` file.

4. Verify that the `jcs.default=` line does not include any settings. It should read exactly as follows:

   `jcs.default=`

5. Search for the string `AVAILABLE AUXILIARY CACHES` to locate the following lines:

   ```
   # AVAILABLE AUXILIARY CACHES
   jcs.auxiliary.DC=org.apache.jcs.auxiliary.disk.indexed.IndexedDiskCacheFactory
   jcs.auxiliary.DC.attributes=org.apache.jcs.auxiliary.disk.indexed.IndexedDiskCacheAttributes
   jcs.auxiliary.DC.attributes.DiskPath=/tmp/cache
   jcs.auxiliary.DC.attributes.MaxPurgatorySize=10000000
   jcs.auxiliary.DC.attributes.MaxKeySize=1000000
   jcs.auxiliary.DC.attributes.MaxRecycleBinSize=5000
   jcs.auxiliary.DC.attributes.OptimizeAtRemoveCount=300000
   jcs.auxiliary.DC.attributes.ShutdownSpoolTimeLimit=60
   ```

6. Comment out each of the lines located in the previous step by inserting a number sign character (#) at the beginning of the line.

7. Save the `cache.ccf` file.

8. In an NA Horizontal Scalability environment, repeat all of the previous steps on each NA core server.

9. On each NA server, restart all NA services. See "Start, Stop, or Restart All NA Services" on page 69.

Data Pruning

It is recommended to verify that the Data Pruning task is scheduled to run at least weekly.

After upgrading NA, the first several runs of the Data Pruning task might exceed the configured maximum task time. In this case, you might see the following warning message:

`com.rendition.pruner.ConfigPruner: The task thread was interrupted. Pruning partially completed.`

> **Note:** In a Distributed System or Horizontal Scalability environment, it is recommended to run the Data Pruning task manually on one NA core server until the warning message does not appear. At that point, verify that the Data Pruning task is scheduled to run at least weekly. In a Distributed

> System, schedule the task to run on each core. Make sure that the separate tasks do not overlap—it is recommended to schedule the tasks to run on different days of the week.

This message indicates that additional records can be pruned. No action is necessary; subsequent runs of the Data Pruning task will clear the additional records.

> **Tip:** If the database configuration includes redo logs, ensure that adequate disk space is available for these logs, especially while the warning message appears. The required size depends on the database configuration and the size of the NA database.

To complete database cleanup faster, do either or both of the following steps:

- Temporarily increase the value of Max Task Length to a value such as 18000 (5 hours). This setting is under Tasks on the Admin > Administrative Settings > Server page in the NA console.

  > **Tip:** After the warning message no longer appears, reset the Max Task Length to the original value (3600 by default).

- Run the Data Pruning task manually until the warning message does not appear.

Install the Latest NA Driver Pack

The NA upgrade installer overwrites the existing driver pack on the NA server with the driver pack embedded in the installer. To prevent a functionality regression, after you upgrade or install NA, install the latest NA Driver Pack. Follow these steps:

1. Go to the HPE Marketplace web site at:

   https://marketplace.saas.hpe.com/itom/content/device-driver-packs-for-network-automation

   Access to this page requires an HPE Marketplace user account.

2. Download the latest NA Driver Pack.

3. Install the downloaded driver pack.

Upgrading to NA 10.30 on the Same System

NA 10.30 must run on a 64-bit operating system.

This chapter describes the procedure for upgrading a standalone NA core server to NA 10.30 from the following versions running on a 64-bit operating system or on a 32-bit operating system that can be upgraded to a 64-bit operating system on the same hardware:

- NA 10.11 or the later patches

- NA 10.21 or the later patches

Note: Always apply the latest available patch before you begin to upgrade NA.

For information about upgrading other NA environments, see the appropriate documentation:

- NA Multimaster Distributed System

  For information about upgrading NA in a Distributed System environment, see *Upgrade the NA Mesh* in the *Multimaster Distributed System on Oracle* or the *Multimaster Distributed System on SQL Server*. Come back to this chapter when directed to do so in the upgrade procedure.

- NA Horizontal Scalability

  For information about upgrading NA in a Horizontal Scalability environment, see *Upgrading Horizontal Scalability* in the *Horizontal Scalability guide*. Come back to this chapter when directed to do so in the upgrade procedure.

- NA Satellites

  If you are using NA Satellites, after installing the current version of NA, run the *Deploy Remote Agent* task to re-install the upgraded Satellite agent on all of the remote Gateways. For information, see *Upgrading the Satellite* of the *Satellite guide*.

NA services are not available during the upgrade process. In addition, after you run the NA Service Pack Installer, you cannot roll back to the previous version of NA.

Restoration of Previous Customizations

During the NA upgrade, the NA Setup program automatically backs up critical NA files.

After upgrading NA, the installer automatically restores the following files:

- Device software images from the backup directory are copied to `<NA_HOME>/server/images`.

- Summary reports from the backup directory are copied to `<NA_HOME>/addins`.

- NA LiveNetwork content files are copied to `<NA_HOME>/content`.

- If you selected the use the previous administrative settings option during installation, the `site_options.rcx` and `adjustable_options.rcx` file from the backup directory are copied to `<NA_HOME>/jre`.

- The SecurID token file is restored.

- The Gateway encryption key is restored.

- The Truecontrol key store, Truecontrol trust store that contain the SSL key used by the NA web server are restored.

- The license.dat file is restored if you do not have a new license file.

The following files are backed up. However, they are **not** restored during the NA upgrade:

- The Java CA certificate (cacerts) store is not restored. To import them, follow the steps in "Configuring the cacerts for User-Added CA-Signed Certificate in NA post upgrade" on page 44.

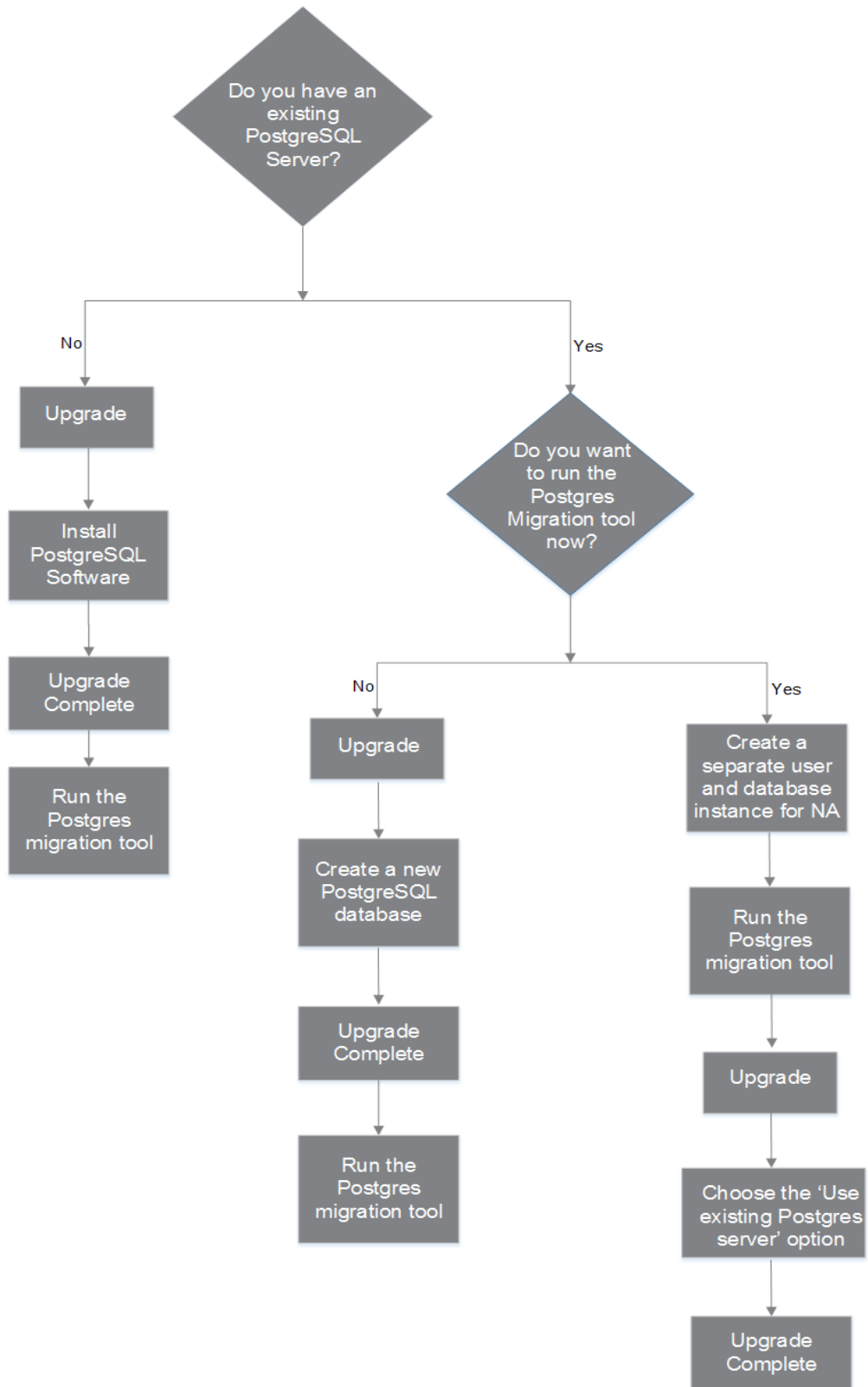   Most `.rcx` files in the `<NA_HOME>/jre` folder.

   - Aside from the `site_options.rcx` and `adjustable_options.rcx` files, changes in other `.rcx` files will not be preserved.

   - If you have customized the NA summary reports template or specification, such as adding additional report tabs, manually update the customized settings from the backed up version of the `reporting.rcx` file to the new version of the `reporting.rcx` file.

   - If you changed other `.rcx` files in the previous installation and want to keep those changes after upgrading, add those changes into the new `adjustable_options.rcx` file. You cannot use the previous `.rcx` file to overwrite the new version. Doing so could cause the application to fail.

- `<NA_HOME>/server/ext/jboss/server/default/conf/log4j.xml` file.

- The `log4j.xml` file is no longer used. The comparative file is `<NA_HOME>/server/ext/jboss/server/default/deploy/jboss-logging.xml`.

- To restore previous settings, manually edit the `jboss-logging.xml` file with the customizations in the `log4j.xml file`. Note that the configuration formats differ between the two files.

- Wrapper configuration files in `<NA_HOME>/server/ext/wrapper/conf`.

  - If you selected the use the previous administrative settings option during installation, the upgrade installer attempts to merge the settings from the backed up version of the `jboss.conf` file to the new `jboss.conf` file. Verify the configuration in the new file.

  - To restore previous settings in other `.conf` files, manually edit the corresponding file after upgrading. You cannot use the previous file to overwrite the new version. Doing so could cause the application to fail.

Before You Upgrade (if you are using MySQL Database)

The procedure to upgrade NA 10.11 to NA 10.30 involves replacing MySQL with the PostgreSQL database. Therefore, before you upgrade from NA 10.11 with a PostgreSQL database, note down the MySQL database details such as the user name and the password. These details are required while running the Postgres migration tool. For more information, see "Migrating NA Data from a MySQL Server to a PostgreSQL Server" on page 42.

The following diagram illustrates the upgrade and data migration procedure with a PostgreSQL database:

```
                    ┌─────────────────┐
                    │  Do you have an │
                    │    existing     │
                    │   PostgreSQL    │
                    │    Server?      │
                    └─────────────────┘

    No                              Yes

 ┌──────────┐          ┌─────────────────┐
 │ Upgrade  │          │  Do you want    │
 └──────────┘          │  to run the     │
                       │   Postgres      │
 ┌──────────┐          │ Migration tool  │
 │ Install  │          │     now?        │
 │PostgreSQL│          └─────────────────┘
 │ Software │
 └──────────┘        No                    Yes

 ┌──────────┐    ┌──────────┐      ┌──────────────┐
 │ Upgrade  │    │ Upgrade  │      │  Create a    │
 │ Complete │    └──────────┘      │ separate user│
 └──────────┘                      │and database  │
                                   │ instance for NA│
 ┌──────────┐    ┌──────────────┐  └──────────────┘
 │ Run the  │    │ Create a new │
 │ Postgres │    │  PostgreSQL  │  ┌──────────────┐
 │migration │    │   database   │  │   Run the    │
 │  tool    │    └──────────────┘  │   Postgres   │
 └──────────┘                      │migration tool│
                 ┌──────────────┐  └──────────────┘
                 │   Upgrade    │
                 │   Complete   │  ┌──────────────┐
                 └──────────────┘  │   Upgrade    │
                                   └──────────────┘
                 ┌──────────────┐
                 │   Run the    │  ┌──────────────┐
                 │   Postgres   │  │Choose the 'Use│
                 │migration tool│  │existing Postgres│
                 └──────────────┘  │server' option │
                                   └──────────────┘

                                   ┌──────────────┐
                                   │   Upgrade    │
                                   │   Complete   │
                                   └──────────────┘
```

Upgrade Procedure

The following steps provide an outline for upgrading NA on a standalone NA core server.

1. Verify the current NA version:

   - If the NA core version is NA 7.xx, 9.0x, 9.1x, or 9.22.x, follow the appropriate upgrade procedure in version 10.11 or 10.21 of the Install and Upgrade guide before completing this procedure.

   - If the NA core version is currently NA 10.11 or 10.21, continue with this procedure.

2. Obtain new NA 10.x license keys. See .

3. Stop all NA services. See

4. If a core gateway is installed on the NA core server, stop that gateway:

   /etc/init.d/opswgw-<gateway_name> stop

5. Back up the NA installation directory to a safe location. For example, if you installed NA in `C:\NA` or `/opt/NA`, back up the entire directory to a safe location.

6. NA versions older than 10.0x provided a mechanism to create duplicate command scripts (command scripts with identical names and drivers). If your NA system was once upgraded from a version older than 10.0x, and therefore, contains residual duplicate command scripts, make sure to modify the duplicate command scripts (by renaming them) before the upgrade begins.

   Tip: If you do not modify the duplicate command scripts at this stage, they are all converted to change plans after NA is upgraded. Running and scheduling of duplicate change plans fail. To address this issue, rename each duplicate change plan with a new and unique name.

7. Back up all of the data in the database. For instructions, see the database documentation or contact your database administrator (DBA).

   Tip: When backing up and restoring the database, enter the NA database name in the identical case as the database name in the database application. For example, if you created your NA database as `Nadb`, enter exactly `Nadb`.

8. Move any existing `*.backup` files from the `<NA_HOME>/server/lib/scripts/Database/Truecontrol` directory to a location outside the NA directory structure.

9. If you will need to reboot the NA core server during this procedure, for example if you are upgrading the operating system or the database, disable automatic starting of the NA services. See "Disable All NA Services" on page 70.

10. If NA 10.30 is not supported on the operating system of the current NA core server, do the following:

    a. Upgrade the operating system to a version supported by NA 10.30.

       For all operating system upgrades, consult the vendor documentation and your system support personnel.

    b. Restart NA, and then verify that NA is working properly.

    c. Stop all NA services before continuing with this procedure.

11. If NA 10.30 is not supported on the database version of the current NA database server, do the following:

    a. Upgrade the database to a version supported by NA 10.30.

       - For all database upgrades, consult the documentation provided by the appropriate vendor and your database administrator (DBA).

       - If after upgrading NA you experience performance issues, such as the NA Home page taking a long time to load, it is recommended that your Oracle DBA perform a re-index of the tables in the NA database instance. This work should be part of your regular Oracle maintenance tasks.

    b. Restart NA, and then verify that NA is working properly.

    c. Stop all NA services before continuing with this procedure.

12. Ensure that the database server is running.

13. *Optional*. Verify the authenticity of the NA 10.30 Service Pack Installer as described in "Optional. Verify the Signature of the NA Installer" on page 49.

14. Run the NA 10.30 Service Pack Installer as described in "Running the NA 10.30 Service Pack Installer" on page 49.

    During installation, if you are using the PostgreSQL database, do the following:

    a. Choose one of the following:

- Install Postgres - Choose this option if you want to install the PostgreSQL software.

  If you choose this option, you must first upgrade NA to 10.30, and then run the Postgres migration tool. For more information about NA data migration, see "Migrating NA Data from a MySQL Server to a PostgreSQL Server" on the next page.

  > **Note:** Till the data migration is complete, ignore the error messages that appear in the NA server logs.

- Use existing Postgres Server - Choose this option if you want to use an already installed PostgreSQL database software.

  If you choose to use an existing PostgreSQL database software, follow these steps:

  A. Specify whether the database software is installed locally or remotely, by selecting one of the following options:

    - The database software is installed on this computer - Indicates that the software is installed locally

    - The database software is installed on another server - Indicates that the software is installed remotely

  B. Configure the NA database. To achieve this, choose one of the following options:

    - Create new database - Choose this option if you want to upgrade to NA 10.30, and then migrate the data.

      For more information about NA data migration, see "Migrating NA Data from a MySQL Server to a PostgreSQL Server" on the next page.

    - Use existing NA database - Choose this option if you have already migrated data from MySQL to PostgreSQL database, and want to upgrade to NA 10.30.

      > **Note:** The NA database user must have at least one database instance associated to the PostgreSQL database.

    b. Specify the database name, user name, and password.

> **Note:** If the upgrade fails, check the upgrade installer log files in the `<NA_HOME>` directory.

> **Tip:** The Service Pack Installer re-enables automatic starting of the NA services.

15. *Linux only*. Set the open file limit for NA sessions as described in "Set the ulimit Values for Running

.

16. *Optional*. Use the optimized Data Pruning task as described in .

17. Install the latest NA Driver Pack as described in .

18. If a core gateway is installed on the NA core server, start that gateway:

    /etc/init.d/opswgw-*<gateway_name>* start

Migrating NA Data from a MySQL Server to a PostgreSQL Server

You can migrate NA data from an existing MySQL server to a new PostgreSQL server by using the Postgres migration tool. The tool uses JDBC (Java Database Connectivity) to connect to the MySQL and PostgreSQL servers, and requires Java 1.8 or a newer version of JRE. You can find the tool at the following location of the NA install directory:

<NA_HOME>/migration

The Postgres migration tool reads the required arguments from the NAPostgresMigration.properties file. Therefore, make sure that you modify the source and destination server details in the property file. However, if the migration tool is run on a system where the PostgreSQL software is installed, make sure that, in the NAPostgresMigration.properties file, you mention localhost as the value for the postgres.db.server field (**postgres.db.server=localhost**).

The tool looks for the following details:

- NA user name and password of the MySQL database

- NA user name and password of the PostgreSQL database

- Total database size

> **Note:** The migration tool resets the PostgreSQL dataset in the NA database. The time taken to migrate the data depends on the size of the database.

Setting up a Database in the PostgreSQL Server

If you choose to migrate the NA data before upgrading to NA 10.30, you must set up a database in the PostgreSQL server. When you do so, make a note of the following:

- Substitute the DBUSER, DBPWD, and DBNAME values with the valid values of your organization

- By default Postgres is case-sensitive to all entities; therefore, create database instance in lower case

To set up a database the PostgreSQL server, follow these steps:

1. Log on as the PostgreSQL administrator, create a separate database user and a database instance. To achieve this, do the following:

   ```
   CREATE USER "DBUSER" WITH CREATEDB PASSWORD 'DBPWD';

   CREATE DATABASE DBNAME WITH OWNER = "DBUSER" ENCODING = 'UTF8';

   GRANT ALL ON DATABASE DBNAME TO "DBUSER";
   ```

2. *Optional, but recommended.* Log on as the database user and modify permissions to the database instance. To achieve this, do the following:

   ```
   CREATE SCHEMA nas AUTHORIZATION "DBUSER";

   GRANT ALL ON SCHEMA nas TO "DBUSER";

   ALTER ROLE "DBUSER" IN DATABASE DBNAME SET search_path = nas;
   ```

3. *Optional, but recommended.* Log on as the PostgreSQL admin user and remove public schema in the database instance. To achieve this, do the following:

   ```
   \c DBNAME;

   DROP SCHEMA public;
   ```

To migrate data from the exisiting MySQL server to a new PostgreSQL server, follow these steps:

1. Stop all NA services. See Start, Stop, or Restart All NA Services.

2. If the MySQL database is on a different server, do the following:

   a. Comment out the `bind-address=127.0.0.1` line.

      For Windows:

      In the `[$MYSQL_HOME]\my.ini` file, comment out the following line:

      `bind-address=127.0.0.1`

      Here, `[$MYSQL_HOME]` is the MySQL install folder.

      For Linux:

      In the `/etc/my.cnf` file, comment out the following line:

```
bind-address=127.0.0.1
```

> **Note:** After a successful migration of data, make sure that you revert to the original settings.

   b. Restart the MySQL service on the remote server.

3. Enable the PostgreSQL server to allow connection from the server on which the migration tool is running. By default, PostgreSQL allows only local host connections. For more information, see "Connecting to a Remote PostgreSQL Server" on page 54.

4. From the *<NA_HOME>*/migration directory, run the following command:

   java -jar postgresMigration.jar

   > **Note:** To run the Postgres migration tool, use Java 1.8 or higher.

5. Restart both the database servers.

6. Restart NA services. See Start, Stop, or Restart All NA Services.

After you upgrade to NA 10.30, run the following script to migrate Command Script to Change Plan:

1. Stop all NA services. See Start, Stop, or Restart All NA Services.

2. From the <NA_HOME>/client directory, run the following command:
   For **Windows**: MigrateCMDScriptToChangePlans.bat
   For **Linux**: MigrateCMDScriptToChangePlans.sh

3. Restart NA services. See Start, Stop, or Restart All NA Services.

Troubleshooting

If the data migration fails, you can verify the 'Failed Data Records' in the SQL dumps. In case of failure, the SQL dumps are available in the same directory where you run the migration tool. You can either use these dumps to troubleshoot or import them into the PostgreSQL server.

Configuring the cacerts for User-Added CA-Signed Certificate in NA post upgrade

The upgrade process of NA does not restore the Java CA certificate (cacerts) store. It creates a copy of the old files in the backup directory.

After upgrade, you must import the user-added CA-signed certificate and its corresponding server certificate from the `backup` directory to the cacert store.

To import these certificates after upgrade, follow these steps:

1. Export the user-added CA-signed certificate from `cacerts` store to a backup certificate file using the following:

    a. Change to the directory that contains the backed up `cacerts` file:

       - **Windows:**

         `<NA_HOME>\backup`

       - **Linux:**

         `<NA_HOME>/backup`

    b. Use the keytool command to find out the alias of the CA-signed certificate present in the trust store. For example,

       - **Windows:**

         `<NA_HOME>\jre\bin\keytool.exe -list -keystore cacerts`

       - **Linux:**

         `<NA_HOME>/jre/bin/keytool -list -keystore cacerts`

       When prompted for the trust store password, type **changeit**.

       Note down the aliases for certificates added by the user.

    c. Use the keytool command to export the CA-signed certificate to a backup file. For example,
       - *Windows:*

         `<NA_HOME>\jre\bin\keytool.exe -export -alias <CA_alias> -file <CA.crt> -keystore cacerts`

       - *Linux:*

         `<NA_HOME>/jre/bin/keytool -export -alias <CA_alias> -file <CA.crt> -keystore cacerts`

       When prompted for the key store password, type **changeit**.

    The CA-signed certificate is stored in the `<CA.crt>` file.

2. Import the backed up CA-signed certificate (`<CA.crt>`) file to the latest `cacerts` store using the following:

    a. Move the exported file from its current location to the directory that contains the `cacerts` file:

- **Windows**: `move <CA.crt> <NA_HOME>\jre\lib\security`

- **Linux**: `mv <CA.crt> <NA_HOME>/jre/lib/security`

b. Change to the directory that contains the `cacerts` file:

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

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

c. Create a backup copy of the `cacerts` file.

d. Use the `keytool` command to import the new certificate into the cacerts store file. For example:

- **Windows**:

```
<NA_HOME>\jre\bin\keytool.exe -import -alias <CA_alias> \
-file <CA.crt> -keystore cacerts
```

- **Linux**:

```
<NA_HOME>/jre/bin/keytool -import -alias <CA_alias> -file <CA.crt> \
-keystore cacerts
```

When prompted for the password, enter: **changeit**

When prompted to trust the certificate, type **yes**, and then press **Enter**.

> **Tip:** Specify the file (for example, `<CA.crt>`) created in **step 1**.
>
> The alias is the identifier of the new certificate in the `cacerts` file. It does not need to match the alias in the `truecontrol.keystore` file.

Configuring PKI After Upgrade

The upgrade process of NA includes the latest self-signed certificates in the Truecontrol key store, Truecontrol trust store, and the CAcerts key store and backs up the older files of these key stores in the `backup` directory. However, after upgrade, you must add the certificate for the Public Key Infrastructure (PKI) user authentication to the latest trust store. To do so, follow these steps:

1. Export the certificate that was added for PKI configuration, from the `truecontrol.truststore` to a backup certificate file. To export the certificate, follow these steps:

a. Change to the directory that contains the backed up `truecontrol.truststore` file:

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

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

b. Use the keytool command to find the alias of the PKI certificate present in the trust store.

- *Windows:*

  `<NA_HOME>\jre\bin\keytool.exe -list -keystore truecontrol.truststore`

- *Linux:*

  `<NA_HOME>/jre/bin/keytool -list -keystore truecontrol.truststore`

  When prompted for the trust store password, type **sentinel**.

c. Use the keytool command to export the PKI certificate to a backup file. For example,

- *Windows:*

  `<NA_HOME>\jre\bin\keytool.exe -export -alias <pki_alias> -file <root.crt> -keystore truecontrol.truststore`

- *Linux:*

  `<NA_HOME>/jre/bin/keytool -export -alias <pki_alias> -file <root.crt> -keystore truecontrol.truststore`

  When prompted for the key store password, type **sentinel**.

The PKI certificate is saved in the `<root.crt>` file.

2. Import the backed up certificate (`root.crt`) into the latest Truecontrol trust store. For more information about the procedure to import a certificate to the trust store, see the *Adding a CA Root Certificate to NA for Enabling PKI* topic in the *Administration guide*.

3. Restart the NA server.

Obtaining an NA License

> **Tip:** In a multiple NA core environment such as Multimaster or Horizontal Scalability, use the same license keys on all NA cores.

NA supports the following license types:

- InstantOn — InstantOn licenses are shipped with the product. Each InstantOn license is limited to 250 devices and 60 days of use after installing the product.

- Permanent — Permanent licenses must be obtained through the HPE License Key Delivery Service. Permanent licenses do not have an expiration date.

- Evaluation — Evaluation licenses are temporary licenses with customized capacity and duration. For more information, contact your NA Sales Representative.

To obtain NA 10.x permanent license keys, follow these steps:

1. Log on to https://softwaresupport.hpe.com/.

2. From the **Products** menu, select **Software Updates**.

3. On the **My Software Updates** page, do one of the following:

   - Select the Service Agreement ID (SAID) from the pull-down menu

   - Enter the SAID

4. Agree to the terms and conditions, and then click **View Available Products**.

5. Expand the **Network Management Center** node.

6. Select the HPE NA version 10.30 line.

7. Click the **Get Software Updates** button.

8. Click the **Get Licensing** tab.

9. Verify the selected product name.

10. Click the **Get License** link.

11. Complete your profile by entering the required information, and then click **Continue**.

12. On the Search Entitlements to Activate page, verify the selected entitlement, and then click **Activate**.

13. Save the NA license file and then transfer it to a location accessible from the NA core server.

Optional. Verify the Signature of the NA Installer

A Gnu Privacy Guard (GPG) signature file (`.sig`) is included with all NA installers on the NA installation media. HPE recommends that you verify the authenticity of the NA installer before installing NA. To verify the validity of a file, follow the instructions for *Verification using GPG* at:

https://h20392.www2.hp.com/portal/swdepot/displayProductInfo.do?productNumber=HPLinuxCodeSigning

This process is valid for all operating system platforms supported by NA. File verification can be done on any system that supports running gpg. Because the verification process might vary depending on the gpg version and operating platform, consult the documentation for your version of gpg.

Running the NA 10.30 Service Pack Installer

Before running the NA Service Pack Installer, ensure that the database server is running.

The NA Service Pack Installer sets the Java virtual machine (JVM) heap size in relation to the amount of system RAM and the number of processors. Generally speaking, the installer sets the JVM heap size to half of the RAM. (The NA installer does not explicitly set the size of the young generation, so this value defaults to 1/3 of the JVM heap size.) Note the following exceptions:

- If the heap size is already set to a larger value than the NA Service Pack Installer would set, the NA Service Pack Installer does not change that value.

- If the NA core server has more than 64GB of RAM, the NA installer sets the JVM heap size to 32GB.

- If HPE Network Node Manager i Software is already installed on the NA core server, the NA installer sets the JVM heap size to 512MB regardless of the system RAM size.

Read the section appropriate to your operating system type.

Running the Service Pack Installer on a Windows Operating System

For upgrading on a Windows platform, do the following:

1. Copy the NA service pack installer zip file and extract the installation files to the local host server.

2. Navigate to the **bin** folder.

3. Run `setup.exe` from the local folder to start the installation process manually.

   For example, `<drive>:\<extracted location>\bin\windows_[nnn]-[mmddyy]_spi_setup_64.exe`, where `[nnn]-[mmddyy]` is the build number.

4. Follow the instructions on the screen. For more information, see .

   > **Caution:** *Oracle only*. In a Multimaster Distributed System environment, do not enable case-insensitive search while upgrading NA.

Running the Service Pack Installer on a Linux Operating System

If you are installing the NA Service Pack Installer on an NA Linux server, you must have root access to run the NA Service Pack Installer.

1. Copy the NA service pack installer tar.gz file and extract the installation files to the local host server.

2. Navigate to the **bin** directory.

3. Set the open file limit for this session:

   a. Determine the open file limits by running the following commands:

   ```
   ulimit -Sn
   ulimit -Hn
   ```

   The soft file limit must be at least 32768.

   The hard file limit must be at least 32768.

   b. If necessary, update the soft file limit by running the following command:

   ```
   ulimit -n 32768
   ```

4. Run the installer:

   `./linux_[nnn]-[mmddyy]_spi_setup_64.bin`, where `[nnn]` is the build number and `[mmddyy]` is the build date.

5. Follow the instructions on the screen. For more information, see .

   > **Caution:** *Oracle only*. In a Multimaster Distributed System environment, do not enable case-insensitive search while upgrading NA.

Set the ulimit Values for Running NA (Linux only)

On the NA core server, ensure that the open file limits are set appropriately for each NA session.

1. Change to the following directory:

   `/etc/init.d`

2. Back up the `truecontrol` file to a location outside the `/etc` directory.

3. In the `truecontrol` file, add the following line as the first non-commented line:

   `ulimit -n 32768`

4. In an NA Horizontal Scalability environment, repeat all of the previous steps on each NA core server.

5. On each NA server, restart all NA services. See "Start, Stop, or Restart All NA Services" on page 69.

> **Tip:** You can wait to restart the NA services until after disabling the JCS disk cache (next).

Data Pruning

It is recommended to verify that the Data Pruning task is scheduled to run at least weekly.

After upgrading NA, the first several runs of the Data Pruning task might exceed the configured maximum task time. In this case, you might see the following warning message:

`com.rendition.pruner.ConfigPruner: The task thread was interrupted. Pruning partially completed.`

> **Note:** In a Distributed System or Horizontal Scalability environment, it is recommended to run the Data Pruning task manually on one NA core server until the warning message does not appear. At that point, verify that the Data Pruning task is scheduled to run at least weekly. In a Distributed System, schedule the task to run on each core. Make sure that the separate tasks do not overlap—it is recommended to schedule the tasks to run on different days of the week.

This message indicates that additional records can be pruned. No action is necessary; subsequent runs of the Data Pruning task will clear the additional records.

> **Tip:** If the database configuration includes redo logs, ensure that adequate disk space is available for these logs, especially while the warning message appears. The required size depends on the database configuration and the size of the NA database.

To complete database cleanup faster, do either or both of the following steps:

- Temporarily increase the value of Max Task Length to a value such as 18000 (5 hours). This setting is under Tasks on the Admin > Administrative Settings > Server page in the NA console.

  > **Tip:** After the warning message no longer appears, reset the Max Task Length to the original value (3600 by default).

- Run the Data Pruning task manually until the warning message does not appear.

Install the Latest NA Driver Pack

The NA upgrade installer overwrites the existing driver pack on the NA server with the driver pack embedded in the installer. To prevent a functionality regression, after you upgrade or install NA, install the latest NA Driver Pack. Follow these steps:

1. Go to the HPE Marketplace web site at:

   https://marketplace.saas.hpe.com/itom/content/device-driver-packs-for-network-automation

   Access to this page requires an HPE Marketplace user account.

2. Download the latest NA Driver Pack.

3. Install the downloaded driver pack.

Installing NA 10.30

This chapter provides information on installing NA 10.30 on a new standalone NA core server.

For information about installing in other NA environments, see the appropriate documentation:

- NA Multimaster Distributed System

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

- NA Horizontal Scalability

  For information about installing NA in a Horizontal Scalability environment, see the *Horizontal Scalability guide*.

- NA Satellites

  See the *Installation* section of the *Satellite guide*.

The following steps provide an outline for single NA Core installation:

1. "Prepare the Database" below

2. "Install Nmap" on page 58

3. "Obtain an NA License" on page 59

4. "Optional. Verify the Signature of the NA Installer" on page 60

5. "Run the NA Installer" on page 61

6. "Set the ulimit Values for Running NA (Linux only)" on page 64

7. "Install the Latest NA Driver Pack" on page 65

Prepare the Database

For Oracle or SQL Server, NA supports reducing the privileges of the NA database user account for general operation. For information, see *Running NA with Minimal Database User Privileges* in the *Administration guide*.

For information about database options, read the section appropriate to your database type:

- "PostgreSQL Database Options" below

- "Oracle Database Options" on the next page

- "Microsoft SQL Server Database Options" on page 57

PostgreSQL Database Options

Make note of the following PostgreSQL Database options during installation:

1. If you want NA to install PostgreSQL, when prompted for the folder in which to install PostgreSQL, do not select the NA Install folder or any sub-folder therein.

2. When prompted whether or not to create a new database or use an existing one, select the **Create New Database** option. Do not return to the previous step after the database has been created.

3. Database option.

4. Note: If you want to use an existing NA database created by a previous NA installation, select the

5. using existing database option. The database will be upgraded to the current version, if applicable.

Connecting to a Remote PostgreSQL Server

To connect to the remote server using the database administrator credentials, do the following configurations:

1. In the PostgreSQL data directory, do the following:

   a. Modify the following line of the `postgresql.conf` file:

   `listen_addresses = '*'`

   > Note: `listen_addresses` specifies the TCP/IP address(es) that the PostgreSQL server must listen for connections from the NA server.

   b. Modify the `pg_hba.conf` file with the IP address of the NA server under the `local connections` (IPv4/IPv6) sections.

   c. Save the changes.

2. Restart the PostgreSQL server.

Oracle Database Options

Oracle database configuration requirements:

- Create a new tablespace dedicated to NA. For example:

CREATE TABLESPACE NADB DATAFILE '/u01/app/oracle/oradata/SIDxx/NADB01.DBF' SIZE 30G REUSE;

> **Tip:** To enable future defragmentation of the NA tablespace, create the tablespace with automatic segment space management (ASSM). The example command creates the tablespace with ASSM.

- Create an NA database user that uses the new tablespace.

  While creating the database user in Oracle 12c, run the following command before running the rest of the commands:

alter session set "_ORACLE_SCRIPT"=true;

  An example of the command to create An NA Oracle database user, with the username as nauser, is as follows:

CREATE USER nauser IDENTIFIED BY napass DEFAULT TABLESPACE NADB QUOTA 100M ON NADB;

- Grant at least the following privileges to the NA database user:

  - CREATE SEQUENCE

  - CREATE SESSION

  - CREATE TABLE

  - CREATE PROCEDURE

  - SELECT ANY DICTIONARY

  - CONNECT

  - EXECUTE on CTXSYS.ctx_ddl

For example (for Oracle user name `nauser`):

```
GRANT CREATE SEQUENCE, CREATE SESSION, CREATE TABLE to nauser;
GRANT CREATE PROCEDURE, SELECT ANY DICTIONARY, CONNECT to nauser;
GRANT EXECUTE on CTXSYS.ctx_ddl to nauser;
```

- To enable future configuration of the "contains (full text)" search functionality, enable Oracle Text for the database.

Designating Unclustered Oracle During NA Installation

In an unclustered Oracle environment, note the following database options during installation:

1. When prompted for the Database Admin Login information, enter the database user with access to the NA tablespace.

2. When prompted to configure the database, select the **Clean database for use by NA** option. Do not return to the previous step after the database has been created.

   Note: If you want to use an existing NA database created by a previous NA installation, select the **using existing database** option. The database will be upgraded to the current version, if applicable.

Designating Oracle RAC During NA Installation

In an Oracle RAC environment, note the following database options during installation:

1. When prompted for the Database Admin Login information, enter the database user with access to the NA tablespace.

2. When prompted to configure the database, select the **Clean database for use by NA** option. Do not return to the previous step after the database has been created.

   Note: If you want to use an existing NA database created by a previous NA installation, select the **using existing database** option. The database will be upgraded to the current version, if applicable.

3. When prompted for database credentials, do the following:

   a. In a text editor, open the `<NA_HOME>/server/conf/JDBCDrivers.properties` file.

   b. Set the `oracle.url` variable in the following format:

      `oracle.url=jdbc:oracle:thin:@//<server>:<port>/<service_name>`

      Replace the variables as follows:

      - `<server>` is the IP address or fully-qualified hostname of the Oracle RAC cluster.

      - `<port>` is the port of the Oracle RAC cluster.

      - `<service_name>` is the service name of the Oracle RAC cluster.

   c. Save the file.

   d. At the NA installer prompt, enter the following information:

      - For the database IP address or hostname, enter the value of `<server>` in the `oracle.url` variable.

      - For the database port, enter the value of `<port>` in the `oracle.url` variable.

      - For the database SID / Service Name, enter the value of `<service_name>` in the `oracle.url` variable.

4. After NA installation completes, ensure that the Oracle RAC cluster information in the `<NA_HOME>/server/ext/jboss/server/default/deploy/db_ds.xml` file is current.

Microsoft SQL Server Database Options

SQL Server database configuration requirement:

- To enable future configuration of the **contains (full text)** search functionality, install and enable the SQL Server Full Text Search service for the database.

Make note of the following SQL Server Database options during NA installation:

1. When prompted for the Database Admin login, if you do not select the **Use Windows Authentication** option, make sure you have set all privileges at the global level.

2. When prompted for the database administrator credentials, provide a SQL Server user account with the `sysadmin` role. You can use the SQL Server SA user account or a custom user account.

3. When prompted whether or not to create a new database or use an existing one, select the **Create New Database** option.

> **Note:** If you want to use an existing NA database created by a previous NA installation, select the **using existing database** option. The database will be upgraded to the current version, if applicable.

4. When prompted for credentials for a new database user, provide a user name that does not yet exist in SQL Server.

As the SQL Server administrator user, the NA installer does the following database actions:

1. Populates the NA database with the NA tables.

2. Creates a new SQL Server user with the provided credentials. The NA core connects to the NA database using this new account.

Install Nmap

Nmap enables you to scan networks to determine which hosts are up and the services they offer.

Install Nmap as described in the section appropriate to the operating system of the NA core server:

- "Installing Nmap on a Windows Operating System " below

- "Installing Nmap on a Linux Operating System" on the next page

For more information about Nmap, see *Scanning Methods* in the *User guide*.

Installing Nmap on a Windows Operating System

The Nmap execution file included with NA might not be compliant with all Windows versions. Be sure to download the correct Nmap install packages for your Windows versions.

Installing Nmap on a Linux Operating System

To install Nmap on a Linux operating system, follow these steps:

1. `cd <NA_HOME>/server/ext/nmap`

2. Install the RPM package using the following command:

   `rpm -i <rpm file>`

   For example:

   `cd <NA_HOME>/server/ext/nmap`
   `rpm -i nmap-5.21-1.x86_64.rpm`

3. Create a link to the nmap executable in the `<NA_HOME>/server/ext/nmap` directory:

   `cd <NA_HOME>/server/ext/nmap`
   `ln -s /usr/bin/nmap nmap`

Obtain an NA License

> **Tip:** In a multiple NA core environment such as Multimaster or Horizontal Scalability, use the same license keys on all NA cores.

NA supports the following license types:

- InstantOn — InstantOn licenses are shipped with the product. Each InstantOn license is limited to 250 devices and 60 days of use after installing the product.

- Permanent — Permanent licenses must be obtained through the HPE License Key Delivery Service. Permanent licenses do not have an expiration date.

- Evaluation — Evaluation licenses are temporary licenses with customized capacity and duration. For more information, contact your NA Sales Representative.

To obtain NA 10.x permanent license keys, follow these steps:

1. Log on to https://softwaresupport.hpe.com/.

2. From the **Products** menu, select **Software Updates**.

3. On the **My Software Updates** page, do one of the following:

    ○ Select the Service Agreement ID (SAID) from the pull-down menu

    ○ Enter the SAID

4. Agree to the terms and conditions, and then click **View Available Products**.

5. Expand the **Network Management Center** node.

6. Select the HPE NA version 10.30 line.

7. Click the **Get Software Updates** button.

8. Click the **Get Licensing** tab.

9. Verify the selected product name.

10. Click the **Get License** link.

11. Complete your profile by entering the required information, and then click **Continue**.

12. On the Search Entitlements to Activate page, verify the selected entitlement, and then click **Activate**.

13. Save the NA license file and then transfer it to a location accessible from the NA core server.

Optional. Verify the Signature of the NA Installer

A Gnu Privacy Guard (GPG) signature file (`.sig`) is included with all NA installers on the NA installation media. HPE recommends that you verify the authenticity of the NA installer before installing NA. To verify the validity of a file, follow the instructions for *Verification using GPG* at:

https://h20392.www2.hp.com/portal/swdepot/displayProductInfo.do?productNumber=HPLinuxCodeSigning

This process is valid for all operating system platforms supported by NA. File verification can be done on any system that supports running gpg. Because the verification process might vary depending on the gpg version and operating platform, consult the documentation for your version of gpg.

Run the NA Installer

If you are installing NA on a Windows platform, run the Install Wizard. If you are installing NA on a Linux platform, run the CLI Installer.

The NA installer sets the Java virtual machine (JVM) heap size in relation to the amount of system RAM and the number of processors. Generally speaking, the installer sets the JVM heap size to half of the RAM. (The NA installer does not explicitly set the size of the young generation, so this value defaults to 1/3 of the JVM heap size.) Note the following exceptions:

- If the NA core server has more than 64GB of RAM, the NA installer sets the JVM heap size to 32GB.

- If HPE Network Node Manager i Software (NNMi) is already installed on the NA core server, the NA installer sets the JVM heap size to 512MB regardless of the system RAM size.

Note: Be sure you have a supported version of ActivePerl/Strawberry Perl (for Windows) or Perl (for Linux) installed before installing NA. For information about supported versions, see the *Support Matrix*.

Note: If the installation fails, save all log files to a location outside the NA directory structure before re-running the installation.

Read the section appropriate to your operating system type.

Running the Installer on a Windows Operating System

With Administrator privileges, do the following to install NA:

1. Copy the NA installer zip file and extract the installation files to the local host server.

2. Navigate to the **bin** folder.

3. Run `setup.exe` from the local folder to start the installation process manually.

   For example, `<drive>:\<extracted location>\bin\windows_[nnn]-[mmddyy]_setup_64.exe`, where `[nnn]-[mmddyy]` is the build number.

4. Follow the instructions on the screen. For more information, see .

Note: Setup does not work with PC Anywhere. If you attempt to run Setup through PC Anywhere,

you cannot view the windows to step through the installation. This also affects uninstalling NA.

Running the Installer on a Linux Operating System

To install NA on a Linux server, follow these steps:

1. Log on to the Linux server as the root user.

2. Copy the NA installer tar.gz file and extract the installation files to the local host server.

3. Navigate to the **bin** directory.

4. Set the time zone environment variable using the following commands:

   TZ=UTC
   export TZ

5. Set the open file limit for this session:

   a. Determine the open file limits by running the following commands:

      ulimit -Sn
      ulimit -Hn

      The soft file limit must be at least 32768.

      The hard file limit must be at least 32768.

   b. If necessary, update the soft file limit by running the following command:

      ulimit -n 32768

6. Run the installer:

   ./linux_[nnn]-[mmddyy]_setup_64.bin

7. Follow the instructions on the screen. For more information, see .

If you see the following errors in the log file, verify the value of the TZ environment variable, and then restart the NA Service Pack Installer:

SQLException while trying to connect to the database.
java.sql.SQLException: ORA-00604: error occurred at recursive SQL level 1
RA-01882: timezone region not found

Installing NA in a Coexistent Environment with NNMi

When NA is installed on the same system with NNMi that has an embedded PostgreSQL database, you must install a PostgreSQL database for NA separately. You must also modify the default port (5432) used by the NA PostgreSQL database as NNMi databse also uses the same port. To modify the port, follow these steps:

1. Install NNMi with the embedded (PostgreSQL) database.

2. Stop the NNMi services.

   > **Note:** Make sure that the NNMi database is also stopped.

3. Install NA with the PostgreSQL database.

   > **Note:** Choose the **Install Postgres** option.

4. Stop all the NA services. For more information, see .

5. Stop the NA PostgreSQL database, by running the following command:

   For Windows:

   `sc stop postgres`

   For Linux:

   `/etc/init.d/postgres stop`

6. Modify the `postgresql.conf` file, by following these steps:

   a. Locate the file in the home directory of PostgreSQL.

   b. Uncomment the port number:

      `#port = 5432`

   c. Change the port to any free port above 1024. For example, 5433.

7. On the NA server, go to the `deploy` directory.

   On Windows:

```
C:\NA\server\ext\jboss\server\default\deploy
```

On Linux:

```
/opt/NA/server/ext/jboss/server/default/deploy
```

8. In the directory, locate the `db-ds.xml` file, and then do the following:

   a. Search for the occurances of the following line:

   ```
   <attribute name="JdbcUrl">jdbc:postgresql://localhost:5432/na</attribute>
   ```

   b. At all the occurances, replace 5432 with the changed port number.

9. Restart NNMi and the NNMi database.

10. Restart NA services and the PostgreSQL database.

> **Note:** If you launch NA from NNMi in a Firefox browser, the main menu in NA is not displayed at first. You will have to refresh the page to see the menu.

Set the ulimit Values for Running NA (Linux only)

On the NA core server, ensure that the open file limits are set appropriately for each NA session.

1. Change to the following directory:

   ```
   /etc/init.d
   ```

2. Back up the `truecontrol` file to a location outside the `/etc` directory.

3. In the `truecontrol` file, add the following line as the first non-commented line:

   ```
   ulimit -n 32768
   ```

4. In an NA Horizontal Scalability environment, repeat all of the previous steps on each NA core server.

5. On each NA server, restart all NA services. See "Start, Stop, or Restart All NA Services" on page 69.

Install the Latest NA Driver Pack

The NA upgrade installer overwrites the existing driver pack on the NA server with the driver pack embedded in the installer. To prevent a functionality regression, after you upgrade or install NA, install the latest NA Driver Pack. Follow these steps:

1. Go to the HPE Marketplace web site at:

   https://marketplace.saas.hpe.com/itom/content/device-driver-packs-for-network-automation

   Access to this page requires an HPE Marketplace user account.

2. Download the latest NA Driver Pack.

3. Install the downloaded driver pack.

Uninstalling NA from Windows

The following steps assume you installed NA using the default directories and names. If you installed NA in a different directory or used different names, adjust accordingly.

To uninstall NA from Windows, do the following:

1. Click **Start > Programs > HPE Network Automation> Uninstall HPE Network Automation**.

2. Click **Uninstall**.

3. When the uninstall program is done, click **Finish**.

4. A message appears saying that you must reboot. The folder `c:\NA` (the installation folder) is removed when you reboot the computer.

Note: If you upgraded to a newer version of NA on a Windows platform, the NA Uninstaller does not remove the FTP service. As a result, after uninstalling NA, enter the `sc delete TrueControlFTP` command from the command line prompt to delete the FTP service.

Uninstalling NA from Linux

To uninstall NA from Linux, do the following step as the root user:

1. Change to the `<NA_HOME>/UninstallerData` directory (for example:
   `/opt/NA/UninstallerData`).

2. Enter: `./Uninstall_HPE_Network_Automation`

3. After the uninstaller completes, delete the `<NA_HOME>` directory if it still exists.

Manually Uninstalling NA (Windows)

If the NA uninstaller makes no progress for over 10 minutes stop the NA uninstaller process and do the following:

1. Run the following commands to stop all NA services:

   ```
   {<NA_HOME>}\server\ext\wrapper\bin\UninstallAAAWrapper-NT.bat
   {<NA_HOME>}\server\ext\wrapper\bin\UninstallJBossWrapper-NT.bat

   {<NA_HOME>}\server\ext\wrapper\bin\UninstallSyslogWrapper-NT.bat
   {<NA_HOME>}\server\ext\wrapper\bin\UninstallTFTPWrapper-NT.bat
   ```

2. Delete the NA folder.

3. Delete the following Windows registry keys if they exist:

   ```
   HKEY_LOCAL_MACHINE\SOFTWARE\Rendition Networks\TrueControl
   HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\TrueControlJBoss
   HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\TrueControlAAA
   HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\TrueControlJBossSyslog
   HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\TrueControlJBossTFTP
   ```

4. Manually delete the `%WINDIR%\temp\Rendition` folder. (Note: `%WINDIR%` is usually located in
   `C:\WINDOWS` or `C:\WINNT`. However, it might reside on a different drive.)

Uninstalling PostgreSQL (NA Installer)

This section includes information on uninstalling PostgreSQL if PostgreSQL was installed by the NA Installer.

To uninstall PostgreSQL on a Windows platform, follow these steps:

1. Stop the PostgreSQL services by running `sc stop postgres`.

2. Manually back up the PostgreSQL data folder, if necessary.

3. From the command line, run `sc delete postgres`.

4. Delete the `[$Postgres_HOME]` directory. (`[$Postgres_HOME]` is where PostgreSQL is installed).

To uninstall PostgreSQL on a Linux platform, follow these steps:

1. Stop the PostgreSQL services by running `/etc/init.d/postgres stop`.

2. Manually back up the PostgreSQL data folder, if necessary.

3. Delete the postgres file from the following location:

   `/etc/init.d/postgres`

4. Delete the `[$Postgres_HOME]` directory. (`[$Postgres_HOME]` is where PostgreSQL is installed).

Uninstalling MySQL 5.0.58 (NA Installer)

This section includes information on uninstalling MySQL 5.0.58 if MySQL 5.0.58 was installed by one of the previous versions of NA Installer.

To uninstall MySQL 5.0.58 on a Windows platform:

1. Double click `[$MYSQL_HOME]\bin\remove-service.bat`.

2. Backup the MySQL data folder if necessary.

3. Manually delete `[$MYSQL_HOME]`. Where `[$MYSQL_HOME]` is where MySQL is installed.

To uninstall MySQL 5.0.58 on a Linux platform:

1. Run `/etc/init.d/mysql stop`

2. Back up the MySQL data folder if necessary.

3. Run `rm -rf /etc/init.d/mysql /etc/my.cnf [$MYSQL_HOME]`, where [$MYSQL_HOME] is where MySQL is installed (`/opt/mysql` is the default).

Common Procedures

This section describes procedures that are common to many Network Automation (NA) configuration and maintenance tasks. It includes the following topics:

-

-

-

Start, Stop, or Restart All NA Services

Stopping the NA services before changing the NA configuration prevents conflicting data from being stored in the NA database. Some procedures call for restarting the NA services to read the updated configuration.

To start all NA services

- *Windows*: Open the **Services** control panel. In the list of services, right-click each of the following services, and then click **Start**:

    - **TrueControl ManagementEngine**

    - **TrueControl SA Client**

    - **TrueControl FTP Server**

    - **TrueControl Syslog Server**

    - **TrueControl TFTP Server**

- *Linux*: Run the following command:

    /etc/init.d/truecontrol start

To stop all NA services

- *Windows*: Open the **Services** control panel. In the list of services, right-click each of the following services, and then click **Stop**:

- ○ **TrueControl ManagementEngine**

- ○ **TrueControl SA Client**

- ○ **TrueControl FTP Server**

- ○ **TrueControl Syslog Server**

- ○ **TrueControl TFTP Server**

- *Linux*: Run the following command:

  /etc/init.d/truecontrol stop

To restart all NA services

- *Windows*: Open the **Services** control panel. In the list of services, right-click each of the following services, and then click **Restart**:

  - ○ **TrueControl ManagementEngine**

  - ○ **TrueControl SA Client**

  - ○ **TrueControl FTP Server**

  - ○ **TrueControl Syslog Server**

  - ○ **TrueControl TFTP Server**

- *Linux*: Run the following command:

  /etc/init.d/truecontrol restart

Disable All NA Services

Some procedures call for disabling automatic startup of the NA services on system boot.

To disable all NA services

- *Windows*: Open the **Services** control panel. In the list of services, right-click each of the following services, click **Properties**, and then set Startup Type to **Disabled**:

  - ○ **TrueControl ManagementEngine**

  - ○ **TrueControl SA Client**

  - ○ **TrueControl FTP Server**

- ○ **TrueControl Syslog Server**

  - ○ **TrueControl TFTP Server**

- *Linux*:

```
mv /etc/rc.d/rc5.d/S99truecontrol /etc/S99truecontrol
```

Working with .rcx Files

The Network Automation (NA) property files use the `.rcx` extension. NA reads `.rcx` files in reverse alphabetical order. If a given setting is in multiple `.rcx` files, NA uses the last-read value. Thus, the settings in the `adjustable_options.rcx` file take precedence over the settings in the other `.rcx` files installed with NA.

> **Note:** At startup, NA reads *all* files in the `jre` directory and interprets their contents for NA configuration options. For this reason, save all backup copies of `.rcx` files outside the root NA directory.

In Horizontal Scalability environments, NA shares the actual values of most settings, not the `.rcx` files, across the NA cores. When a setting is modified on one NA core, that setting is replicated to the other NA cores. If an NA core is not operational during the change replication, that NA core does not receive the change. In that case, at a later time, use the Admin > Distributed > Renew Configuration Options page to push changes to other NA cores.

> **Tip:** The distributed system options section of the `appserver.rcx` file lists the settings that are specific to one NA core and are not shared across the NA cores.

Some configuration changes require `.rcx` file modifications. The `.rcx` files are located in the following directory:

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

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

> **Caution:** Always edit `.rcx` files with care. These files use XML format. If a `.rcx` file change results in invalid XML, the NA console might not start correctly.

> **Tip:** It is recommended to make all configuration changes in the `adjustable_options.rcx` file. NA patch installations and product upgrades might overwrite any of the other NA-installed `.rcx`

files.

The general procedure for changing `.rcx` files is as follows:

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

   (NA reads all `.rcx` files within the NA directory structure.)

2. Add new content or update existing content as described in the instructions.

3. Save the `.rcx` file.

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

   - In the NA console, on the Admin > Administrative Settings > User Interface page, click **Save**.

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

   - Restart the NA services.

     Tip: Some changes do not take effect until the NA services have been restarted.

Other Installation Topics

This section includes information for maintaining your Network Automation (NA) installation. It includes the following topics:

- "Deploying NA License Information" below

- "System Status Page" on the next page

- "Database Upgrades" on the next page

Deploying NA License Information

The best practice for deploying an NA 10.30 license is to provide the text file containing the NA license key to the NA core server during installation or upgrade. In this way, the NA console is immediately accessible. If you do not provide the NA license text file during installation or upgrade and the InstantOn license has already been consumed, NA is unusable until you provide valid NA 10.30 license information.

To deploy an NA license key after product installation or upgrade, follow the procedure that matches your situation:

- If you can log on to the NA console:

  a. Obtain an NA license key as described in "Obtain an NA License" on page 59.

  b. Log on to the NA console as an NA administrator.

  c. On the About HPE Network Automation page (**Help > About HPE Network Automation**) click the **View License Information** link.

  d. On the License Information page, copy the entire contents of the delivered license file into the text box, and then click **Update License**.

- If you cannot log on to the NA console:

  a. Obtain an NA license key as described in "Obtain an NA License" on page 59.

  b. Copy the new NA license key into the `license.dat` file, which is located in the NA installation directory (`<NA_HOME>`).

- If the file exists, completely replace the current contents with the entire contents of the delivered license file.

- If the file does not exist, create the file to include only the contents of the delivered license file (with no extra lines).

c. Restart all NA services. See "Start, Stop, or Restart All NA Services" on page 69.

System Status Page

If you do not know the name of the existing NA database, before shutting down NA do the following:

1. On the menu bar under Admin, click System Status. The System Status page opens.

2. In the Monitor Name column, locate DatabaseMonitor.

3. Click the View Details option in the Actions column. The database information is displayed.

Database Upgrades

This topic describes how to upgrade the NA database separately from upgrading the NA core software. If you also need to upgrade the NA core software, see the appropriate instructions first:

- "Upgrading to NA 10.30 from a Different System" on page 14

- "Upgrading to NA 10.30 on the Same System" on page 34

For a same-system upgrade of the database software on the database server used by NA, follow these steps:

1. Stop all NA services.

2. Back up the NA database.

   Note: When you enter a database name to identify the NA database, it must be in the identical case as the database name in the database application. For example, if you created your NA database as **Nadb**, be sure to enter **Nadb** when backing up and restoring the database.

3. Upgrade the database to a version supported by NA 10.30.

4. Restart NA and verify that NA is working properly.

> **Note:** For all database upgrades, consult the documentation provided by the appropriate vendor and your database administrator (DBA).

Maintaining an Oracle Database

This section explains the procedures to maintain an Oracle database for NA in horizontal scalability and multimaster distributed system environments.

> **Note:** All the NA database servers must maintain synchronized system clocks. Typically, you must synchronize the system clocks through an external server that uses NTP (Network Time Protocol) services.

For information about the best practices in a standalone system, see "Oracle Database Options" on page 55.

Running the Horizontal Scalability Scripts on Oracle

To run a customized setup script on an Oracle database server using SQLPlus, follow these steps:

1. Copy the customized SQL script to the database server.

   ○ *Windows*: Place the file in `C:\`.

   ○ *Linux*: Place the file in the `$ORACLE_HOME/bin` directory, such as the following:

   `/u01/app/oracle/product/11.2.0/dbhome_1/bin`

2. Log on to a SQLPlus window as the NA database user, such as the following:

   `sqlplus <USER>/<PASSWORD>@<SID>`

   For `<USER>` and `<PASSWORD>`, use the Oracle user account for the NA database user.

   For `<SID>`, use the Oracle SID of the NA database.

3. In the SQLPlus window, run the customized script, such as the following:

   `run: SQL > @OracleInitialSetup.sql`

Setting up the Initial Replication for Oracle 11g in a Multimaster Distributed Environment

Oracle 11g requires recreation of the database schema after exporting that schema for use on another database server. The procedure described in this section accommodates this behavior of Oracle 11g.

NA can already be installed on one core server and database server (a single NA core). Alternatively, you can complete the first NA core installation as part of setting up initial replication.

This procedure uses the following identifiers:

- NA core servers: NA1 and NA2
- Oracle database SIDs:

  - SID1 on database server Master 1

  - SID2 on database server Master 2

- NA database user for both databases: nauser

- Password for the NA database user: napass

- NA tablespace: NAORA

- Script to create the NA database user: create_nauser.sql

- NA schema export file: NAEXP.dmp

To use a different identifier, substitute the actual value for each instance of the example value within the procedure.

To set up initial replication between two NA cores, complete the following tasks:

- Task 1: Verify Prerequisites (Oracle 11g)

- Task 2: (New Installations Only) Create the NA Schema on Master 1 (Oracle 11g)

- Task 3: Prepare Master 1 for Replication (Oracle 11g)

- Task 4: Prepare Master 2 for Replication (Oracle 11g)

- Task 5: Configure Replication (Oracle 11g)

- Task 6: Configure the NA Core Servers for Replication

Task 1: Verify Prerequisites (Oracle 11g)

Prepare two database servers and two core servers. For best performance, each core server-database server pair should be co-located. Additionally, the core server-core server link and the database server-database server link should each be a high-speed connection.

Verify that the following prerequisites have been met:

- The two database servers are running Oracle 11g with the following configuration:

  - Unique SIDs

    > **Note:** One SID *cannot* be a subset of the other SID, such as `NARp` and `NARpBU`. Instead, use SIDs that stand alone, such as `NARp1` and `NARp2`.

  - The following parameters:

    - global_names = TRUE

    - open_links = at least 4 (increase this by 1 for each additional server in the NA Mesh beyond 2)

    - open_links_per_instance = at least 4 (same as open_links)

    - parallel_min_servers = 2

    - shared_pool_size = increase current value by 40m to support replication

    - job_queue_processes = at least 2

    > **Note:** The parameters must be set on each database in the NA Mesh. The parameters could be set up when the database is first created. If not, they must be modified at this point. You can view the current value of these parameters using Oracle Enterprise Manager or SQLPlus with the "`SHOW PARAMETERS`" or "`SELECT NAME, VALUE FROM v$parameters`" commands (where NAME = <parameter_name>, such as, global_names).

- The two core servers that will run NA have working hostnames. Note the following:

  - Each core server must have a high-speed connection to one of the database servers

  - For core server hardware and operating system requirements, see the *Support Matrix*

- It is recommended that the host names of both database servers and both core servers are in the `hosts` file on each core server. This file is located as follows:

  - *Windows*: `<Drive>:\Windows\System32\drivers\etc\hosts`

  - *Linux*: `/etc/hosts`

- All database servers and core servers are set to use the same time and timezone.

- If NA is already installed on one NA core, verify that the database user in place for this core has at least the permissions as listed here:

```
/*Create a new user with a default tablespace*/
CREATE USER nauser IDENTIFIED BY napass DEFAULT TABLESPACE NAORA;

/*grant Role equivalent to a system user (only choose public if you choose to
```

```
provide basic privileges)*/
GRANT DBA to nauser WITH ADMIN OPTION;

/*grant permissions for normal NA operation*/
GRANT CREATE SEQUENCE, CREATE SESSION, CREATE TABLE, CREATE PROCEDURE, SELECT
ANY DICTIONARY, CONNECT, CREATE VIEW TO nauser;
GRANT EXECUTE ON SYS.DBMS_REPCAT_ADMIN TO nauser;
GRANT EXECUTE ON SYS.DBMS_DEFER_SYS TO nauser;
GRANT CREATE PUBLIC DATABASE LINK TO nauser;
GRANT CREATE DATABASE LINK TO nauser;
GRANT CREATE USER TO nauser;
GRANT CREATE ANY PROCEDURE TO nauser;

/*For normal operation of a NA Core in a replication environment:*/
GRANT EXECUTE ON SYS.DBMS_REPUTIL TO nauser;
GRANT SELECT ON SYS.DBA_CONSTRAINTS TO nauser;
GRANT SELECT ON SYS.DBA_CONS_COLUMNS TO nauser;
GRANT SELECT ON SYS.DBA_REPCOLUMN TO nauser;

/*For replication deletion:*/
GRANT DROP USER TO nauser;
GRANT DROP PUBLIC DATABASE LINK TO nauser;
GRANT DROP ANY PROCEDURE TO nauser;

/*grant permissions for system level*/
GRANT CREATE MATERIALIZED VIEW, GLOBAL QUERY REWRITE, SELECT ANY TABLE to
nauser;
GRANT UNLIMITED TABLESPACE to nauser WITH ADMIN OPTION;
commit;
```

Task 2: (New Installations Only) Create the NA Schema on Master 1 (Oracle 11g)

If NA has not yet been installed, create the NA schema on the Master 1 database server by following these steps:

1. Log on to Master 1 as the SYS user, and then create a new tablespace dedicated to NA on Master 1.

   For example, create the NAORA tablespace for SID1 by using the following command:

- *Windows*:

  ```
  CREATE TABLESPACE NAORA DATAFILE 'C:\APP\ADMINISTRATOR\ORADATA\SID1\
  NAORA.DBF' SIZE 200M REUSE AUTOEXTEND ON NEXT 50M;
  ```

- *Linux*:

  ```
  CREATE TABLESPACE NAORA DATAFILE '/u01/app/oracle/oradata/SID1/
  NAORA.DBF' SIZE 200M REUSE AUTOEXTEND ON NEXT 50M;
  ```

2. Create a script for creating the NA database user as follows:

   a. Using a text editor such as WordPad, copy the text in the script, mentioned in Task 1, into a new text file, such as `create_user.sql`.

   b. Customize the script to your environment by making the following changes:

      - Replace `NAORA` with the tablespace name created in step 1.

      - Replace each instance of `nauser` with the desired NA database user name.

      - Replace `napass` with the desired password for the NA database user.

   c. Place a copy of the script on Master 1 and Master 2.

      - *Windows*: Place the file in `C:\`.

      - *Linux*: Place the file in the `$ORACLE_HOME/bin` directory, for example `/u01/app/oracle/product/11.2.0/dbhome_1/bin`.

3. On Master 1, create a new NA database user with the privileges listed in the script that uses the tablespace name created in step 1:

   a. Log on to Master 1 as the SYS user.

   b. At the `sqlplus` prompt, run the user creation script. For example, run: `SQL > @create_user.sql`

4. Install NA on the first core server (`NA1`).

   During installation, supply the following database credentials:

   - For the database IP address or hostname, enter the hostname of Master 1.

   - For the database port, enter the port of Master 1 that NA will use to communicate with the database.

   - For the database SID, enter the SID on Master 1 (for example, `SID1`).

- For the database user name and password, enter the name and password of the NA database user created in step 3, for example, `nauser` and `napass`.

5. After NA installation is complete, log on to NA (as `nauser`) to ensure that it works as expected.

6. Stop all NA services on NA1. See, "Start, Stop, or Restart All NA Services" on page 69.

Task 3: Prepare Master 1 for Replication (Oracle 11g)

To create the database export and finish preparing the database on Master 1, follow these steps:

1. On Master 1, create a directory to receive the tablespace export. For example, `C:\NA_data1` or `/tmp/NA_data1`

   - Ensure that the database user, for example `nauser`, has read-write access to this directory.

   - If NA was running prior to beginning this configuration procedure, ensure that this directory has more available disk space than the NA tablespace consumes.

2. Log on to Master 1 as the NA database user, and then associate the new directory with the datapump directory in preparation for the tablespace export, such as the following:

   - *Windows*:

     ```
     sqlplus nauser/napass@SID1
     create DIRECTORY datapump AS 'C:\NA_data1';
     exit
     ```

   - *Linux*:

     ```
     sqlplus nauser/napass@SID1
     create DIRECTORY datapump AS '/tmp/NA_data1';
     exit
     ```

3. Log on to Master 1 as the SYS user, and then grant the NA database user read-write access to the datapump directory. For example, `sqlplus / as sysdba`
   `GRANT READ,WRITE ON DIRECTORY datapump to nauser; exit`

4. On Master 1, verify that `$ORACLE_SID` is set to the SID for the NA database (for example, `SID1`).

5. With the NA management engine on NA1 shut down, on Master 1 and outside of SQLPlus, use the Oracle Data Pump Utility to export the NA database schema. For example:

   ```
   expdp nauser/napass TABLES=RN_% DIRECTORY=datapump DUMPFILE=NAEXP.dmp
   LOGFILE=NAEXP.log
   ```

6. Examine the export log file, for example `NAEXP.log` in the `NA_data1` directory.

- ○ If the export was successful, continue to step 8 of this task.

- ○ If the export was not successful, resolve the problems causing the failure, and then repeat step 5 of this task.

7. If you did not run the user creation script to create the database user, identify this user's complete set of permissions. You will use this information to re-create the user in step 10 of this task.

8. With the NA management engine on NA1 shut down, log on to Master 1 as the SYS user, and then delete the NA database user while retaining the NA tablespace.

   For example, in the Oracle Enterprise Manager (preferred), delete `nauser`, or at the `sqlplus` prompt, enter the following command:

   ```
   DROP USER nauser CASCADE;
   ```

   > **Note:** Use the cascade delete option to completely delete the user and empty its tablespace.

9. Verify that the NA tablespace is now empty.

10. Log on to Master 1 as the SYS user, and then recreate the NA database user:

    - ○ To use the user creation script, run commands similar to the following example:

      ```
      sqlplus / as sysdba
      run: SQL > @create_user.sql
      exit
      ```

    - ○ Else, recreate the user with the permissions collected in step 7 of this task.

    The newly-created NA database user connects to the existing NA tablespace. You might see an RMI error during the connection process. This error should clear after a few minutes, and the user-tablespace connection should occur without intervention.

11. On Master 1, outside of SQLPlus, use the Oracle Data Pump Utility to import the NA database schema for the NA database user. For example,

    ```
    impdp nauser/napass DIRECTORY=datapump TABLES=RN_% DUMPFILE=NAEXP.dmp
    LOGFILE=NAIMP1.log
    ```

    > **Note:** *Linux only*: Verify that the export file permissions are at least 755.

12. Examine the import log file, for example `NAIMP1.log` in the `NA_data1` directory.

    - ○ If the import was successful, continue to the next task.

    - ○ If the import was not successful, do the following:

- Resolve the problems causing the failure.

  Verify that the permissions for the user created in step 10 of this task match the user permissions collected in step 7 of this task.

- Drop the NA database user as described in step 8 of this task.

- Repeat step 11 of this task.

Task 4: Prepare Master 2 for Replication (Oracle 11g)

To import the Master 1 database to Master 2, follow these steps:

1. Log on to Master 2 as the SYS user, and then create the NA tablespace with the same name and parameters as the NA tablespace on Master 1. For example,

   ○ *Windows*:

   ```
   sqlplus nauser/napass@SID2
   CREATE TABLESPACE NAORA DATAFILE 'C:\APP\ADMINISTRATOR\ORADATA\SID2\
   NAORA.DBF' SIZE 200M REUSE AUTOEXTEND ON NEXT 50M;
   exit
   ```

   ○ *Linux*:

   ```
   sqlplus nauser/napass@SID2
   CREATE TABLESPACE NAORA DATAFILE '/u01/app/oracle/oradata/SID2/NAORA.DBF'
   SIZE 200M REUSE AUTOEXTEND ON NEXT 50M;
   exit
   ```

2. Log on to Master 2 as the SYS user, and then create the NA database user:

   ○ To use the user creation script, copy the script to Master 2 and then run commands similar to the following example:

   ```
   sqlplus / as sysdba
   run: SQL > @create_user.sql
   exit
   ```

   ○ Else, create the user with the permissions collected in step 7 of the previous task.

   The newly-created NA database user connects to the existing NA tablespace. You might see an RMI error during the connection process. This error should clear after a few minutes, and the user-tablespace connection should occur without intervention.

3. On Master 2, create a directory to hold the tablespace export. For example, C:\NA_data2 or

/tmp/NA_data2. Ensure that the database user (for example, nauser) has read-write access to this directory.

4. Copy the tablespace export file (for example, NAEXP.dmp) to the new directory on Master 2. Ensure that the export file owner and group are those for the Oracle user for the operating system.

5. Log on to Master 2 as the NA database user, and then associate the new directory with the datapump directory in preparation for the tablespace import. For example:

   ○ *Windows*:

   ```
   sqlplus nauser/napass@SID2
   create DIRECTORY datapump AS 'C:\NA_data2';
   exit
   ```

   ○ *Linux*:

   ```
   sqlplus nauser/napass@SID2
   create DIRECTORY datapump AS '/tmp/NA_data2';
   exit
   ```

6. Log on to Master 2 as the SYS user, and then grant the NA database user read-write access to the datapump directory. For example:

   ```
   sqlplus / as sysdba
   GRANT READ,WRITE ON DIRECTORY datapump to nauser;
   exit
   ```

7. On Master 2, verify that $ORACLE_SID is set to the SID for the NA database (for example, SID2).

8. On Master 2, outside of SQLPlus, use the Oracle Data Pump Utility to import the NA database schema for the NA database user. For example:

   ```
   impdp nauser/napass DIRECTORY=datapump TABLES=RN_% DUMPFILE=NAEXP.dmp
   LOGFILE=NAIMP2.log
   ```

   Note: *Linux only*: Verify that the export file permissions are at least 755.

9. Examine the import log file, for example NAIMP2.log in the NA_data2 directory.

   ○ If the import was successful, continue to the next task.

   ○ If the import was not successful, do the following:

     • Resolve the problems causing the failure.

- Drop the NA database user as described in step 8 of the previous task.

- Repeat step 8 of this task.

Task 5: Configure Replication (Oracle 11g)

To configure replication between the Master 1 and Master 2 databases, follow these steps:

1. On Master 1, add the Master 2 database information to the local `TNSNAMES.ora`. Verify that the Master 1 database information also exists in the `TNSNAMES.ora`. If the Master 1 database information does not exist, add it in the same format as the other entries.

   Note: You might also need to make modifications to the `LISTENER.ora` and `SQLNET.ora` files depending on how the Oracle servers are configured. In particular, in certain environments the `NAMES.DEFAULT_DOMAIN` property needs to be commented out in `SQLNET.ora`. For more information, contact your Oracle DBA.

2. On Master 2, add the Master 1 database information to the local `TNSNAMES.ora`. Verify that the Master 2 database information also exists in the `TNSNAMES.ora`. If the Master 2 database information does not exist, add it in the same format as the other entries.

   Note: You might also need to make modifications to the `LISTENER.ora` and `SQLNET.ora` files depending on how the Oracle servers are configured. In particular, in certain environments the `NAMES.DEFAULT_DOMAIN` property needs to be commented out in `SQLNET.ora`. For more information, contact your Oracle DBA.

3. On `NA1`, unpack the `OracleReplicationScriptToolBundle.zip` file to a known location, for example the `NA_data` directory used earlier in this procedure.

   Tip: On Windows systems, unpack the replication bundle to a location with low security, for example, `C:\tmp`.

4. From the known location of step 3, customize the `ReplicationScriptTool.properties` file for your environment:

   a. In a text editor such as WordPad or vi, open the `ReplicationScriptTool.properties` file.

   b. Search for and replace the text `REPLACEME` with the appropriate value for that variable.

      - Use the fully-qualified hostnames to identify the database and core servers. For example:

        ```
        db.server.0=Master1.example.com
        db.port.0=1521
        db.name.0=SID1
        ```

```
db.username.0=nauer
db.password.0=napass
app.server.0=NA1.example.com
app.rmiport.0=1099
app.corename.0=Core1

db.server.1=Master2.example.com
db.port.1=1521
db.name.1=SID2
db.username.1=nauser
db.password.1=napass
app.server.1=NA2.example.com
app.rmiport.1=1099
app.corename.1=Core 2
```

   c. Set `timezone_offset` to the value that matches the time zone setting for all servers in the distributed system.

   d. Verify that `mode` is set to `initial`.

5. From the known location of step 3, run `java -version` to verify that Java is version 1.7 or later.

6. From the known location of step 3, run the ReplicationScriptTool:

`java -classpath . ReplicationScriptTool`

This command creates a script for starting replication. By default, the script is named `ReplicationTool.sql`.

> **Tip:** The following error message can mean that Java does not have permission to run the replication tool:
>
> `Could not find the main class: ReplicationScriptTool.`
>
> Move all files from the replication bundle to a directory with lower security, and then run the `java` command from that directory.

7. On Master 1, ensure that SQLPlus that can access all NA Cores in the NA Mesh. To verify this, connect to one database with SQLPlus and issue the `CONNECT <USER>/<PASSWORD>@<SID>` command for each different SID in the Mesh. This is necessary because the script issues CONNECT commands to change which database it is running procedures against.

8. Copy the replication script created in step 6 (for example, `ReplicationScript.sql`) from the known location to the server identified in step 7.

- *Windows*: Place the file in `C:\`.

- *Linux*: Place the file in the `$ORACLE_HOME/bin` directory, for example
  `/u01/app/oracle/product/11.2.0/dbhome_1/bin`.

  Note: Make sure that files named `*_spool.txt` do not exist in the directory. When run, the script will log its actions to a file with that suffix.

9. On Master 1, open two SQLPLus windows, each connected as the NA database user (for example, `nauser`).

10. On Master 2, open a SQLPlus window connected as the NA database user (for example, `nauser`).

11. In one SQLPlus window on Master 1, run the replication script. For example:

    `@ReplicationScript.sql`

12. Follow the instructions provided by the script at several points as it runs. This process involves running commands in the second SQLPlus window on Master 1 to verify that certain operations necessary for later steps in the script have completed.

    At the first and second pauses, verify the configuration for both of the databases by running the same command in each of the following windows:

    - The second SQLPlus window on Master 1.

    - The SQLPlus window on Master 2.

    At the third pause, run the command in the second SQLPlus window on Master 1 only. When the `SELECT STATUS,REQUEST,ONAME FROM DBA_REPCATLOG;` statement returns "0 rows selected," replication setup is almost completed. Finish the process in the NA database user window.

    Note: If you see errors during replication setup, before performing initial replication setup again, see *Removing Replication Across the Entire NA Mesh* in the *Multimaster Distributed System on Oracle*.

    Tip: Depending on database size, it can take 30 to 60 minutes to see the "0 rows selected" results.

13. After the replication script completes, close both SQLPlus windows to ensure that all actions are logged to the spool file.

14. Verify that the replication is working correctly. Make sure:

○ The spool file generated by running the replication SQL script contains no errors.

○ The RN_CORE table in each database contains the appropriate list of servers in the NA Mesh. To check the RN_CORE table, using SQLPlus, enter the following command on each server:

`SELECT * FROM RN_CORE;`

○ Verify (using the Oracle Enterprise Manager) that each database in the NA Mesh has replication set up, is in the `Normal` state, and has `purge`, `push`, and `repcat_admin` jobs installed correctly. Contact your Oracle DBA for assistance.

○ Verify that the replication of data is working correctly. To verify that replication is working between all NA Cores in the NA Mesh, enter the following commands:

```
CONNECT <USER>/<PASSWORD>@<MASTER1_SID>;
UPDATE RN_CORE SET COMMENTS = 'Test from sid1 to sid2' where CoreID=1;
COMMIT;
```

wait 10 to 30 seconds

```
CONNECT <USER>/<PASSWORD>@<MASTER2_SID>;
SELECT Comments from RN_CORE where CoreID=1;
```

Enter this from every NA Core in the NA Mesh. Check the values each time on all of the other NA Cores to ensure that the links between each database in the system are working correctly.

○ The following command must return 'no rows selected' and not 'ready':

`SELECT STATUS,REQUEST,ONAME FROM DBA_REPCATLOG;`

15. Install NA on the second core server (NA2).

During installation, connect NA to the database on Master 2. When prompted for the database credentials, choose: use existing database.

Task 6: Configure the NA Core Servers for Replication

To configure the NA core servers for replication, follow these steps:

1. Stop all NA services on NA2. See "Start, Stop, or Restart All NA Services" on page 69.

2. Copy the `distributed.rcx` file from the known location of step 3 of Task 5: Configure Replication (Oracle 11g) to the following directory on both core servers, NA1 and NA2:

   ○ *Windows*: <NA_HOME>\jre

   ○ *Linux*: <NA_HOME>/jre

3. Start all NA services on both NA core servers, NA1 and NA2. See "Start, Stop, or Restart All NA Services" on page 69.

4. Connect to the NA console on both core servers, NA1 and NA2, (as user nauser), and ensure that there are no issues.

> **Tip:** An RMI error message at this point can mean that NA is unable to identify the localhost. For more information, see *RMI Errors in the NA Console* in the *Multimaster Distributed System on Oracle*.

5. Verify the NA installation:

   a. Edit an object on one NA server (for example, a Comments field for a device).

   b. Wait for about a minute, and then verify that the updated comment exists on the second server.

   c. Check the status of the Oracle Distributed Monitor in the NA console to ensure that no problems are being reported. It could take up to five minutes for this monitor to initially run.

Installation Tutorial

This appendix provides installation information for Network Automation (NA). It contains the following topics:

Standalone Install

For information about supported platforms, see the *Support Matrix*.

> **Note:** If you are using Oracle, create the NA database tablespace prior to the installation.
>
> If you are using Microsoft SQL Server, the NA database instance is created during installation.

Follow the instructions in "Installing NA 10.30" on page 53 of this guide. Refer to this section for help with the NA Installer interface.

> **Note:** It is recommended that the operating system locale of the NA core server be the same as the NA installed language.

Windows Operating System

To install NA on a Windows platform, do the following:

1. Locate the `setup.exe` file in the release package, and then double-click the file.

2. On the **Introduction** page, review the introduction information, and then click **Next**.
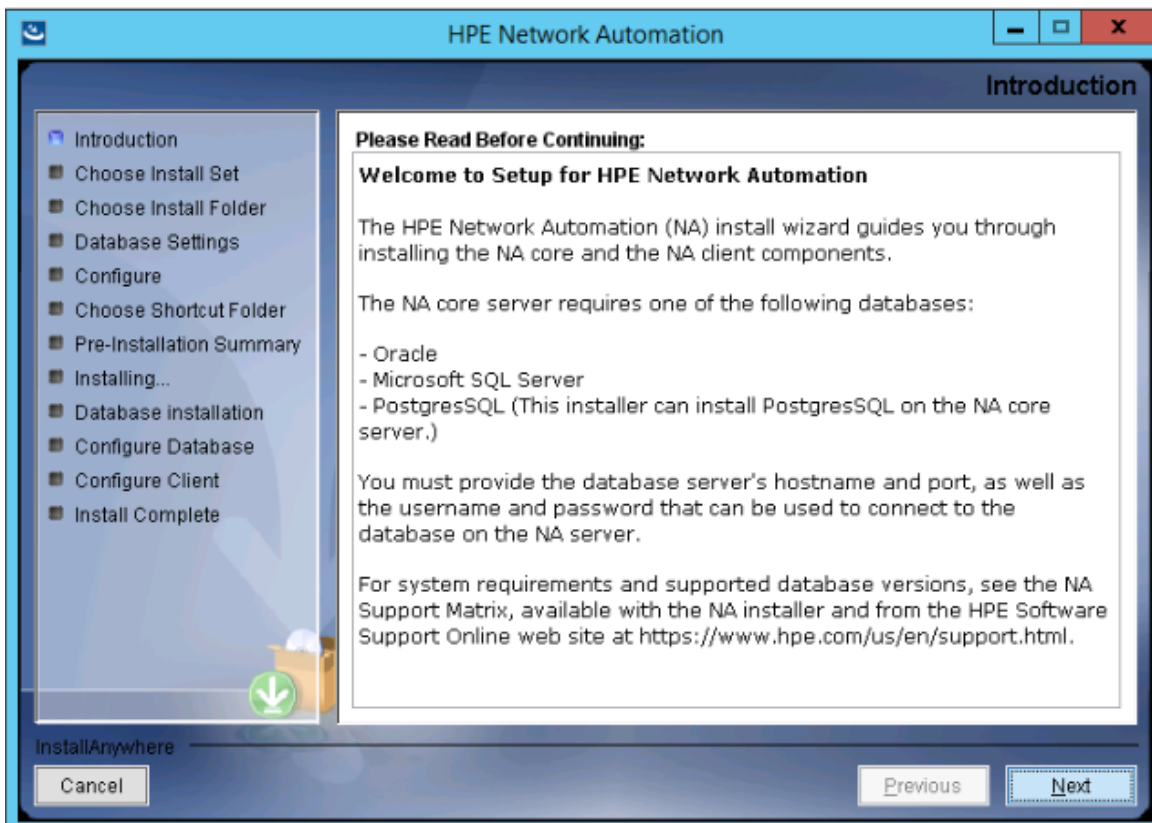
3. On the **Choose Install Set** page, select what you want to install, and then click **Next**. Options are as follows:

   ○ **NA core and NA client using Oracle**—Select this option if you will use a supported version of Oracle for the NA database. Oracle must already be installed on a separate database server, and the NA tablespace must already be created.

   ○ **NA core and NA client using Microsoft SQL Server**—Select this option if you will use a supported version of Microsoft SQL Server for the NA database. SQL Server must already be installed on a separate database server. The NA installer will create the NA database instance.

- **NA core and NA client using Postgres**—Select this option if you want the NA installer to also install the database that ships with NA or if you will use a supported version of PostgreSQL that is already installed on this system or a separate database server. The NA installer will create the NA database instance.

- **NA Client Only**—Select this option for secondary installations of NA without a database, for example, the second NA core server in a Horizontal Scalability environment.
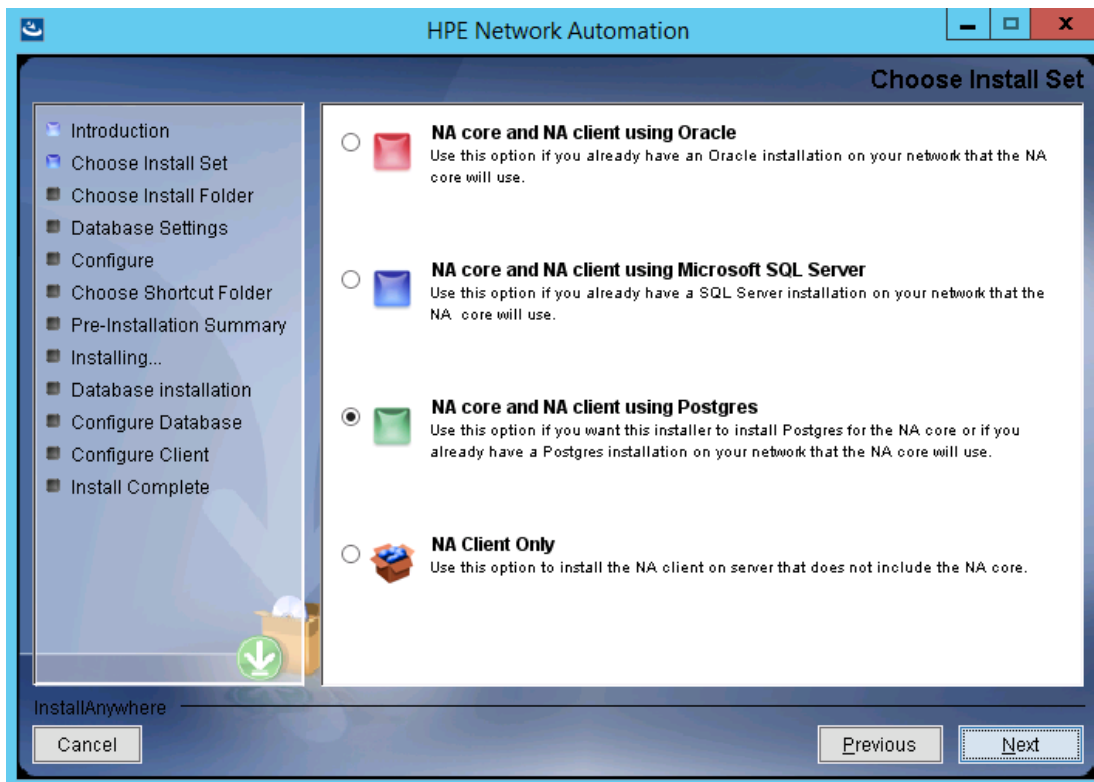
4. *SQL Server only*. On the **License Agreement** page, if you agree with the terms of the Microsoft SQL Server JDBC driver license, select **I accept the terms of the License Agreement**, and then click **Next**.
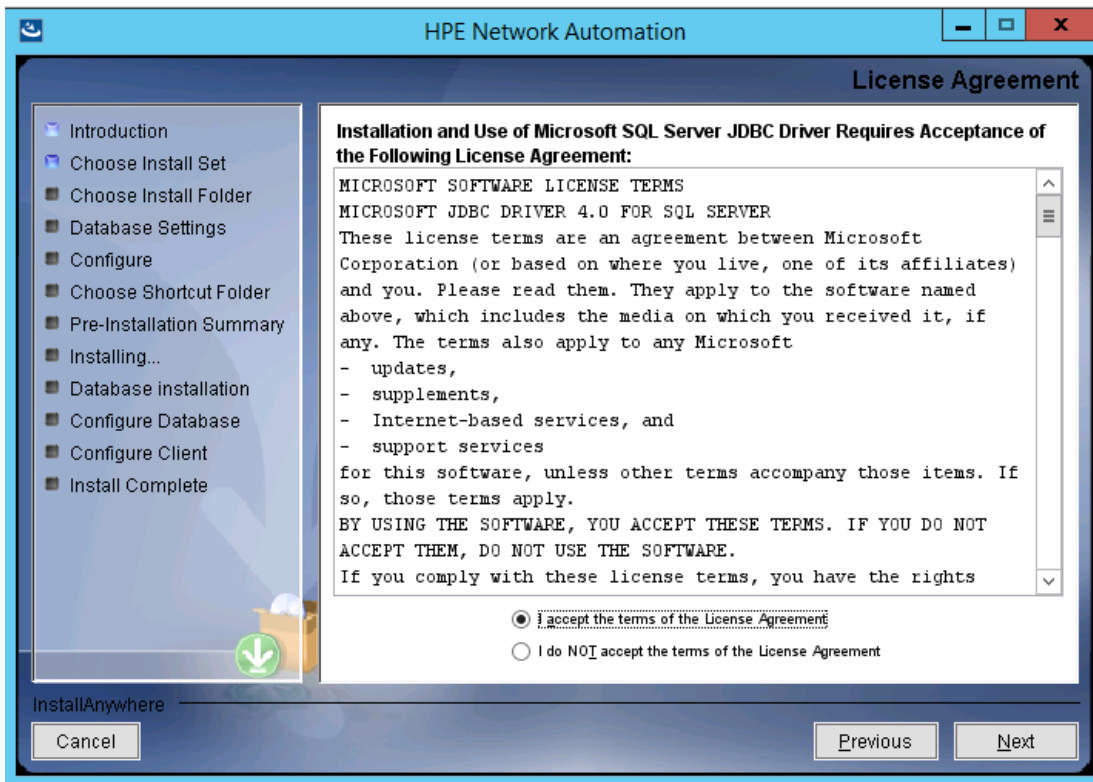
5. *PostgreSQL only*. On the **Postgres Installation** page, select one of the following options, and then click **Next**:

   ○ Install Postgres

   ○ Use existing Postgres Server
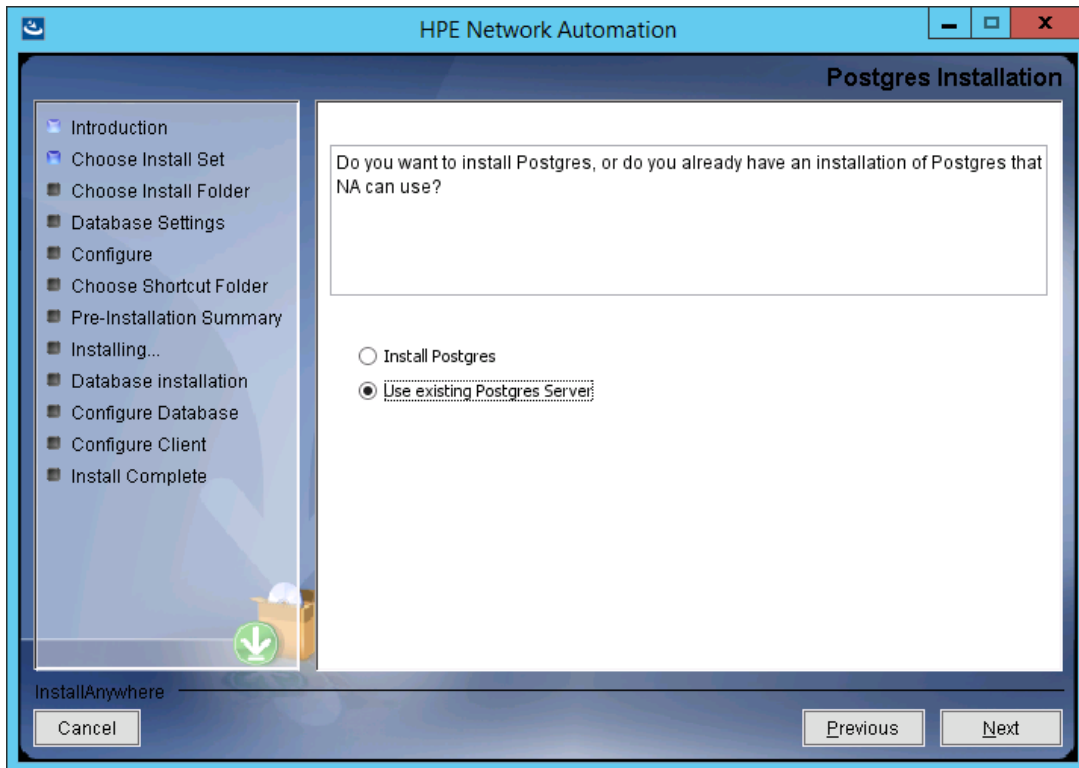
6. *Pre-Existing PostgreSQL only*. The **Important: Postgres Version** page prompts you to verify that the PostgreSQL that is already installed on this system or a separate database server is of a supported version. For more information, see the *Support Matrix*.
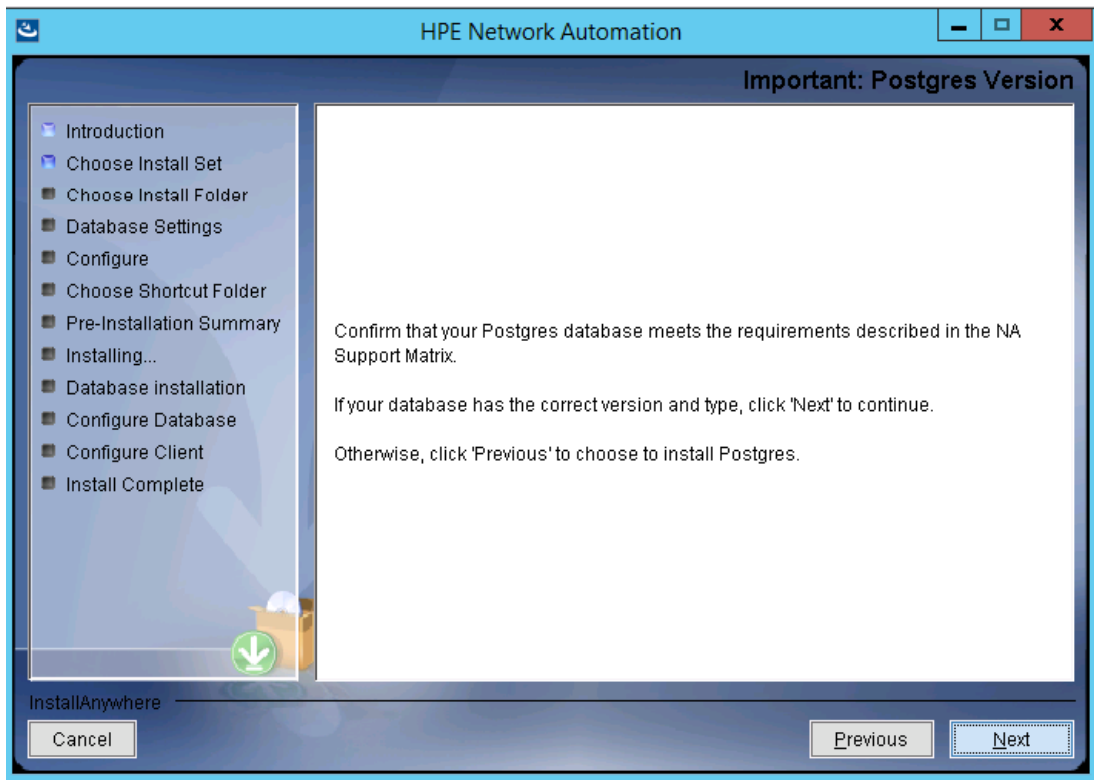
7. On the **Product License** page, if you have a license file, enter the path to that file, and then click **Next**.
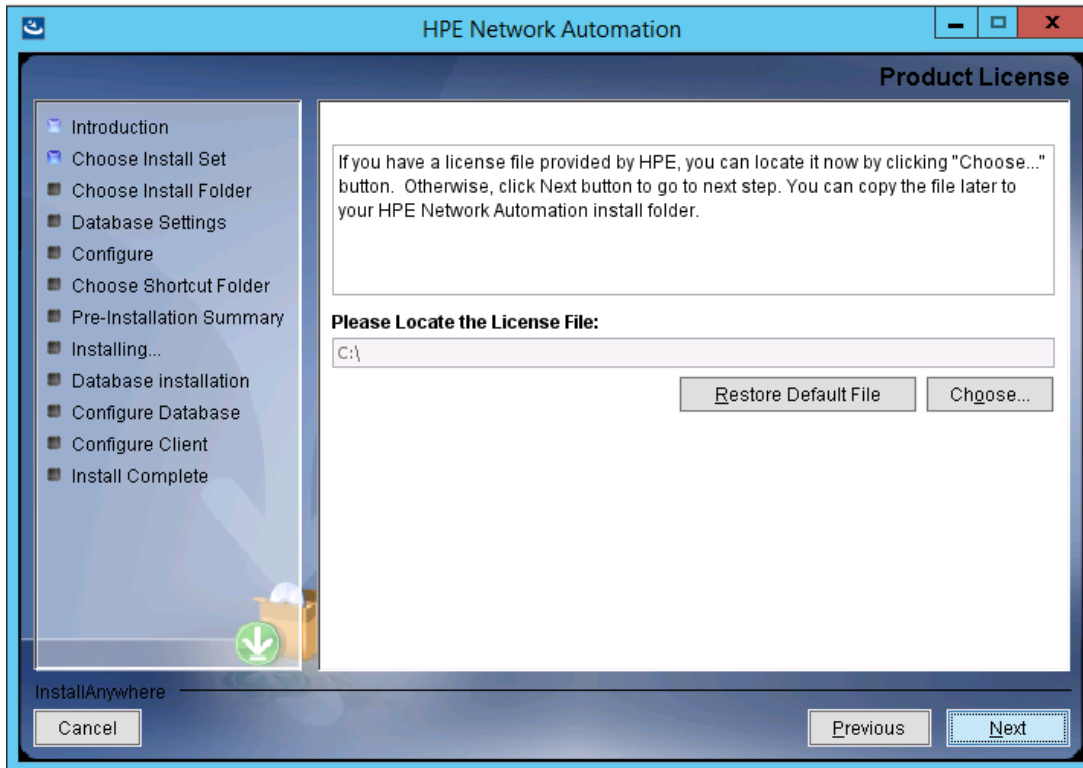
8. On the **Choose Install Folder** page, enter the path for the NA root directory, and then click **Next**.

> **Note:** The path must not contain any spaces.
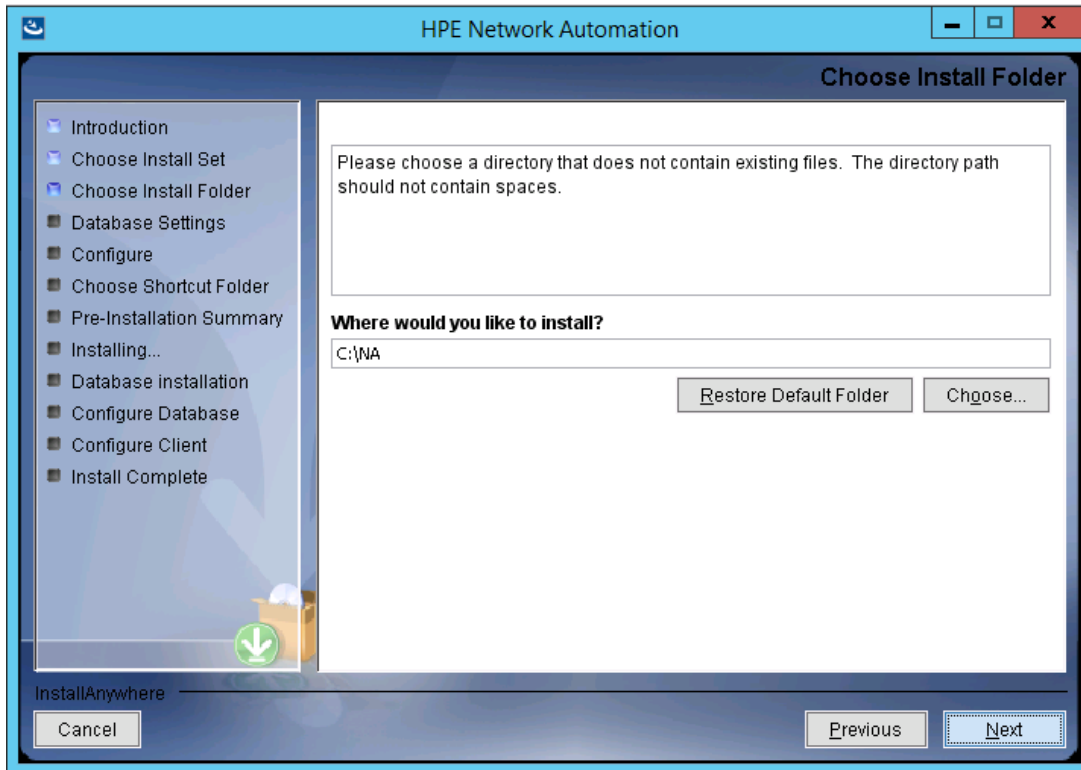
9. *NA-Installed PostgreSQL only*. On the **Postgres- Install Options** page, enter the path for the
    PostgreSQL root directory, and then click **Next**.
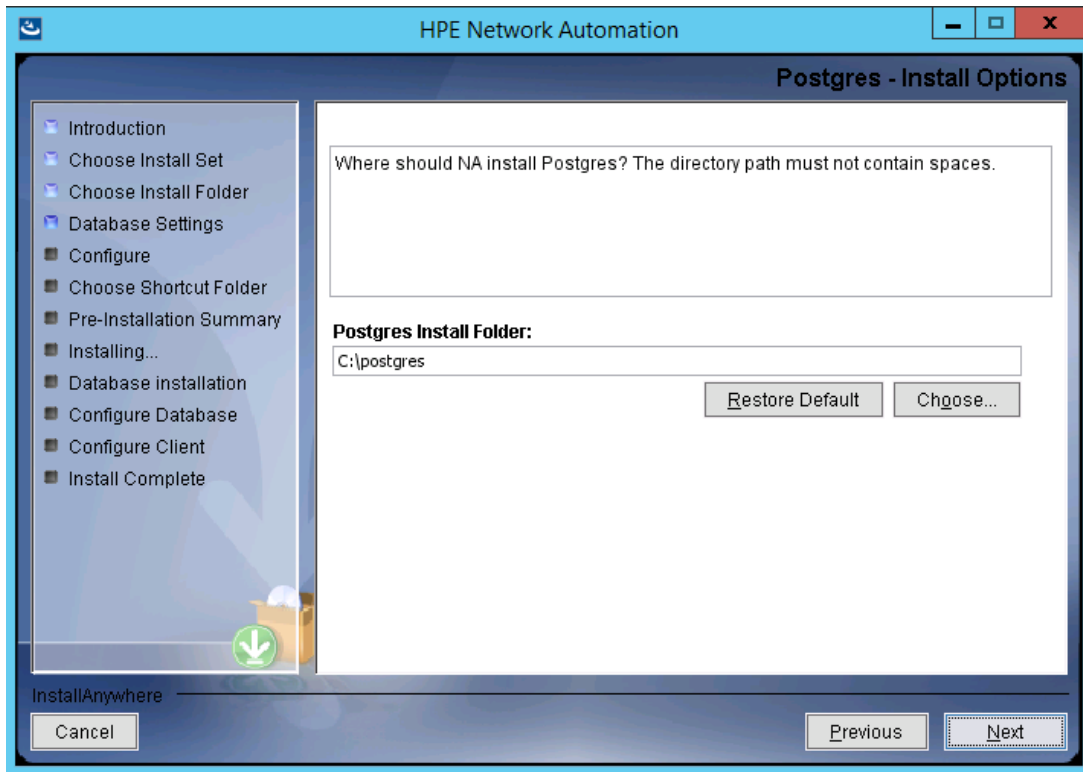
10. *Oracle, SQL Server, or Pre-Existing PostgreSQL only*. On the **Database Settings** page, specify whether the database is installed on this system or a different system, and then click **Next**.
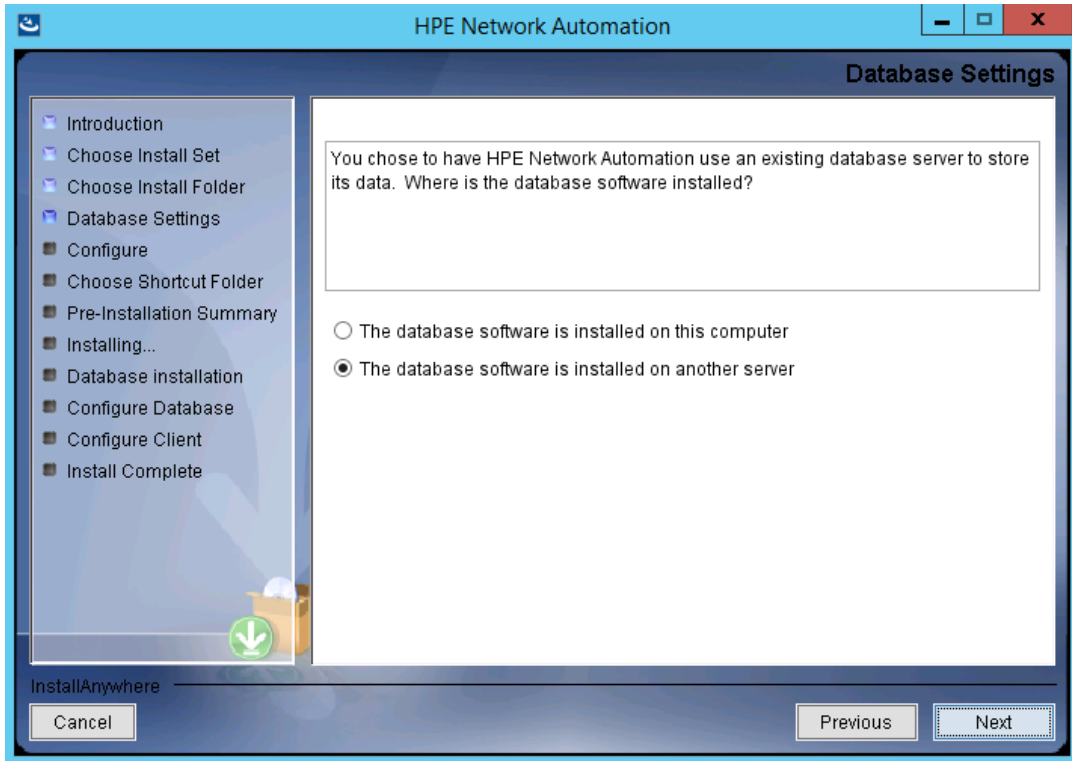
11. On the **Configure Email** page, enter the configuration of the NA email server, and then click **Next**. The fields are as follows:

    ○ **SMTP Server**—The host name of the SMTP server.

    ○ **Sender Email Address**—The email address for messages sent by NA.
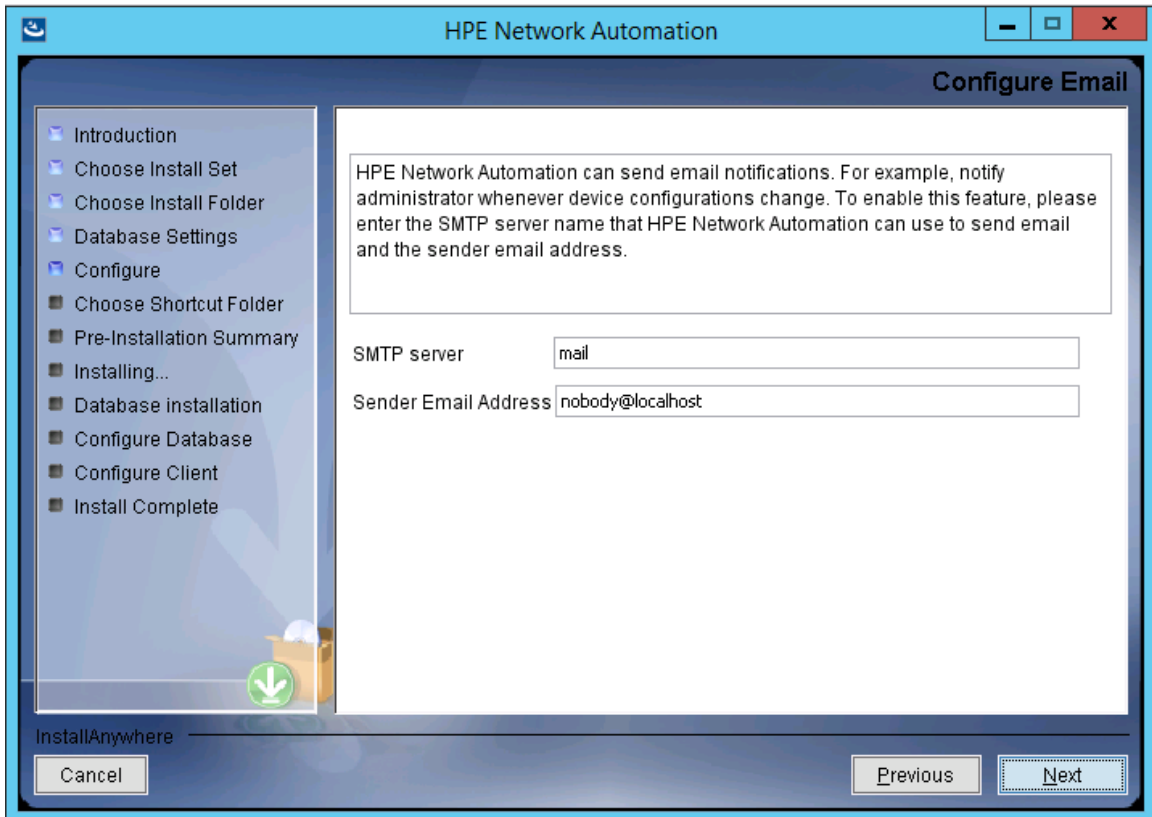
12. On the **Select Language** page, select the language that NA will use for the NA console, storing information in the database, and presenting the product help and documentation (when localized), and then click **Next**. Options are as follows:

    ○ **French**—French.

    ○ **German**—German.

    ○ **Japanese**—Japanese.

    ○ **Spanish**—Spanish.

13. On the **Choose Shortcut Folder** page, select the location for the NA shortcuts, and then click **Next**. Options are as follows:

- **In a new Program Group**—Enter the name of the program group the NA installer will create to hold the NA shortcuts.

- **In an existing Program Group**—Enter the name of an existing program group to receive the NA shortcuts.

- **In the Start Menu**—The NA installer will add the NA shortcuts to the Start menu.

- **On the Desktop**—The NA installer will add the NA shortcuts to the desktop.

- **In the Quick Launch Bar**—The NA installer will add the NA shortcuts to the quick launch bar.

- **Other**—Enter the name of an existing folder to receive the NA shortcuts.

- **Don't create icons**—If you do not want the NA installer to create NA shortcuts, select this option.

- **Create Icons for All Users**—If you want the NA installer to create NA shortcuts for all users of this computer, select this check box.
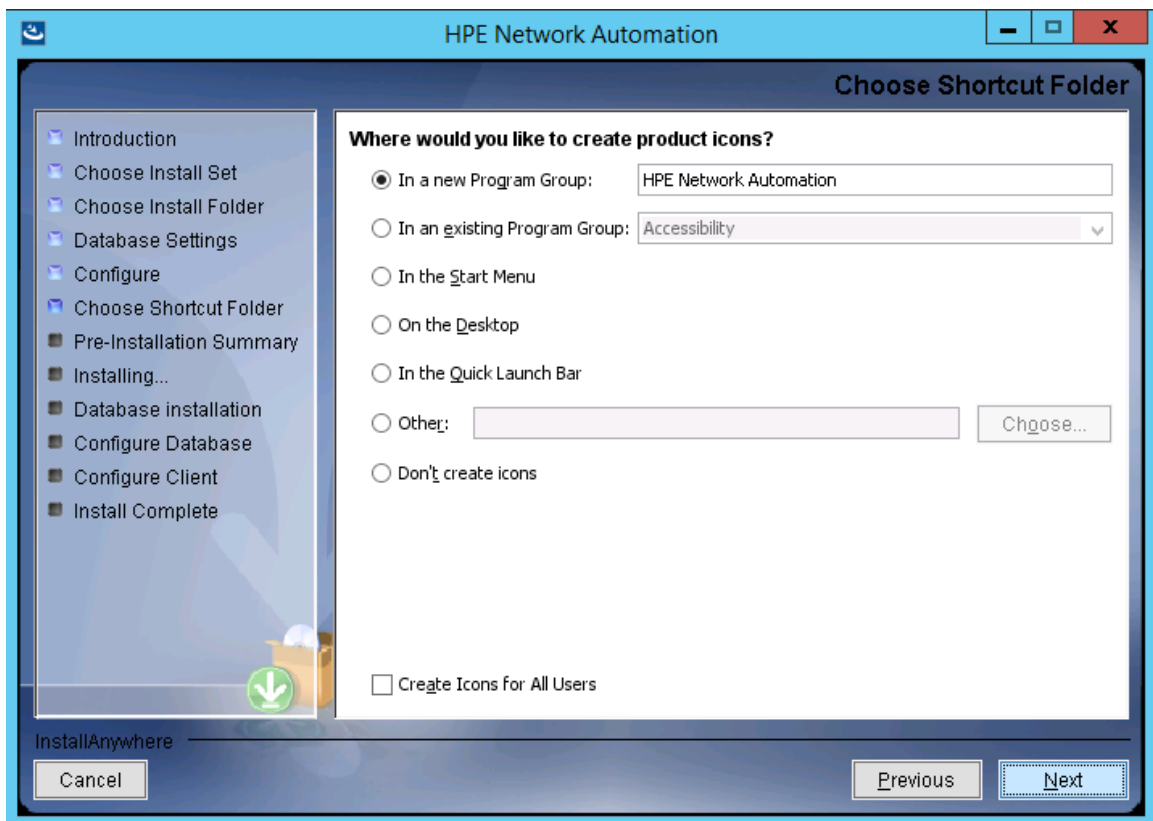
14. On the **Pre-Installation Summary** page, review the information. To correct a setting, click **Previous**. When all settings are correct, click **Install**.
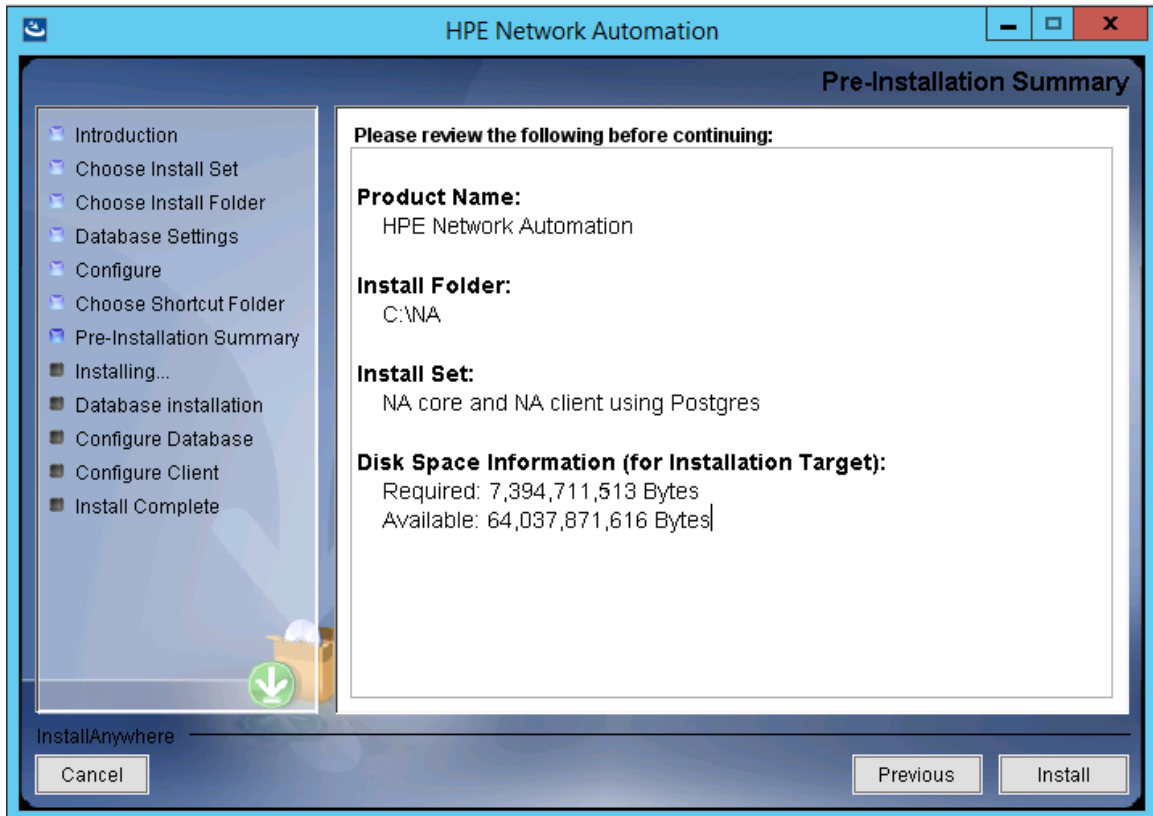
15. On the **Installing HPE Network Automation** page, wait for the installation to finish.
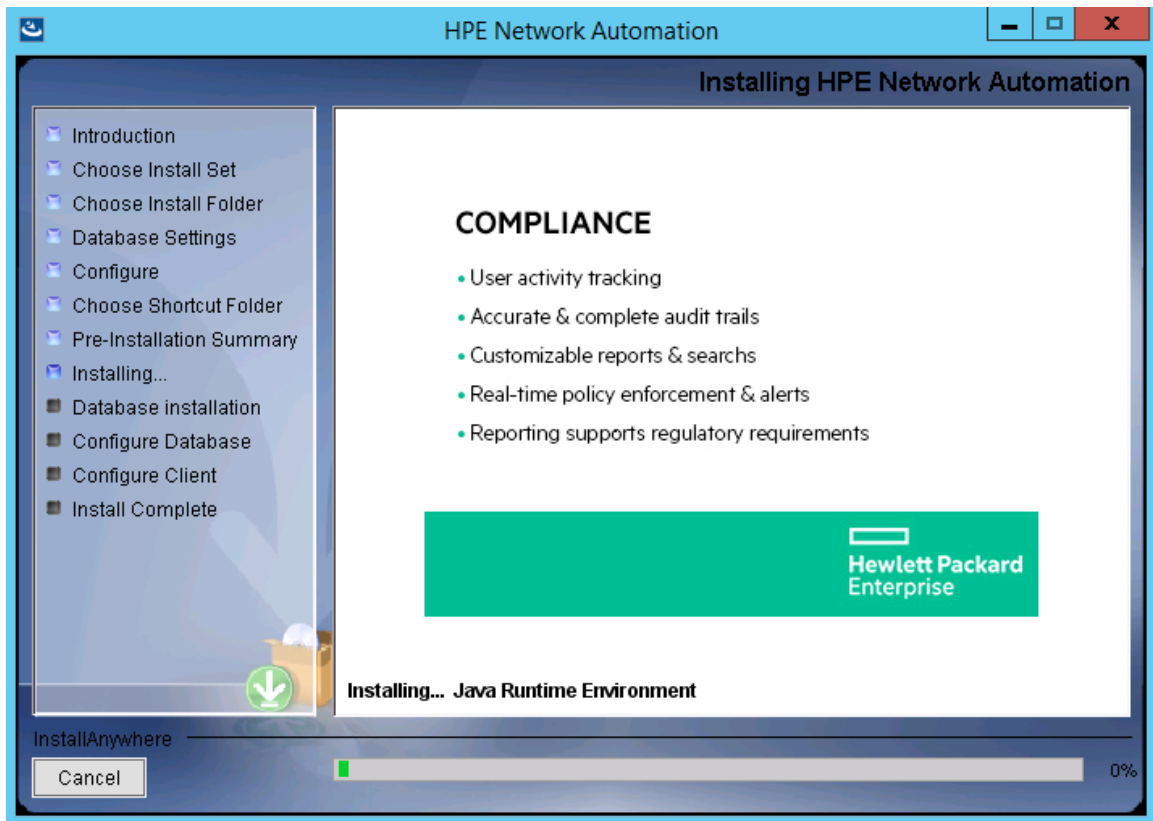
16. *NA-Installed PostgreSQL only*. On the **Postgres- Configuration** page, create the password for the NA database instance PostgreSQL user, and then click **Next**.
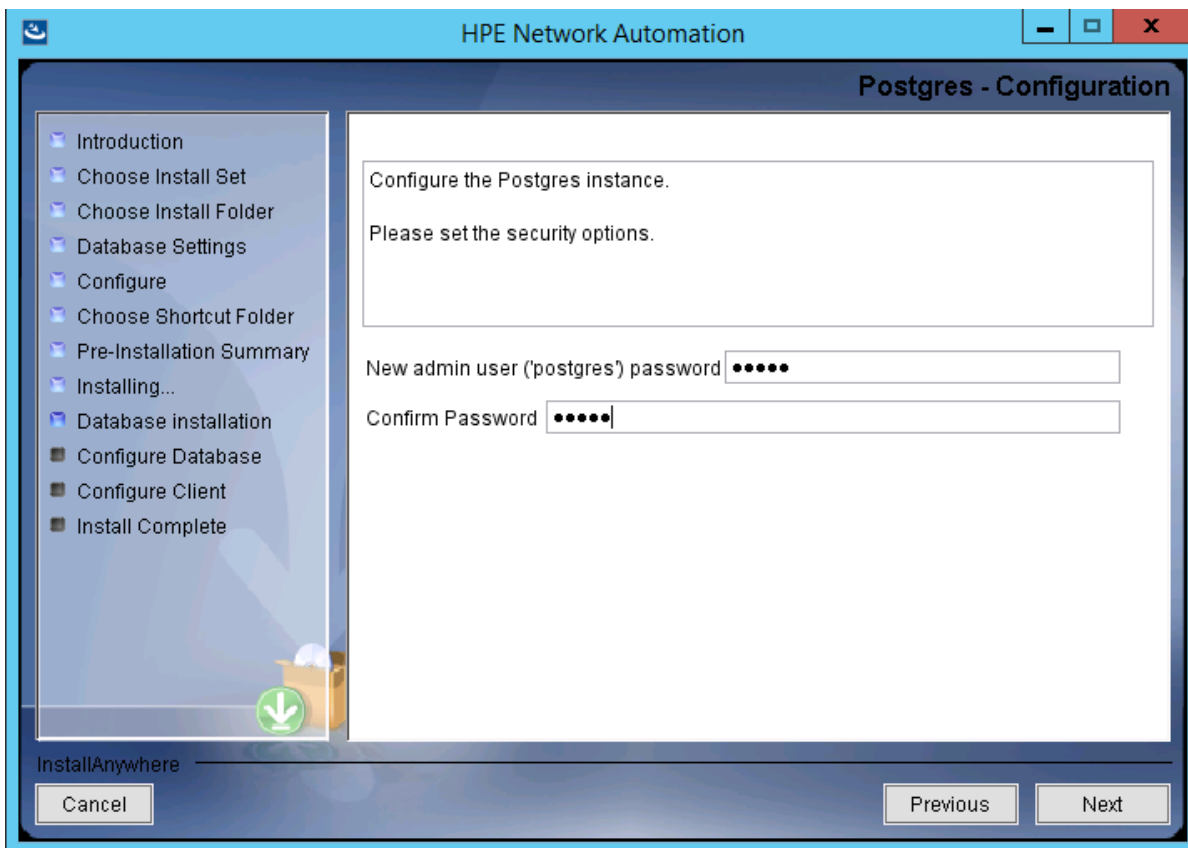
17. *Pre-Existing PostgreSQL only*. On the **Database Admin Login** page, enter the information for connecting to PostgreSQL, and then click **Next**. Fields are as follows:

    ○ **Hostname**—The host name of the PostgreSQL server.

    ○ **Port**—The port number for the PostgreSQL server.

    ○ **Username**—The name of the PostgreSQL administrator user.

    ○ **Password**—The password of the PostgreSQL administrator user.
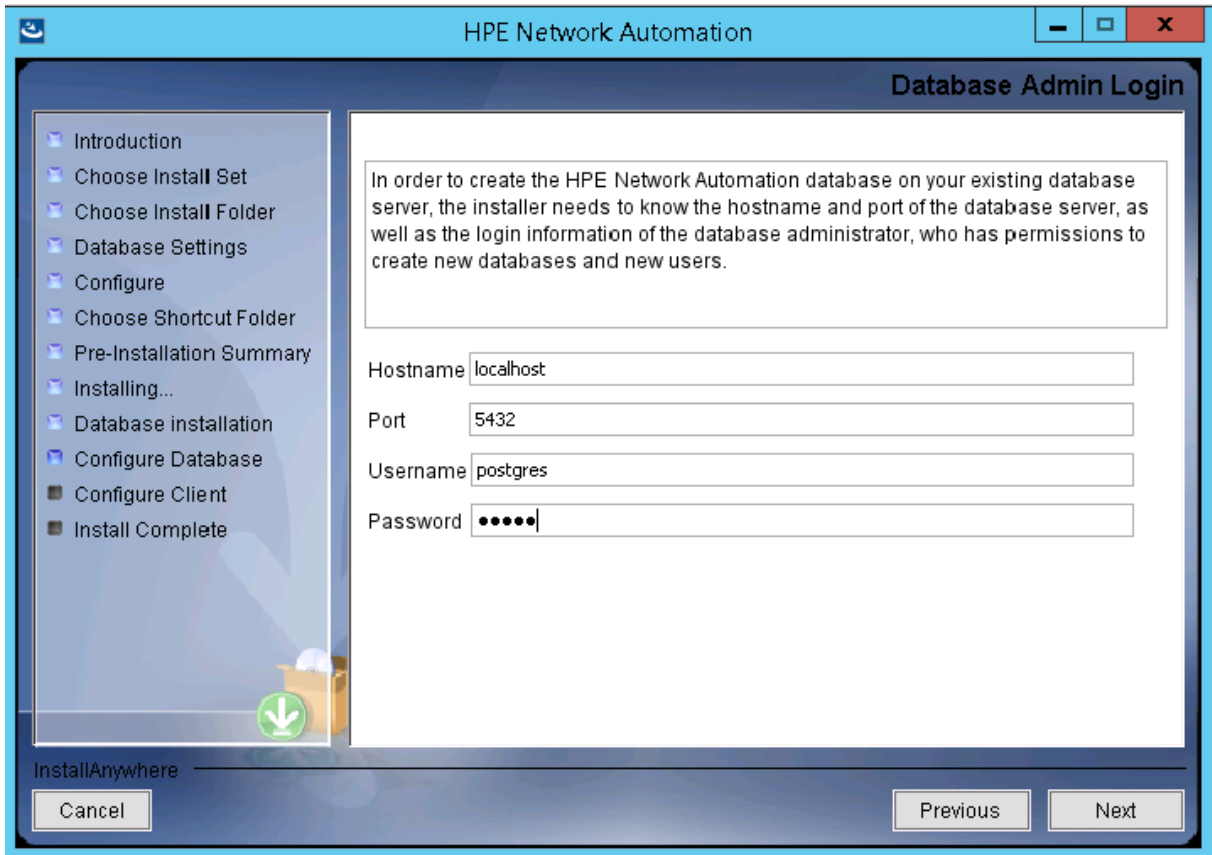
18. *PostgreSQL only*. On the **New Database** page, enter the information for connecting to the NA database, and then click **Next**. Fields are as follows:

   ○ **Username**—The name of the PostgreSQL user for connecting to the NA database. If the NA installer is also installing PostgreSQL, the installer creates this user. If the NA installer is connecting to a pre-existing installation of PostgreSQL, this user must already exist.

   ○ **Password**—The password for the PostgreSQL user.

   ○ **Confirm Password**—The password for the PostgreSQL user.

   ○ **Database Name**—The name of the new NA database instance.

   ○ **Create NA user with this username and password**—If you want the NA installer to create an NA user with this user name and password, select this check box.
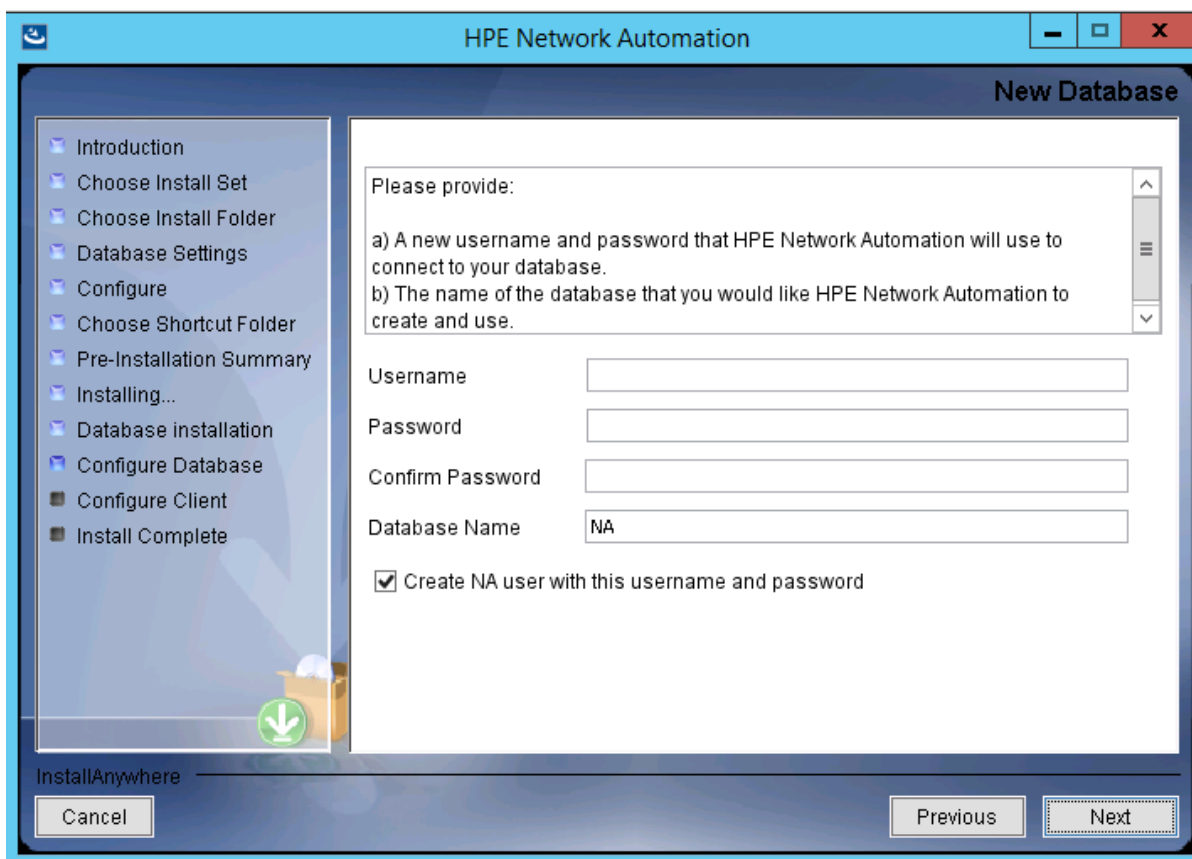
19. *PostgreSQL only*. On the **Confirm Database Settings** page, review the information. Verify that the database user name and instance name do not yet exist. To correct a setting, click **Previous**. When all settings are correct, click **Next**.
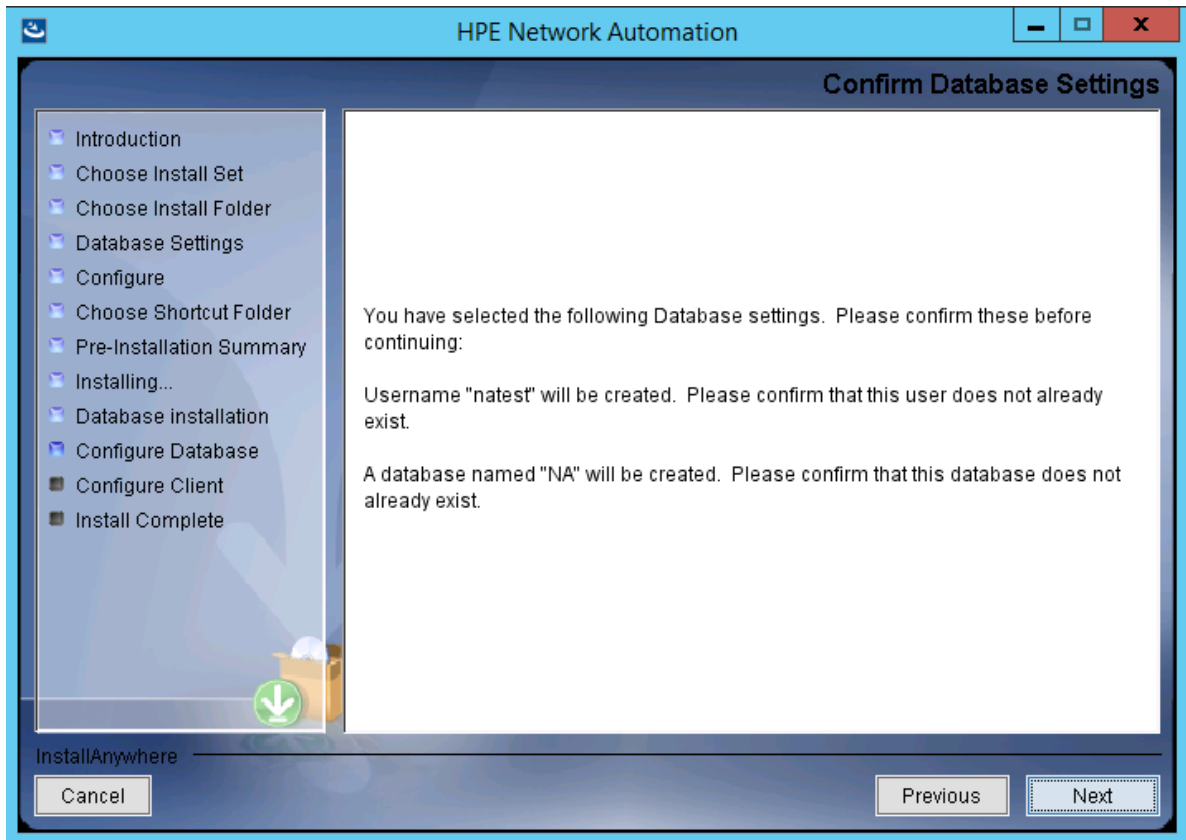
20. *SQL Server only*. On the **Database Admin Authentication** page, enter the information for
connecting to the SQL Server, and then click **Next**. Fields are as follows:

  ○ **Hostname**—The host name of the SQL Server. For a named instance, the format should be
  <hostname>\\<instance name>.

  ○ **Port**—The port number for the SQL Server.

  ○ **Use Windows Authentication**—To use Windows authentication, select this check box.

  ○ **Username**—The name of the SQL Server administrator user.

  ○ **Password**—The password of the SQL Server administrator user.
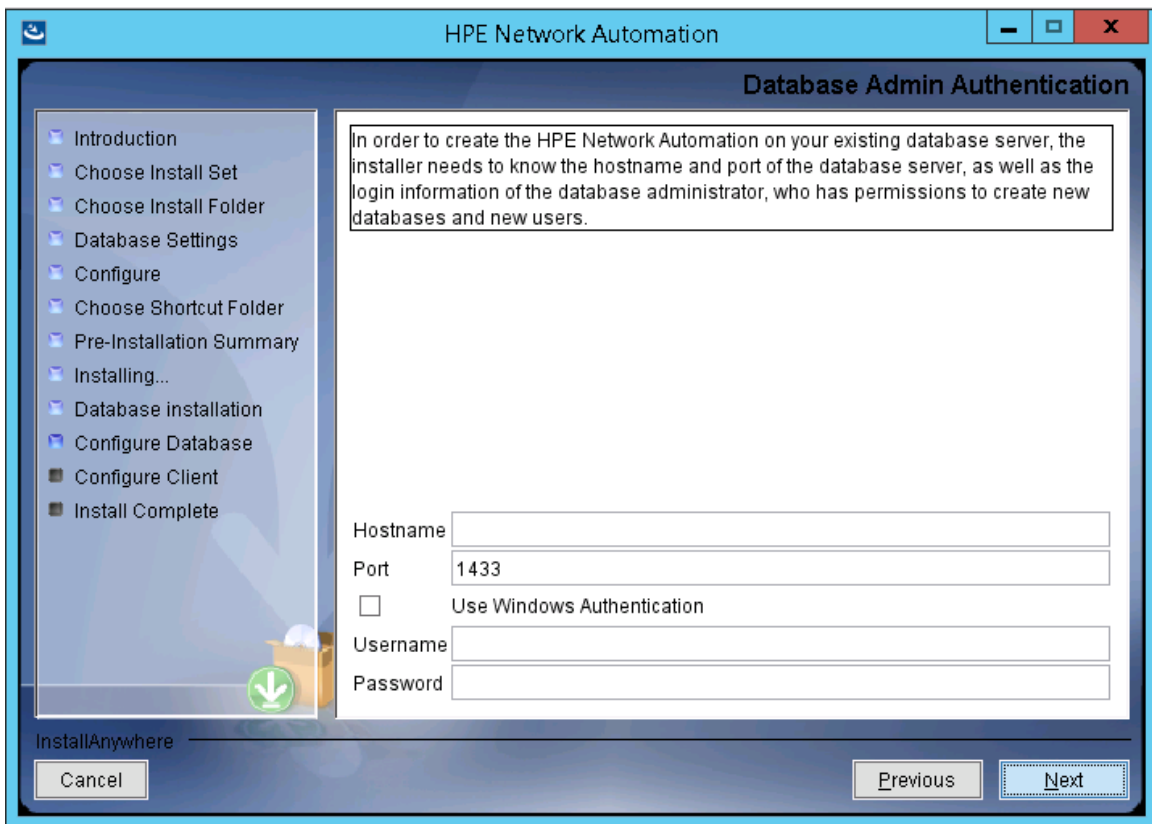
21. *SQL Server only*. On the **Configure Database** page, select whether the database name is a clean database (with no NA data) or an existing NA database, and then click **Next**.
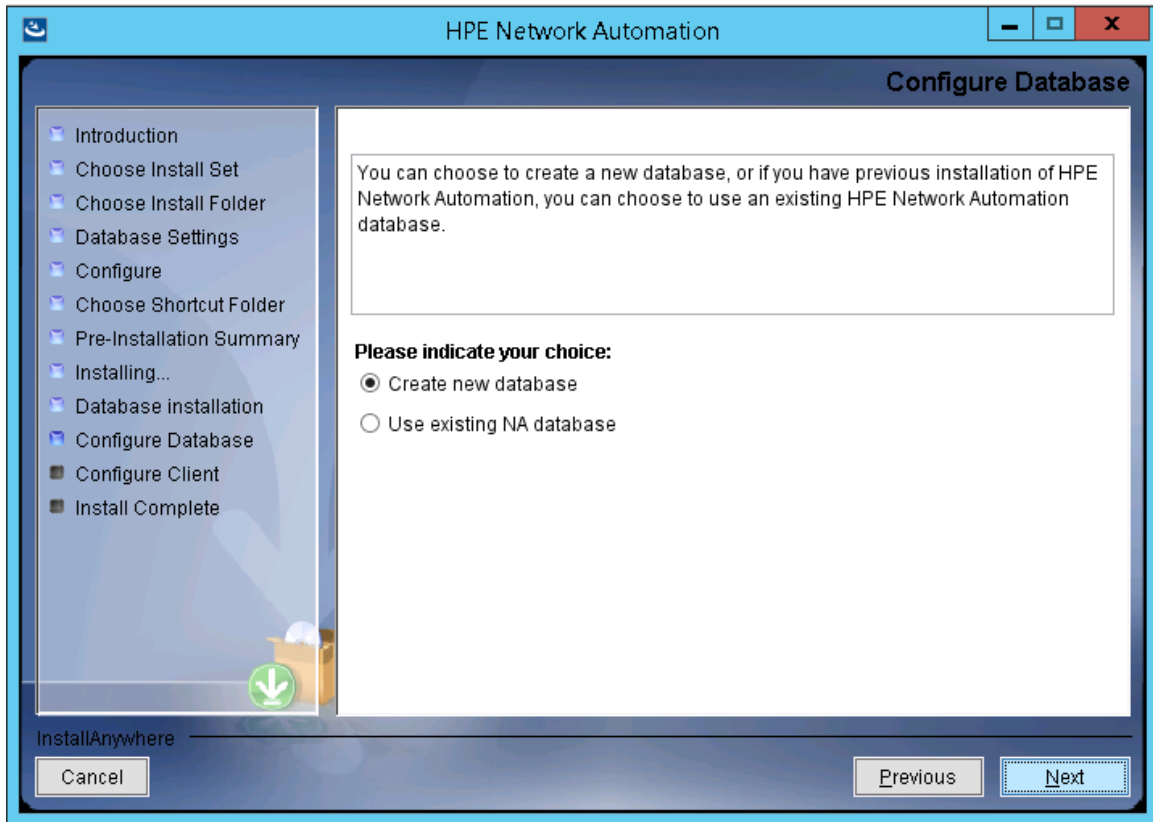
22. *SQL Server only*. On the **New Database** page, enter the information for connecting to the NA database, and then click **Next**. Fields are as follows:

- **Username**—The name of the new SQL Server user for connecting to the NA database.

- **Password**—The password for the new SQL Server user.

- **Confirm Password**—The password for the new SQL Server user.

- **Database Name**—The name of the new NA database instance.

- **Create NA user with this username and password**—If you want the NA installer to create an NA user with this user name and password, select this check box.

23. *SQL Server only*. On the **New Database Collation - Microsoft SQL Server** page, select a database collation, and then click **Next**.
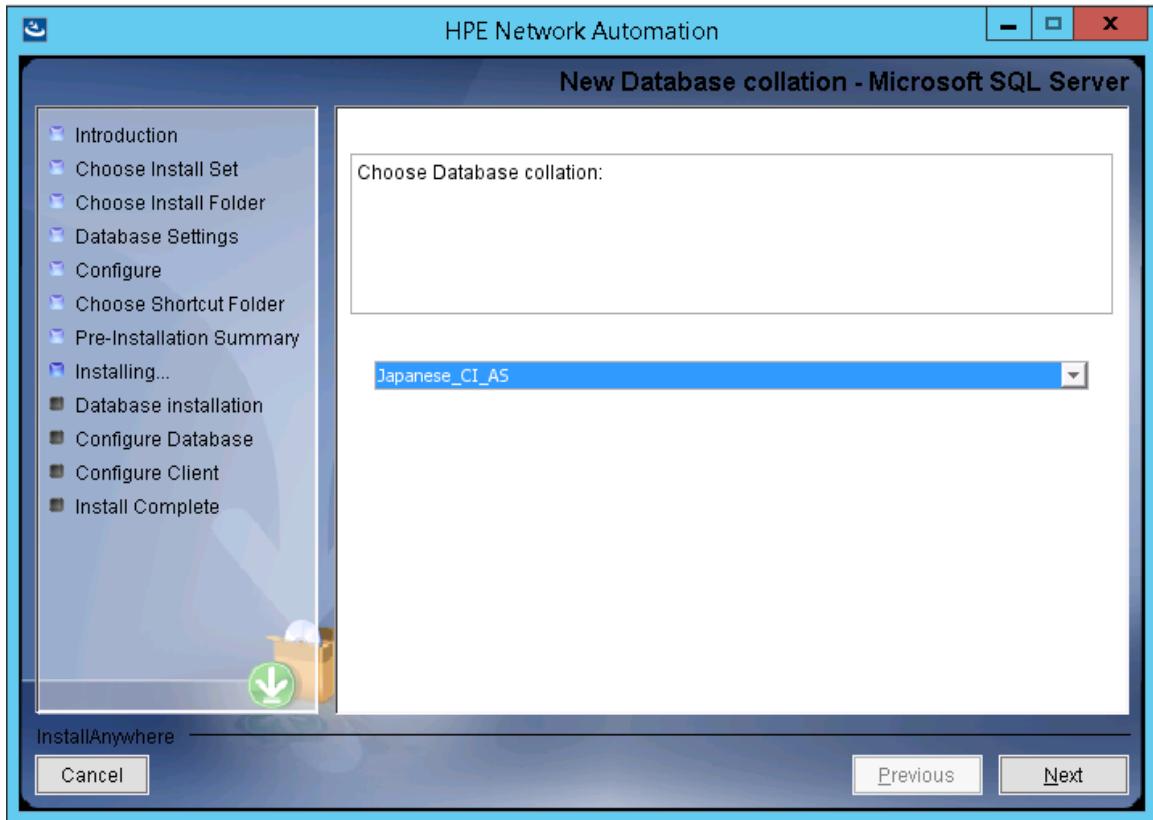
24. *SQL Server only*. On the **Confirm Database Settings** page, review the information. To correct a setting, click **Previous**. When all settings are correct, click **Next**.

25. *Oracle only*. On the **Database Login** page, enter the information for connecting to the Oracle database, and then click **Next**. Fields are as follows:

   ○ **Hostname**—The host name of the Oracle server.

   ○ **Port**—The port number for the Oracle server.

   ○ **SID / Service Name**—The system identifier or service name of the Oracle database.

   ○ **Username**—The name of the Oracle administrator user.

   ○ **Password**—The password of the Oracle administrator user.
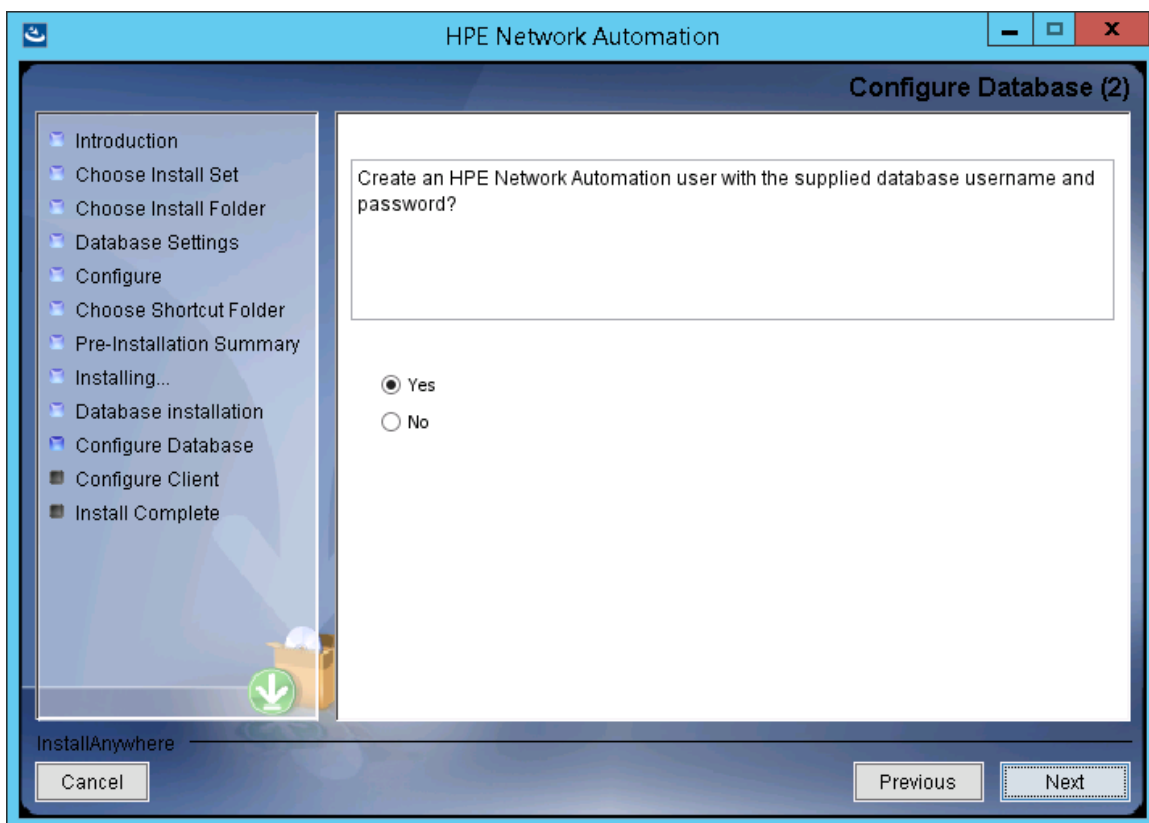
26. *Oracle only*. On the **Configure Database (1)** page, select whether the database name is a clean database (with no NA data) or an existing NA database, and then click **Next**.

27. *Oracle only*. On the **Configure Database (2)** page, specify whether the NA installer should create an NA user with the same user name and password as for the database, and then press **Enter**.

28. If you did not select that the NA installer should create an NA user with the same user name and password and the database user, on the **Set HPE Network Automation Credentials** page, enter the credentials for the NA administrator, and then click **Next**. Fields are as follows:

    - **Username**—The name of the new NA administrator user.

    - **Password**—The password for the new NA administrator user.

   - **Confirm Password**—The password for the new NA administrator user.
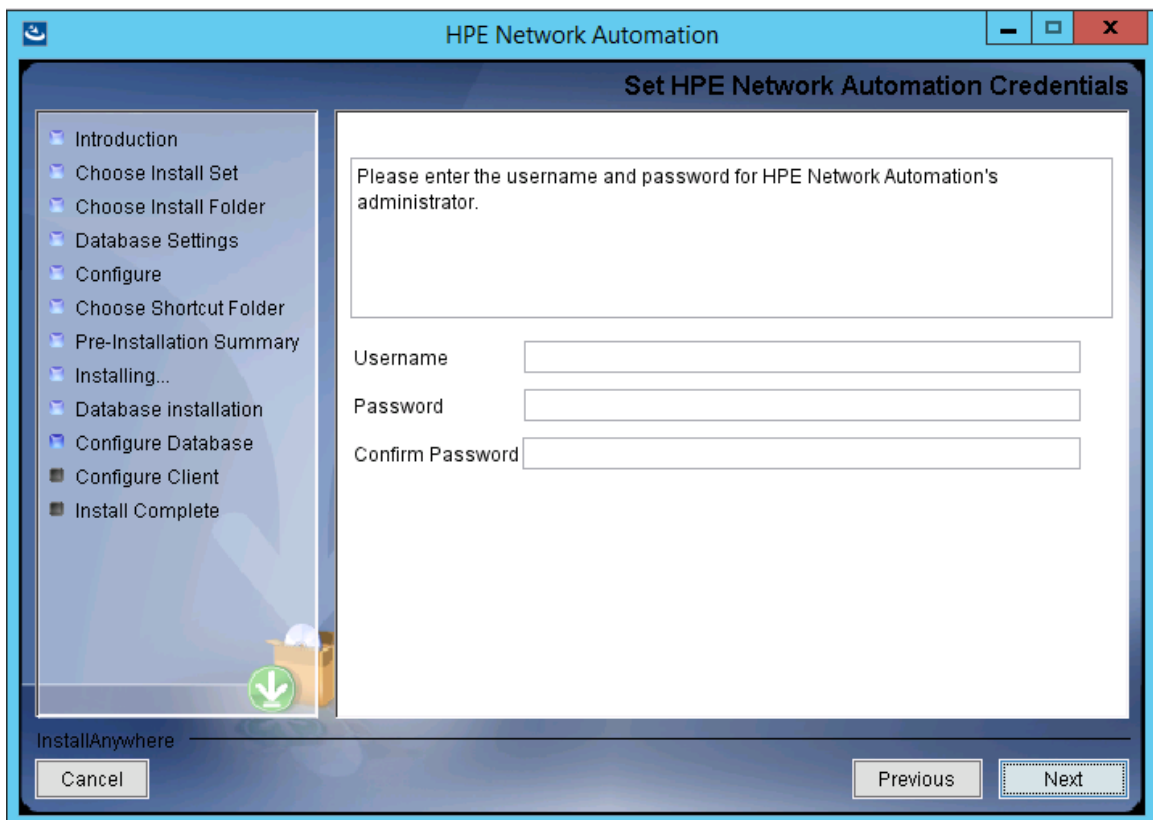
29. On the **Configure Admin** page, enter contact information for the NA administrator, and then click **Next**. Fields are as follows:

   ○ **First Name**—The first name of the NA administrator.

   ○ **Last Name**—The last name of the NA administrator.

   ○ **Email Address**—The email address of the NA administrator.
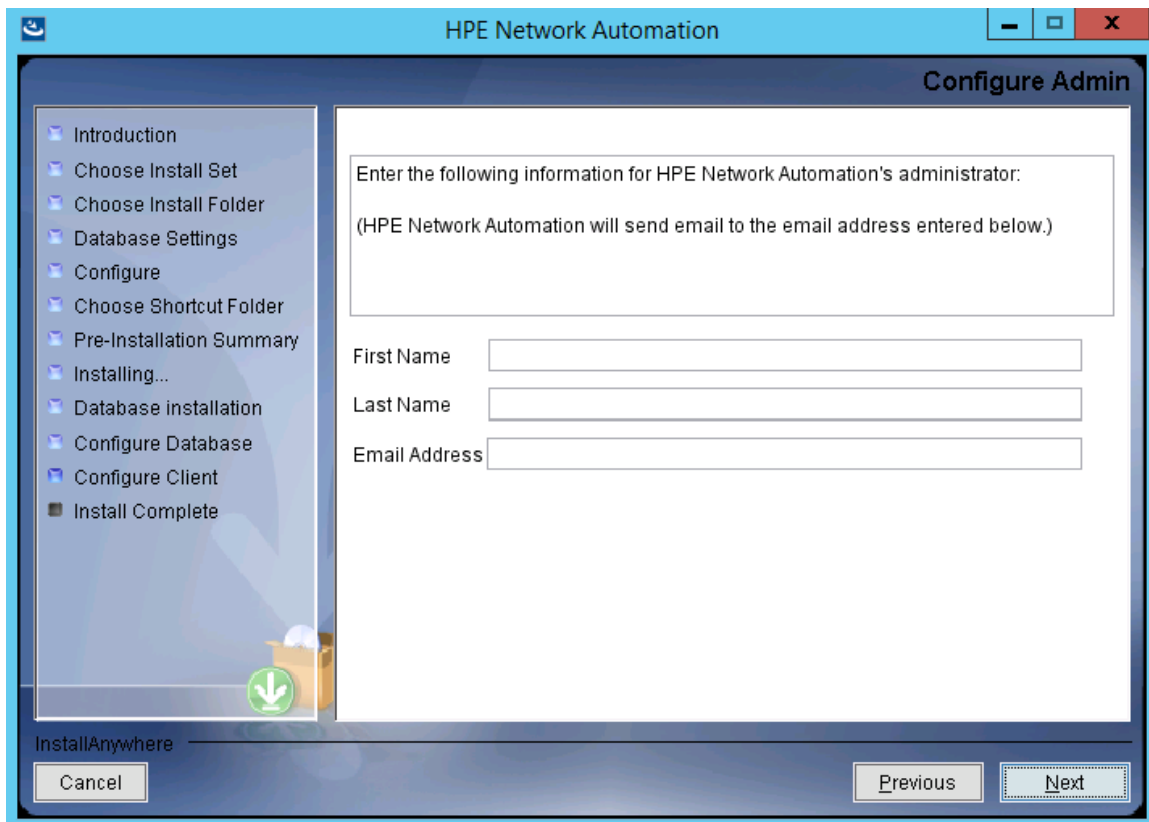
30. On the **Full Text Search** page, read the description of full-text search of the Configuration Text field. For information about configuring full-text search, see the *Administration guide*. Click **Next**.
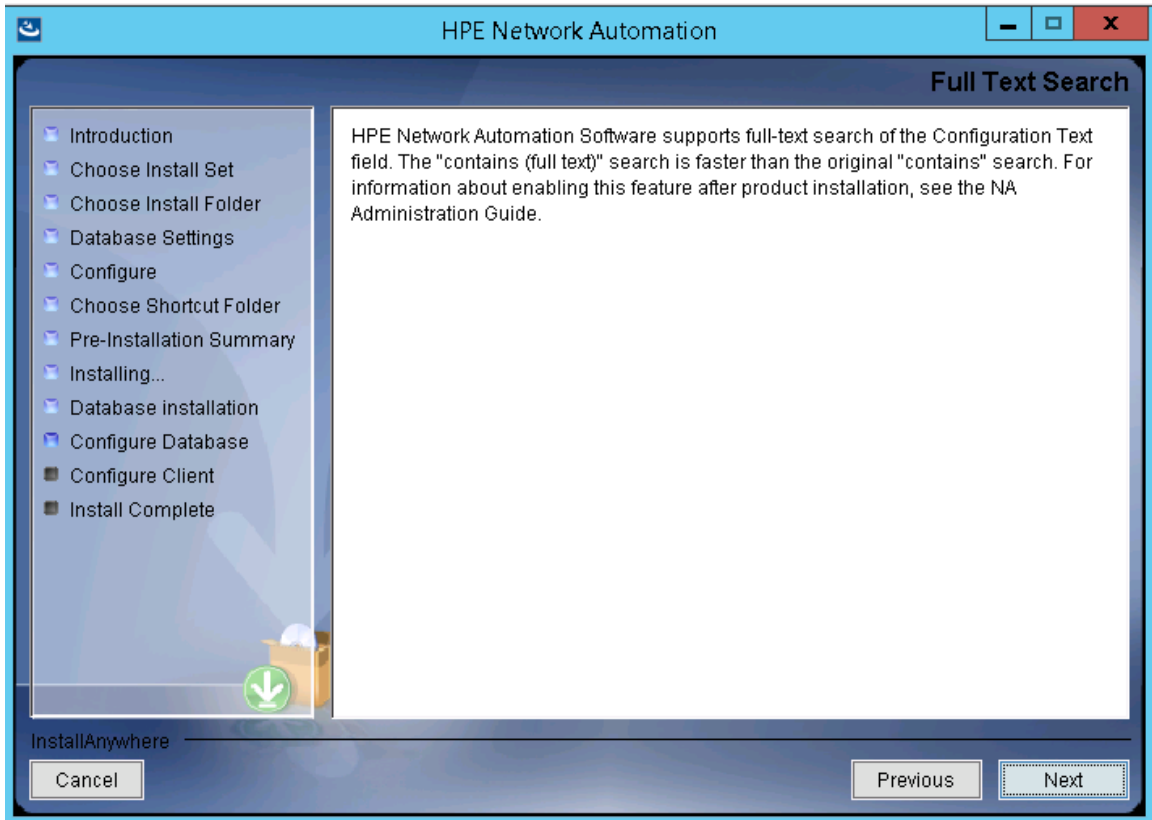
31. *Oracle or PostgreSQL only*. On the **Case-Sensitivity of Text Fields** page, select whether to enable case-insensitive search of most text fields. If your organization uses case-sensitivity to distinguish managed devices, do not enable case-insensitivity. (To change this configuration after product installation, see the *Administration guide*.) Click **Next**.

In a standalone NA core or Horizontal Scalability environment, you can enable this feature during installation.

> **Caution:** In a Multimaster Distributed System environment, do not enable case-insensitive search while installing NA. For information about enabling full-text search after installing NA, see the *Administration guide*.
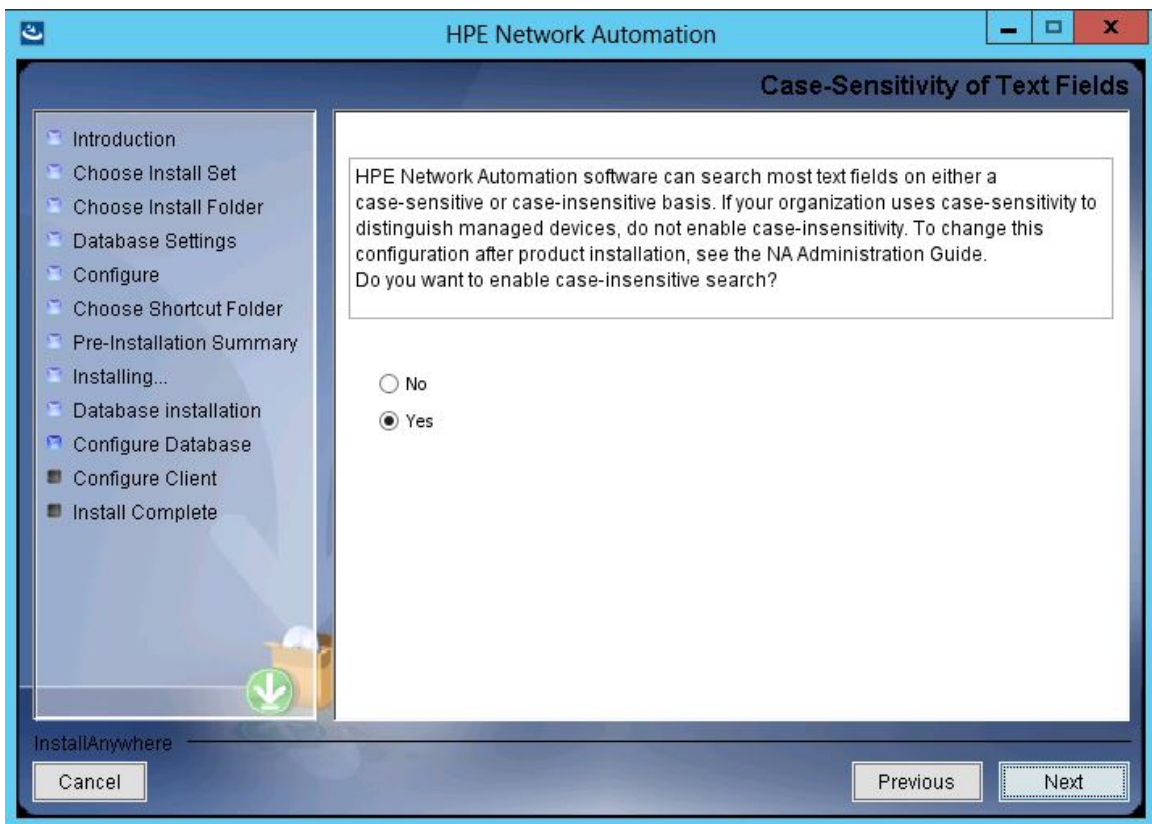
32. In the **FIPS MODE** message box, read the information about the Federal Information Processing Standardization (FIPS) mode in NA 10.30. (For more information about the FIPS mode, see the *Administration guide*.) Click **OK**.
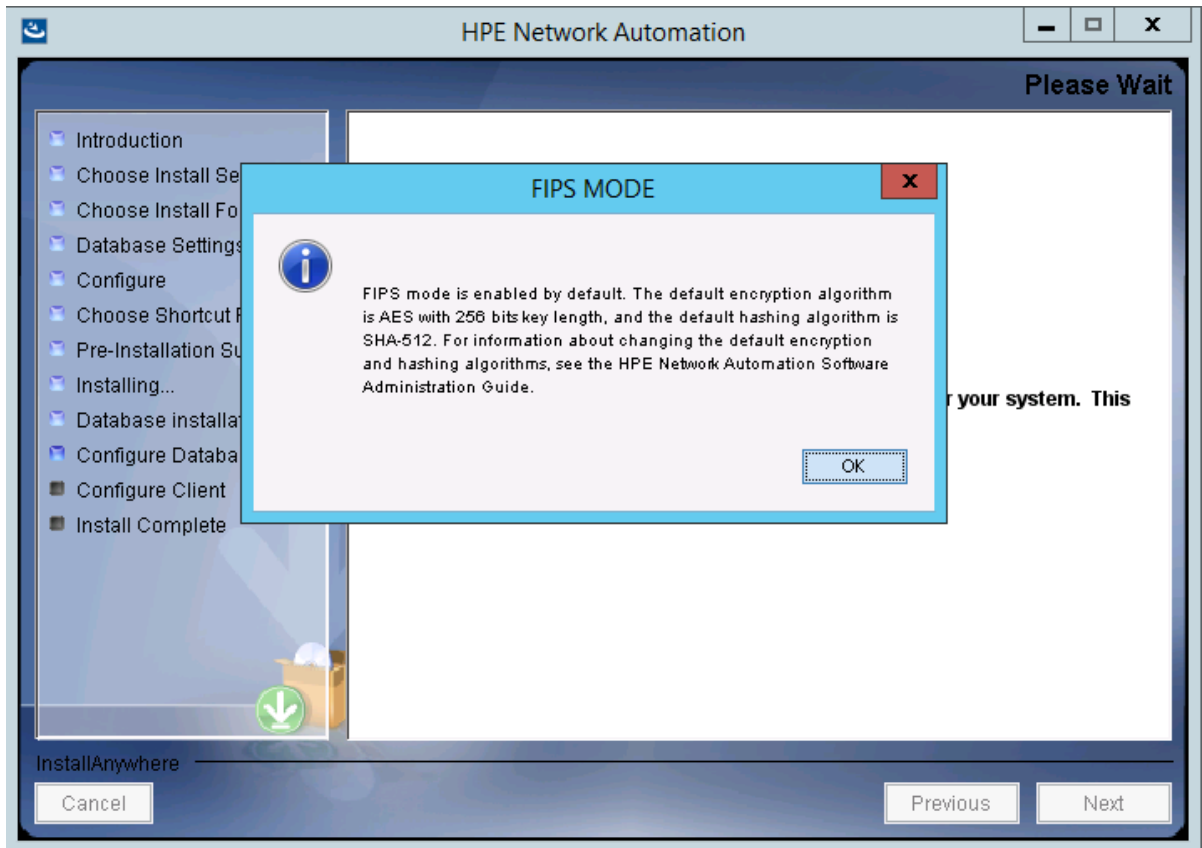
33. In the **HPE Marketplace** message box, read the information about HPE Marketplace. If the NA core server is connected to the Internet, you can use HPE Marketplace to receive free NA driver pack updates and subscription-based network security and compliance updates. Click **OK**.

34. On the **Install Complete** page, note the user name and password of the NA administrator user, and then click **Next**.
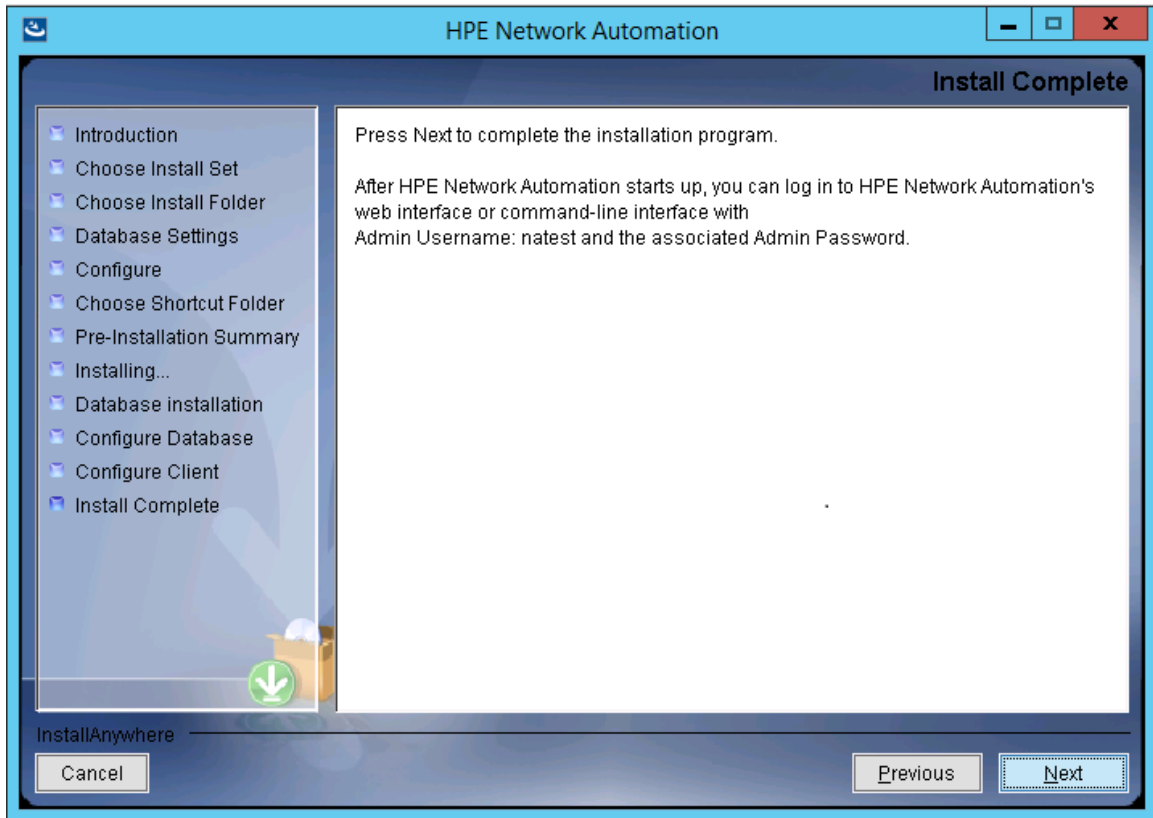
35. On the **Launch HPE Network Automation** page, after waiting for three minutes click the link to launch the NA console, and then click **Done**.
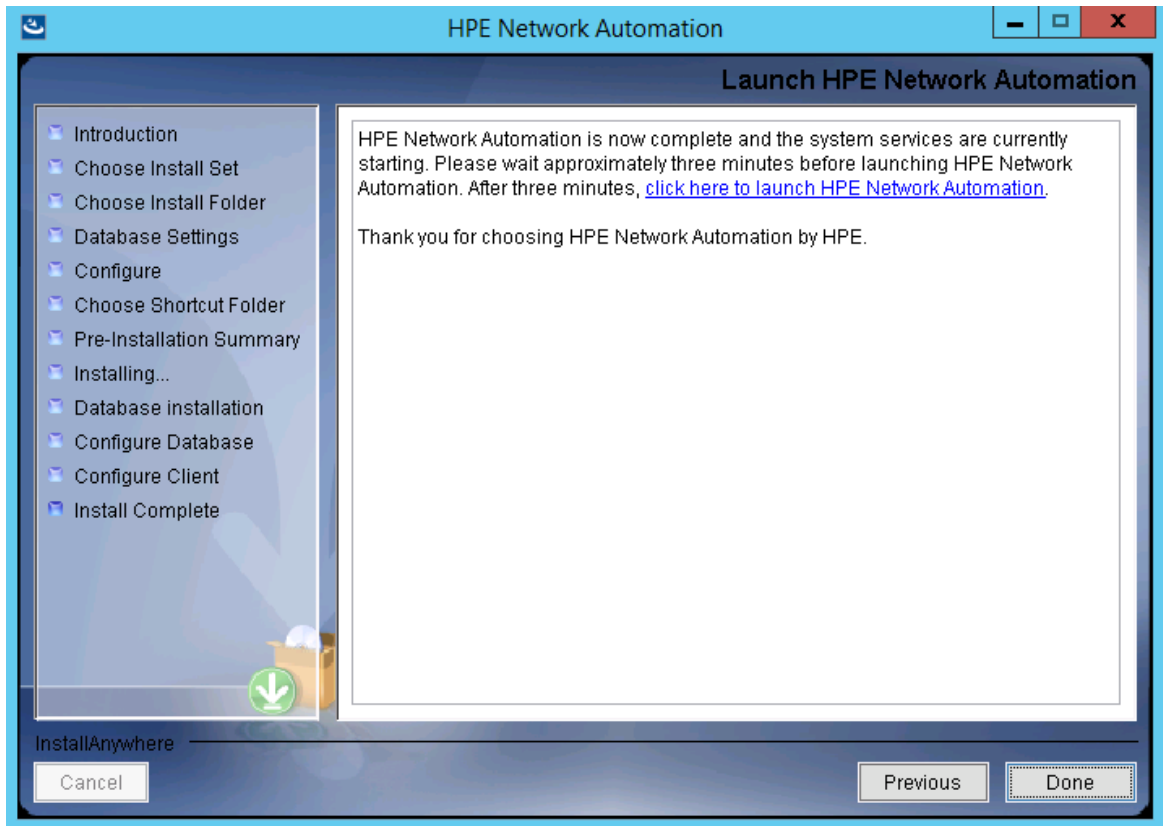
Linux Operating Systems

To install NA on a Linux platform, do the following:

1. Locate the `setup.bin` file in the release package, and then run it from the command line.

   The installer opens to the `Useful Commands` section.

```
Extracting the installation resources from the installer archive...
Configuring the installer for this system's environment...

Launching installer...

===============================================================================
HPE Network Automation                            (created with InstallAnywhere)
-------------------------------------------------------------------------------

Preparing CONSOLE Mode Installation...




===============================================================================
Useful Commands
---------------

###############################################################################
#
#
#
# 1. During the installation you can backup to previous step by typing "back"
#
#    and pressing Enter.
#
#
#
# 2. You can exit the installer by typing "quit" and pressing Enter.
#
#
#
###############################################################################
#

PRESS <ENTER> TO CONTINUE:
```

   Note that during the installation you can return to a previous step by typing **back**, or exit the installer by typing **quit**, and then pressing **Enter**.

   Press **Enter** to continue the installation process.

2. For the `Introduction` section, review the information, and then press **Enter**.

```
===============================================================================
Introduction
------------

Please read before continuing:

Welcome to Setup for HPE Network Automation

The HPE Network Automation (NA) install wizard guides you through installing
the NA core and the NA client components.

The NA core server requires one of the following databases:

- Oracle
- Microsoft SQL Server
- PostgresSQL (This installer can install PostgresSQL on the NA core server.)


You must provide the database server's hostname and port,  as well as the
username and password that can be used to connect to the database on the NA
server.

For system requirements and supported database versions, see the NA Support
Matrix, available with the NA installer and from the HPE Software Support
Online web site at https://www.hpe.com/us/en/support.html.

IMPORTANT INFORMATION COMPLETE. PRESS <ENTER> TO CONTINUE:
```

3. For the `Choose Install Set` section, select what you want to install, and then press **Enter**. Options are as follows:

   ○ Enter **1** if you will use a supported version of Oracle for the NA database. Oracle must already be installed on a separate database server, and the NA tablespace must already be created.

   ○ Enter **2** if you will use a supported version of Microsoft SQL Server for the NA database. SQL Server must already be installed on a separate database server. The NA installer will create the NA database instance.

   ○ Enter **3** if you want the NA installer to also install the database that ships with NA or if you will use a supported version of PostgreSQL that is already installed on this system or a separate database server. The NA installer will create the NA database instance.

   ○ Enter **4** for secondary installations of NA without a database, for example, the second NA core server in a horizontal scalability environment.

```
================================================================================
Choose Install Set
------------------

Please choose the Install Set to be installed by this installer.

    1- NA core and NA client using Oracle
    2- NA core and NA client using Microsoft SQL Server
  ->3- NA core and NA client using Postgres
    4- NA Client Only

ENTER THE NUMBER FOR THE INSTALL SET, OR PRESS <ENTER> TO ACCEPT THE DEFAULT
   :
```

4. *SQL Server only*. For the `License Agreement (Microsoft SQL Server)` section, read each page of the license, and then press **Enter**. If you agree with the terms of the Microsoft SQL Server JDBC driver license, at the `DO YOU ACCEPT THE TERMS OF THIS LICENSE AGREEMENT?` prompt, enter **y**, and then press **Enter**.

5. *PostgreSQL only*. For the `Postgres Installation` section, select the location of the PostgreSQL server, and then press **Enter**. Options are as follows:

   ○ Enter **1** if the NA installer should install PostgreSQL.

   ○ Enter **2** if the NA installer should connect to a separate database server that already has PostgreSQL installed.

```
===============================================================================
Postgres Installation
---------------------

Do you want to install Postgres, or do you already have an installation of
Postgres that NA can use?

  ->1- Install Postgres
    2- Use existing Postgres Server

ENTER THE NUMBER FOR YOUR CHOICE, OR PRESS <ENTER> TO ACCEPT THE DEFAULT::
```

6. *Pre-Existing PostgreSQL only*. The `Important: Postgres Version` section prompts you to verify that the PostgreSQL that is already installed on this system or a separate database server is of a supported version. For more information, see the *Support Matrix*.

```
===============================================================================
Important: Postgres Version
---------------------------

Confirm that your Postgres database meets the requirements described in the NA
Support Matrix.

If your database has the correct version and type, press Enter to continue.

Otherwise, type "back" and press Enter to choose to install Postgres.

PRESS <ENTER> TO CONTINUE:
```

7. For the `Product License` section, if you have a license file, enter the path to that file, and then press **Enter**.

```
===============================================================================
Product License
---------------

If you have a license file provided by HPE, you can enter it now.
Otherwise, you can copy the file later to your HPE Network Automation install
folder.




Please Provide Full Path and Filename to License File: (Default: ):
```

8. For the `Choose Install Folder` section, enter the absolute path of the NA root directory, and then press **Enter**.

```
===============================================================================
Choose Install Folder
---------------------

Please choose a directory that does not contain existing files.  The directory
path should not contain spaces.




Where would you like to install?

  Default Install Folder: /opt/NA

ENTER AN ABSOLUTE PATH, OR PRESS <ENTER> TO ACCEPT THE DEFAULT
        :
```

9. *NA-Installed PostgreSQL only*. For the `Choose Postgres Install Folder` section, enter the path for the PostgreSQL root directory, and then press **Enter**.

```
===============================================================================
Choose Postgres Install Folder
------------------------------

Where would you like to install Postgres?

Postgres install folder: (Default: /opt/postgres):
```

10. *Oracle, SQL Server, or Pre-Existing PostgreSQL only*. For the `Database Settings` section, specify the location of the database server, and then press **Enter**. Options are as follows:

   ○ Enter **1** if the database is on the NA core server (this computer).

○ Enter **2** if the database is on a different computer.

```
=======================================================================
Database Settings
----------------

You chose to have HPE Network Automation use an existing database server to
store its data.  Where is the database software installed?

   1- The database software is installed on this computer
 ->2- The database software is installed on another server

ENTER THE NUMBER FOR YOUR CHOICE, OR PRESS <ENTER> TO ACCEPT THE DEFAULT::
```

11. For the `Configure Email` section, do the following:

    a. Enter the host name of the SMTP server, and then press **Enter**.

    b. Enter the email address for messages sent by NA, and then press **Enter**.

```
=======================================================================
Configure Email
---------------

HPE Network Automation can send email notifications. For example, notify
administrator whenever device configurations change. To enable this feature,
please enter the SMTP server name that HPE Network Automation can use to send
email and the sender email address.

SMTP server (Default: mail): smtp.corp.com

Sender Email Address (Default: nobody@localhost): admin@corp.com
```

12. For the `Select Language` section, select the language that NA will use for the NA console, storing information in the database, and presenting the product help and documentation (when localized), and then press **Enter**. Options are as follows:

    ○ Enter **1** for French.

    ○ Enter **2** for German.

    ○ Enter **3** for Japanese.

    ○ Enter **4** for Spanish.

13. For the `Pre-Installation Summary` section, review the information, and then press **Enter**.

```
================================================================================
Pre-Installation Summary
------------------------

Please Review the Following Before Continuing:

Product Name:
    HPE Network Automation

Install Folder:
    /opt/NA

Link Folder:
    DO NOT INSTALL

Install Set:
    NA core and NA client using Postgres

Disk Space Information (for Installation Target):
    Required:  6,842,408,755 Bytes
    Available: 17,564,721,152 Bytes

PRESS <ENTER> TO CONTINUE: █
```

14. For the `Installing...` section, wait for the installation to finish.

```
================================================================================
Installing...
-------------

 [================|================|================|================]
 [-█
```

15. *NA-Installed PostgreSQL only*. For the `Postgres Security Setup` section, do the following:

   a. Enter the password to be created for the NA database instance root user, and then press **Enter**.

   b. Re-enter the password, and then press **Enter**.

```
================================================================================
Postgres Security Setup
-----------------------

Please setup Postgres admin user('postgres') password and other security
settings.
New Password:
Confirm Password:
```

16. *Pre-Existing PostgreSQL only*. For the `Database Admin Login` section, enter the information for connecting to PostgreSQL. Do the following:

   a. Enter the host name of the PostgreSQL server, and then press **Enter**.

   b. Enter the port number for the PostgreSQL server, and then press **Enter**.

   c. Enter the name of the PostgreSQL administrator user, and then press **Enter**.

   d. Enter the password of the PostgreSQL administrator user, and then press **Enter**.

```
=================================================================================
Database Admin Login
--------------------

In order to create the HPE Network Automation database on your existing database
server, the installer needs to know the hostname and port of the database server,
as well as the login information of the database administrator, who has
permissions to create new databases and new users.


Hostname (Default:
Port (Default: 5432):
User Name (Default: postgres):
Password:
```

17. *PostgreSQL only*. For the `New Database - Postgres` section, enter the information for connecting to the NA database. Do the following:

   a. Enter the name of the PostgreSQL user for connecting to the NA database. If the NA installer is also installing PostgreSQL, the installer creates this user. If the NA installer is connecting to a pre-existing installation of PostgreSQL, this user must already exist. Press **Enter**.

   b. Enter the password for the new PostgreSQL user, and then press **Enter**.

   c. Re-enter the password, and then press **Enter**.

   d. Enter the name of the new NA database instance, and then press **Enter**.

   e. At the `Create NA user with this username and password` prompt, do the following:

   - If you want the NA installer to create an NA user with the same user name and password as for the database, enter **y**, and then press **Enter**.

   - If want to define a different NA administrator user, enter **n**, and then press **Enter**.

```
==================================================================
New Database - Postgres
-----------------------

Please provide:

a) A username and password that HPE Network Automation will use to connect to
your database.

b) The name of the database that you would like HPE Network Automation to create
and use.

A connection to the database will be tried when you press Enter.


User Name (Default: ):
Password:
Confirm Password:
Enter the name of the database to create (Default: NA):
Create NA user with this username and password (Y/N): Y
```

18. *PostgreSQL only*. For the `Confirm Database Settings` section, review the information. Verify that the database user name and instance name do not yet exist, and then press **Enter**.

```
==================================================================
Confirm Database Settings
-------------------------

You have selected the following Database settings.  Please confirm these
before continuing:

Username "admin" will be created.  Please confirm that this user does not
already exist.

A database named "NA" will be created.  Please confirm that this database does
not already exist.


PRESS <ENTER> TO CONTINUE:
```

19. *SQL Server only*. For the `New Database Collation - Microsoft SQL Server` section, select a database collation, and then press **Enter**.

```
================================================================================
New Database collation - Microsoft SQL Server
---------------------------------------------

Choose Database collation:

     1- Chinese_PRC_CI_AS
     2- Cyrillic_General_CI_AS
     3- Japanese_CI_AS
     4- Korean_Wansung_CI_AS
  ->5- SQL_Latin1_General_Cp1_CI_AS

ENTER THE NUMBER FOR YOUR CHOICE, OR PRESS <ENTER> TO ACCEPT THE DEFAULT::
```

20. *SQL Server only*. For the `Database Admin Login` section, enter the information for connecting to the SQL Server. Do the following:

a. Enter the host name of the SQL Server, and then press **Enter**. For a named instance, the format should be <hostname>\\<instance name>.

b. Enter the port number for the SQL Server, and then press **Enter**.

c. Enter the name of the SQL Server administrator user, and then press **Enter**.

d. Enter the password of the SQL Server administrator user, and then press **Enter**.

```
================================================================================
Database Admin Login
--------------------

In order to create the HPE Network Automation database on your existing database
server, the installer needs to know the hostname and port of the database server,
as well as the login information of the database administrator, who has
permissions to create new databases and new users.


Hostname (Default: )
Port (Default: 1433):
User Name (Default: ):
Password:
```

21. *SQL Server only*. For the `Configure Database` section, specify the condition of the NA database, and then press **Enter**. Options are as follows:

   - Enter **1** if the database is a clean database (with no NA data).

   - Enter **2** if the database is an existing NA database.

```
================================================================================
Configure Database
------------------


You can choose to create a new database, or if you have previous installation
of HPE Network Automation, you can choose to use an existing HPE Network
Automation database.

  ->1- Create new database
    2- Use existing NA database

ENTER THE NUMBER FOR YOUR CHOICE, OR PRESS <ENTER> TO ACCEPT THE DEFAULT:: 1
```

22. *SQL Server only*. For the `Not supported - new SQL Server or Oracle database` section, enter the information for connecting to the NA database. Do the following:

   a. Enter the name of the new SQL Server user for connecting to the NA database, and then press **Enter**.

   b. Enter the password for the new SQL Server user, and then press **Enter**.

   c. Re-enter the password, and then press **Enter**.

   d. Enter the name of the new NA database instance, and then press **Enter**.

   e. At the `Create NA user with this username and password` prompt, do the following:

   - If you want the NA installer to create an NA user with the same user name and password as for the database, enter **y**, and then press **Enter**.

   - If want to define a different NA administrator user, enter **n**, and then press **Enter**.

```
================================================================================
Not supported - new SQL Server or Oracle database
------------------------------------------------

Please provide:

a) A username and password that HPE Network Automation will use to connect to
your database.

b) The name of the database that you would like HPE Network Automation to create
and use.

A connection to the database will be tried when you press Enter.


User Name (Default: ):
Password:
Confirm Password:
Enter the name of the database to create (Default: NA):
Create NA user with this username and password (Y/N):
```

23. *SQL Server only*. For the `Confirm Database Settings` section, review the information. Verify that the database user name and instance name do not yet exist, and then press **Enter**.

```
================================================================================
Confirm Database Settings
-------------------------

You have selected the following Database settings.  Please confirm these
before continuing:

Username "nauser" will be created.  Please confirm that this user does not
already exist.

A database named "NA" will be created.  Please confirm that this database does
not already exist.


PRESS <ENTER> TO CONTINUE:
```

24. *Oracle only*. For the `Database Admin Login` section, enter the information for connecting to the Oracle database. Do the following:

    a. Enter the host name of the Oracle server, and then press **Enter**.

    b. Enter the port number for the Oracle server, and then press **Enter**.

    c. Enter the system identifier or service name of the Oracle database, and then press **Enter**.

    d. Enter the name of the Oracle administrator user, and then press **Enter**.

    e. Enter the password of the Oracle administrator user, and then press **Enter**.

```
================================================================================
Database Admin Login
--------------------

Please provide the hostname and port of the database server, the Oracle System
ID (SID / Service Name) to be used by HPE Network Automation, and the login
information of a database user who has permission to create tables.


Hostname (Default: ):
Port (Default: 1521):
Oracle System ID (SID) (Default: ):
User Name (Default: postgres):
Password:
```

25. *Oracle only*. For the `Configure Database (1)` section, specify the condition of the NA database, and then press **Enter**. Options are as follows:

    ○ Enter **1** if the database is a clean database (with no NA data).

○ Enter **2** if the database is an existing NA database.

```
===============================================================================
Configure Database (1)
----------------------

Is naqa421 a clean database for use by HPE Network Automation or an existing
HPE Network Automation database that is ready to use?

  ->1- a clean database for use by HPE Network Automation
    2- an existing HPE Network Automation database

ENTER THE NUMBER FOR YOUR CHOICE, OR PRESS <ENTER> TO ACCEPT THE DEFAULT::
```

26. *Oracle only*. For the `Configure Database (2)` section, specify whether the NA installer should create an NA user with the same user name and password as for the database, and then press **Enter**.

```
===============================================================================
Configure Database (2)
----------------------

Create an HPE Network Automation user with the supplied database username and
password?

  ->1- Yes
    2- No

ENTER THE NUMBER FOR YOUR CHOICE, OR PRESS <ENTER> TO ACCEPT THE DEFAULT::
```

27. If you chose to create an NA administrator user with credentials that are different from the credentials for connecting to the database, for the `Set NA Credentials` section, enter the credentials for the NA administrator. Do the following:

   a. Enter the name of the new NA administrator user, and then press **Enter**.

   b. Enter the password for the new NA administrator user, and then press **Enter**.

   c. Re-enter the password, and then press **Enter**.

```
===============================================================================
Set NA Credentials
------------------

Please enter the username and password for NA's administrator.
User Name (Default: ):
Password:
Confirm Password:
```

28. For the `Configure Admin` section, enter contact information for the NA administrator. Do the following:

    a. Enter the first name of the NA administrator, and then press **Enter**.

    b. Enter the last name of the NA administrator, and then press **Enter**.

    c. Enter the email address of the NA administrator, and then press **Enter**.

```
========================================================================
Configure Admin
---------------

Enter the following information for HPE Network Automation's administrator.
HPE Network Automation will send email to the email address entered below.

Database is going to be created.

First name (Default: ):

Last name (Default: ):

Email address (Default: ):
```

29. For the `Database Setup` section, wait for the database configuration to finish.

```
========================================================================
Database Setup
--------------

The installer will create the database you have provided.

#########################################################################
#
# This step might take up to a few minutes. Please do not interrupt.
#
#########################################################################
#

PRESS <ENTER> TO CONTINUE:
```

30. For `Full Text Search` section, read the description of full-text search of the Configuration Text field. For information about configuring full-text search, see the Administration guide. Press **Enter**.

```
================================================================================
Full Text Search
---------------

HPE Network Automation Software supports full-text search of the Configuration
Text field. The "contains (full text)" search is faster than the original
"contains" search. For information about enabling this feature after product
installation, see the NA Administration Guide.

PRESS <ENTER> TO CONTINUE:
```

31. *Oracle or PostgreSQL only*. For the `Case-Sensitivity of Text Fields` section, select whether to enable case-insensitive search of most text fields. If your organization uses case-sensitivity to distinguish managed devices, do not enable case-insensitivity. (To change this configuration after product installation, see the *Administration guide*.) Press **Enter**.

In a standalone NA core or Horizontal Scalability environment, you can enable this feature during installation.

> **Caution:** In a Multimaster Distributed System environment, do not enable case-insensitive search while installing NA. For information about enabling full-text search after installing NA, see the *Administration guide*.

```
================================================================================
Case-Sensitivity of Text Fields
-------------------------------

HPE Network Automation software can search most text fields on either a
case-sensitive or case-insensitive basis. If your organization uses
case-sensitivity to distinguish managed devices, do not enable
case-insensitivity. To change this configuration after product installation,
see the NA Administration Guide.
Do you want to enable case-insensitive search?


    1- No
  ->2- Yes

ENTER THE NUMBER FOR YOUR CHOICE, OR PRESS <ENTER> TO ACCEPT THE DEFAULT::
```

32. For the `FIPS MODE` section, read the information about the Federal Information Processing Standardization (FIPS) mode in NA10.30. (For more information about the FIPS mode, see the *Administration guide*.). Press **Enter**.

```
================================================================================
FIPS MODE
---------

FIPS mode is enabled by default. The default encryption algorithm is AES with
256 bits key length, and the default hashing algorithm is SHA-512. For
information about changing the default encryption and hashing algorithms, see
the HPE Network Automation Software Administration Guide.

PRESS <ENTER> TO CONTINUE:
```

33. For the `HPE Marketplace` section, read the information about HPE Marketplace. In the **HPE Marketplace** message box, read the information about HPE Marketplace. If the NA core server is connected to the Internet, you can use HPE Marketplace to receive free NA driver pack updates and subscription-based network security and compliance updates. Press **Enter**.

34. For the `Installation Complete` section, note the user name and password of the NA administrator user, and then press **Enter**.

```
================================================================================
Installation Complete
---------------------

Press Enter to complete the installation program.

After HPE Network Automation starts up, you can log in to HPE Network
Automation's web interface or command-line interface with
Admin Username: admin and the associated Admin Password.


PRESS <ENTER> TO EXIT THE INSTALLER:
```

Service Pack Installer

For information about supported platforms, see the *Support Matrix*.

Follow the instructions in the appropriate chapter of this guide:

- "Upgrading to NA 10.30 from a Different System" on page 14
- "Upgrading to NA 10.30 on the Same System" on page 34

Refer to this section for help with the NA Service Pack Installer interface.

> **Note:** To prevent date loss, back up all the content in the NA install directory and the NA database.
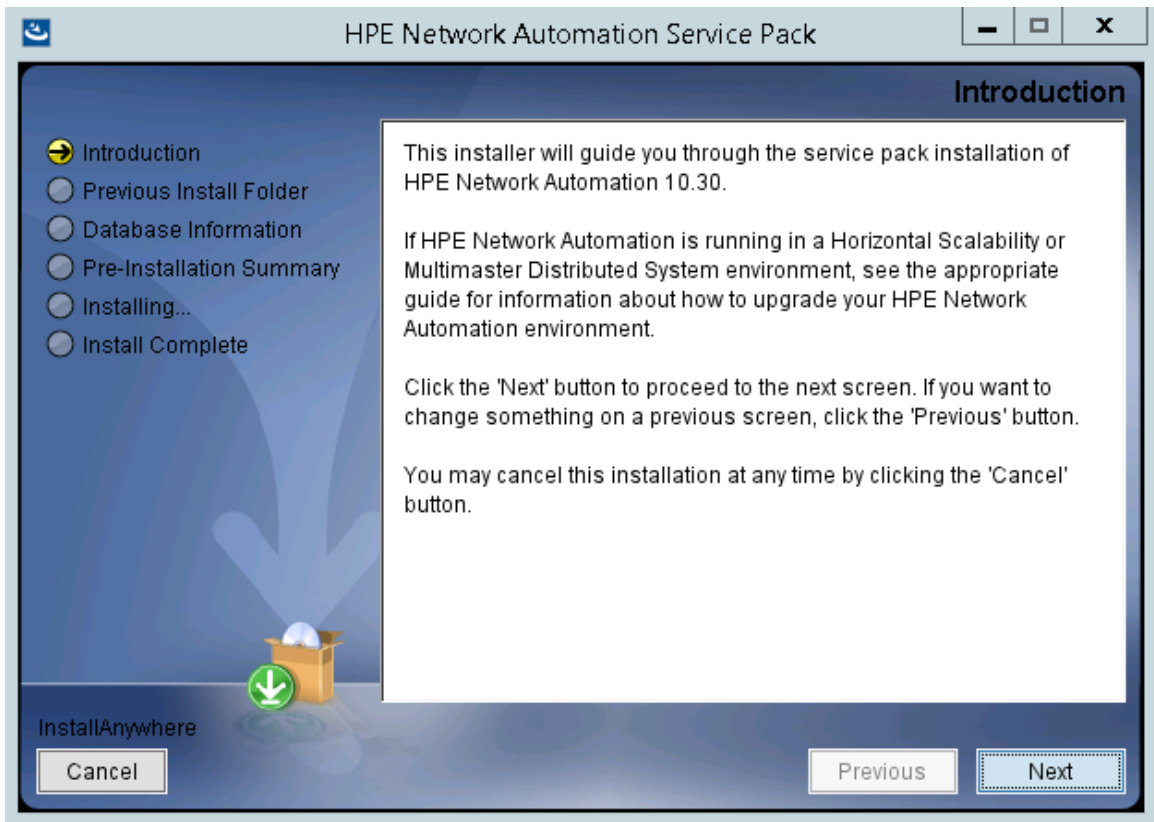
Windows Operating System

To upgrade NA on a Windows platform, do the following:

1. Locate the `setup` file in the release package, and then double-click the file.

   > **Tip:** The `setup` file is available in the *<media_root>*`\bin` directory.

2. On the **Introduction** page, review the introduction information, and then click **Next**.

3. *Only when upgrading from NA 10.11.* The **Removing SWIM Server** message box indicates that this upgrade removes the SWIM (Software Image Management) server and its functionality. Click **OK**.
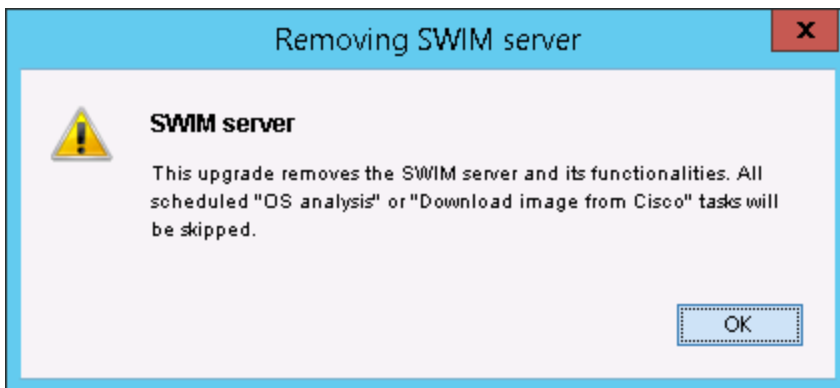
4. The **License Enforcement** message box indicates that this upgrade enforces the NA License structure. Click **OK**.


5. A message box opens to indicate that this upgrade migrates Command Scripts to Change Plan. Click **OK**.

6. The **Stop Services** message box indicates that the Service Pack Installer will stop the NA services. Click **OK**.
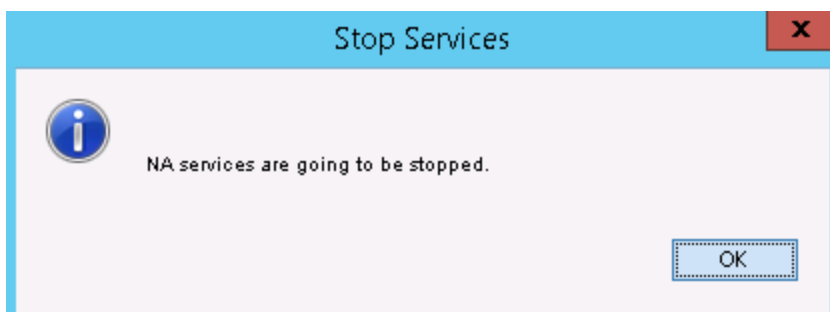
7. Wait for the installation preparation to complete.

8. The **Backup** message box reminds you to back up the NA file system and the NA database. If you have not completed both backups, do so now. After backing up the NA file system and the NA database, click **OK**.
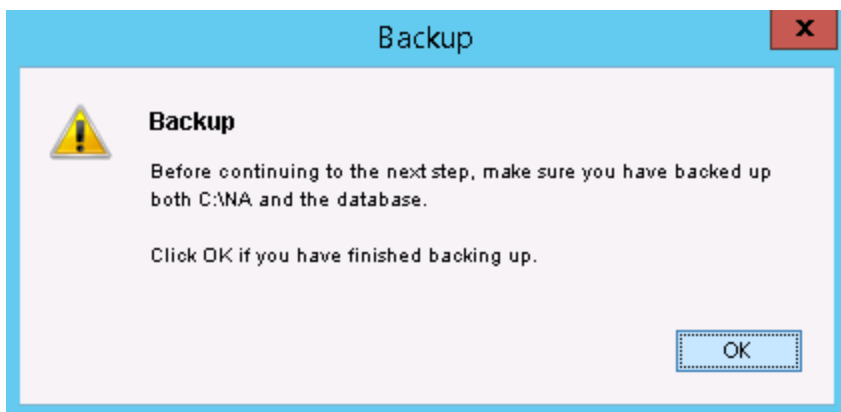
9. *Only when upgrading from NA 10.11*. NA 10.20 or higher replaces MySQL with the PostgreSQL database. Therefore, the following warning message appears if MySQL database is detected on your system:
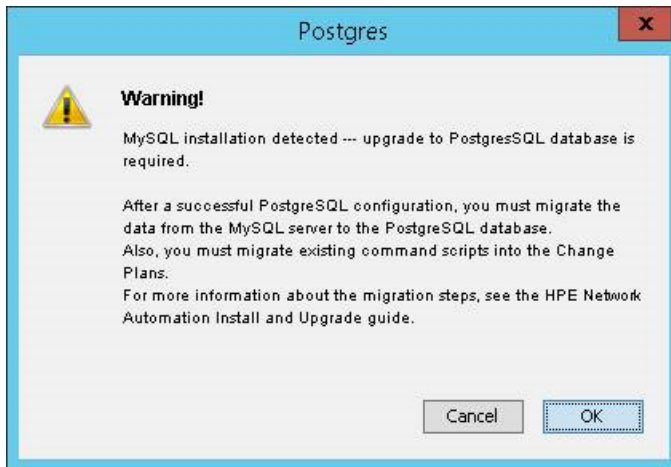

Click **OK**.

> **Note:** The warning message does not appear if you use an Oracle or Microsoft SQL Server database.
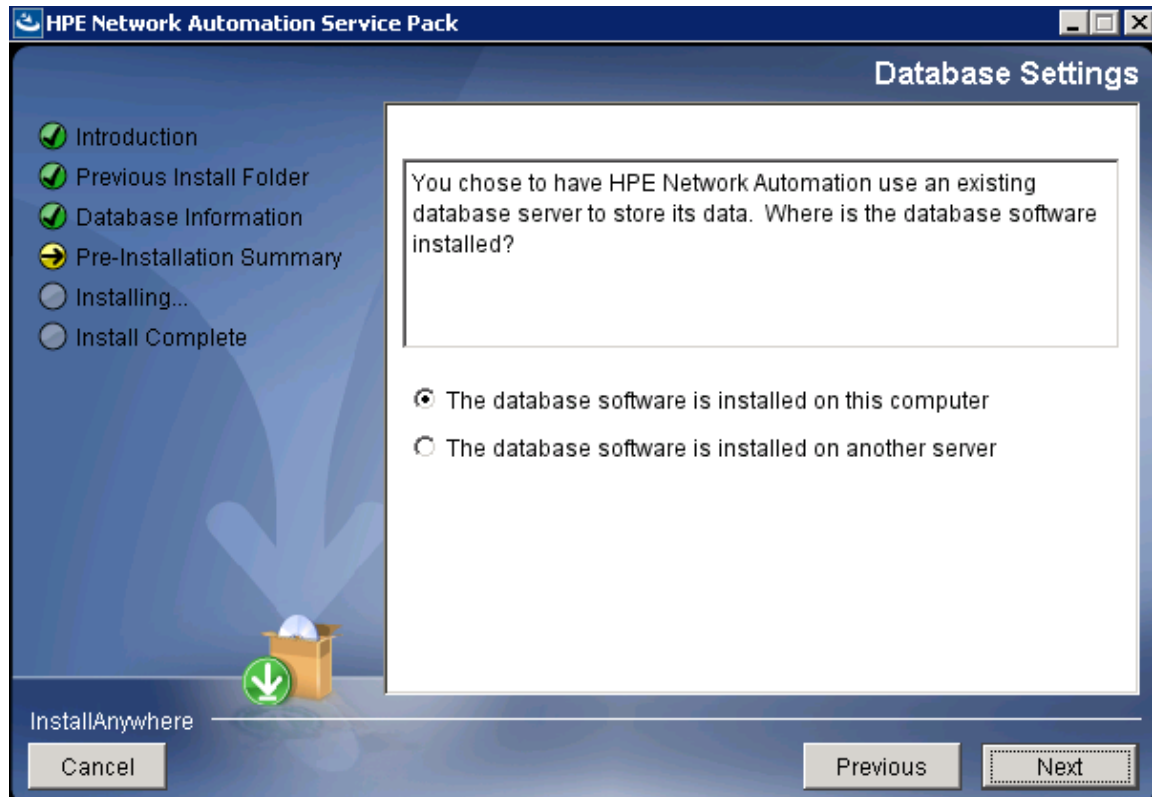
10. *PostgreSQL only*. On the **Postgres Installation** page, select one of the following options, and then click **Next**:

   ○ Install Postgres
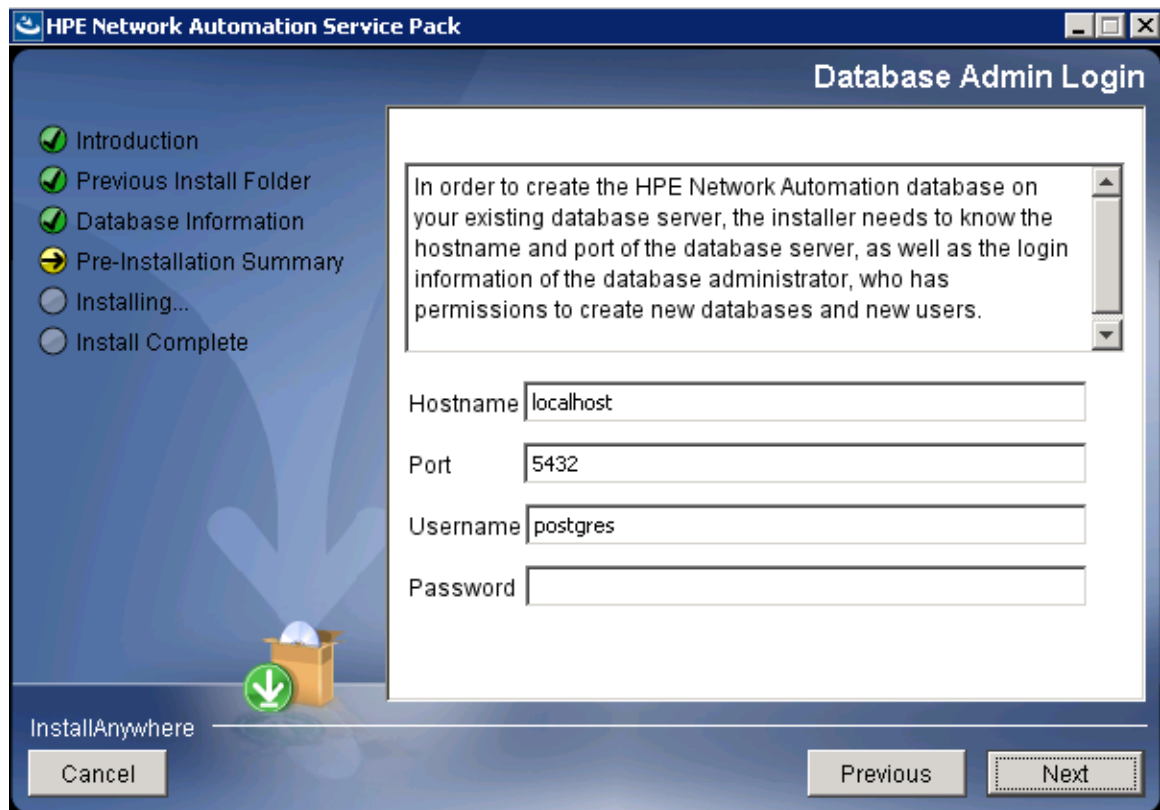
   ○ Use existing Postgres Server
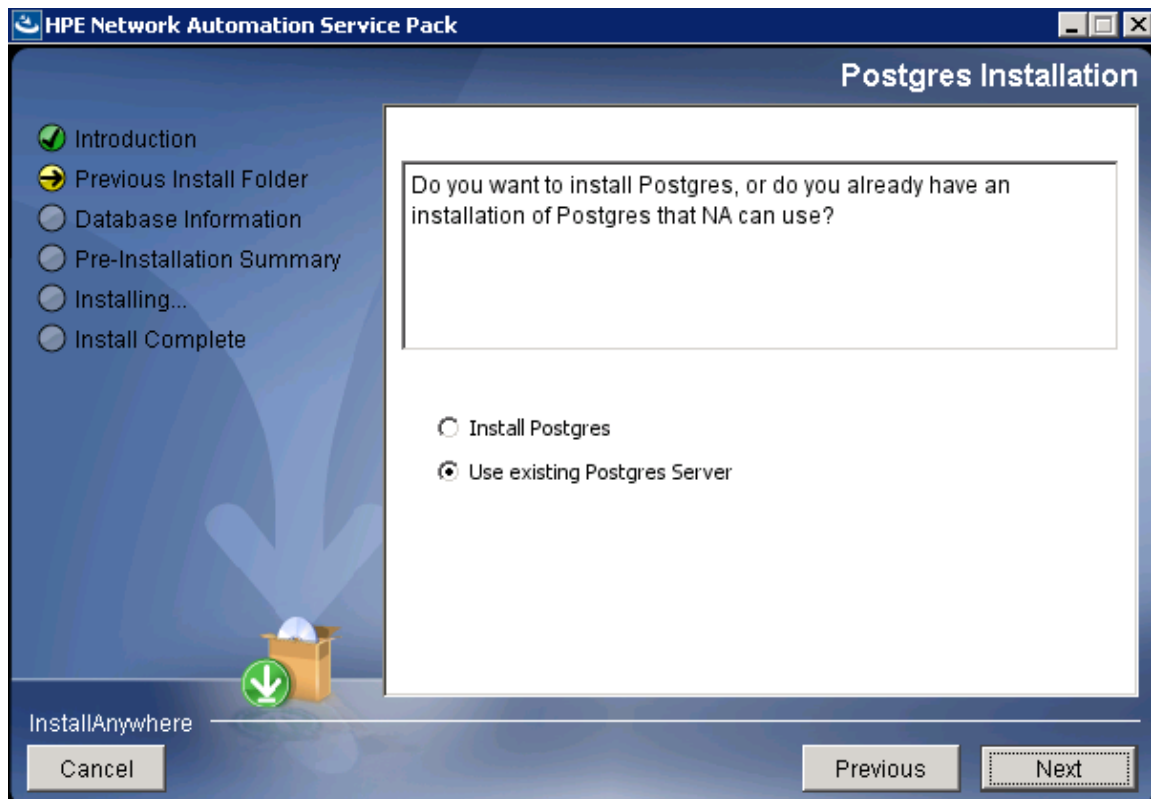
If you choose to install PostgreSQL software, specify the folder where you want to install software, and then setup the PostgreSQL admin user (`postgres`).
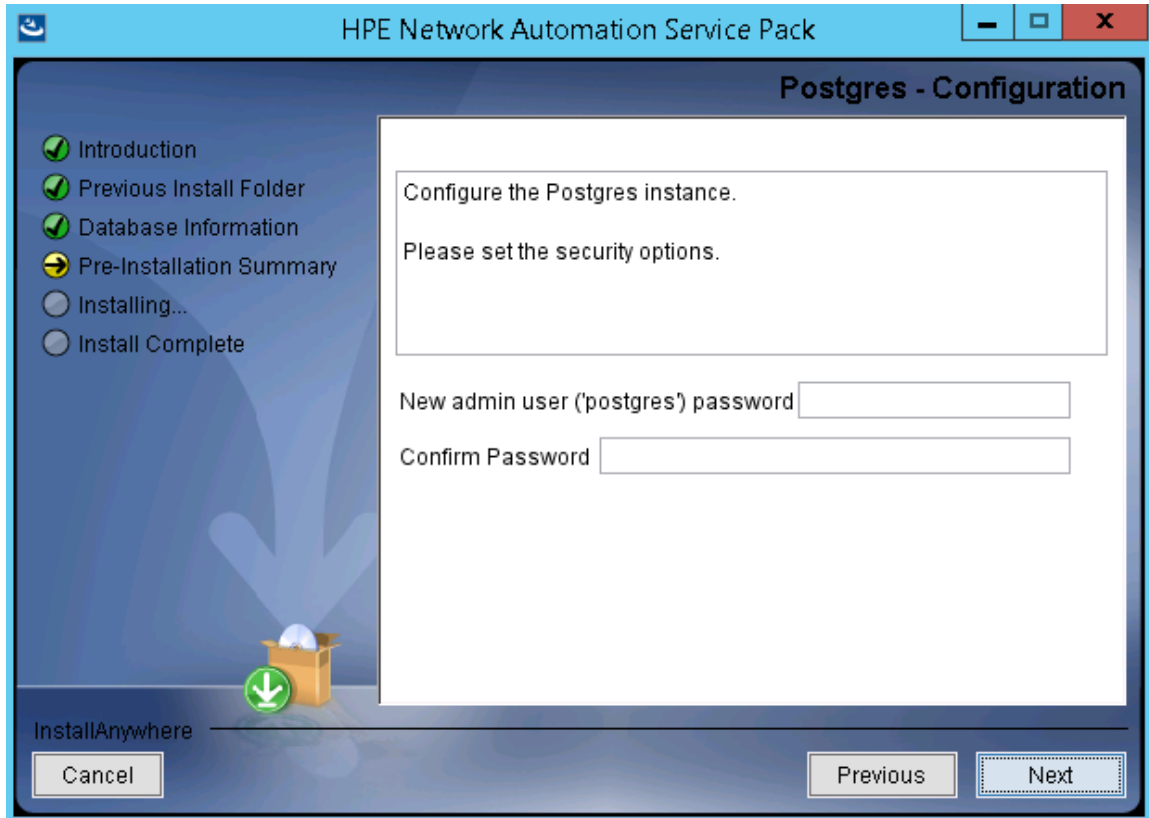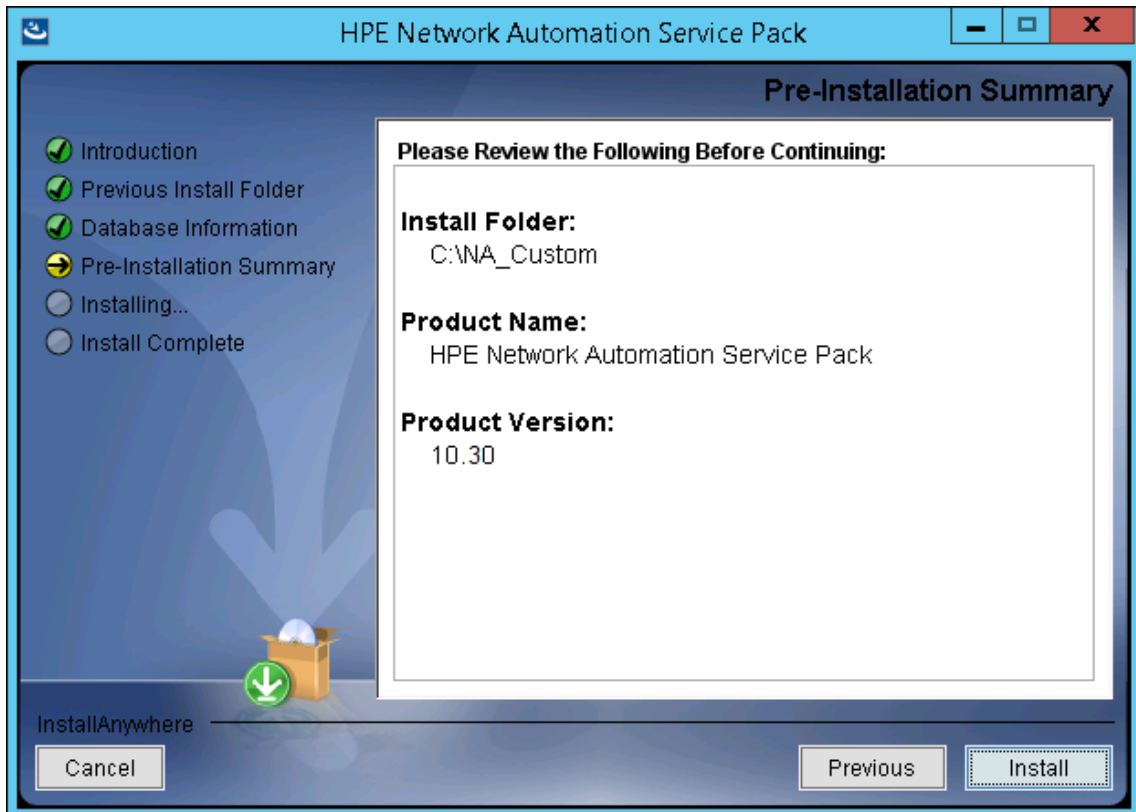
If you choose to use an existing PostgreSQL server, specify whether the database is installed locally or remotely:

Specify the details of the PostgreSQL database server:

11. On the **Pre-Installation Summary** page, review the information. To correct a setting, click **Previous**. When all settings are correct, click **Install**.

12. On the **Installing HPE Network Automation** page, wait for the installation to complete.

13. Configure the NA database. For example, if you choose to use an existing PostgreSQL server, the following screen appears:
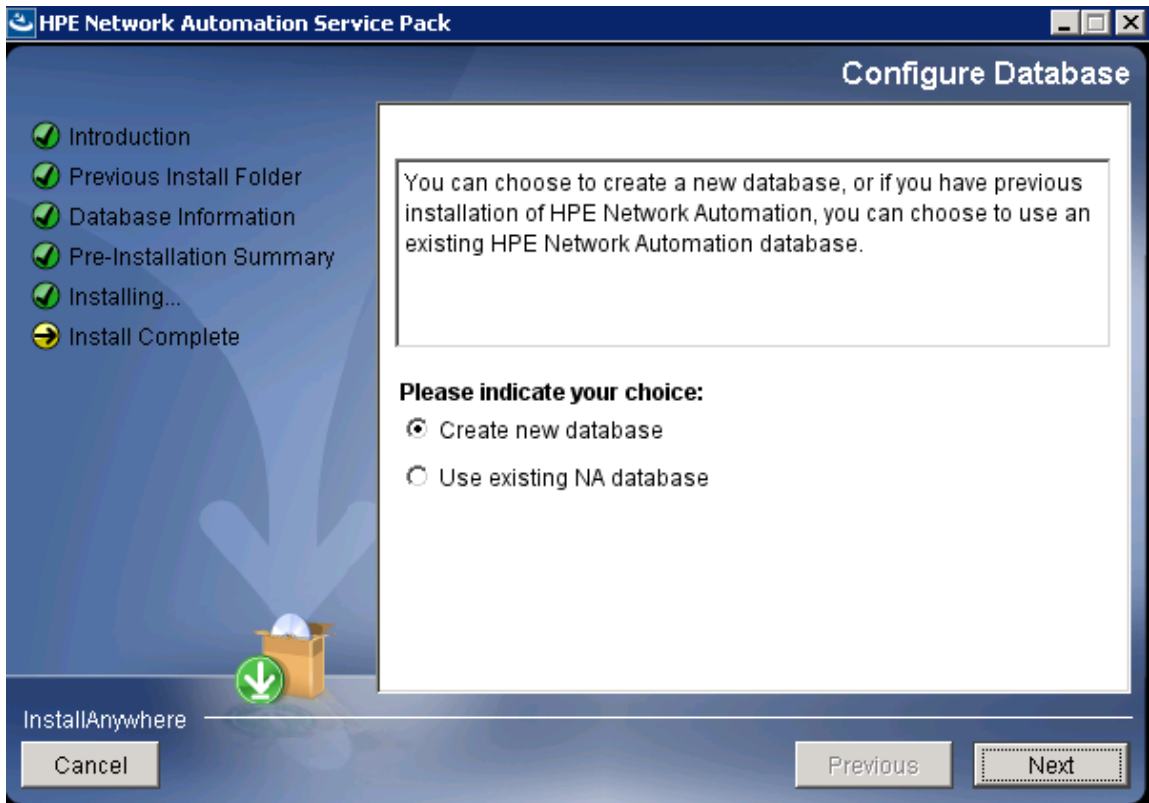
Choose the **Create new database** option if you plan to upgrade to NA 10.30, and then migrate the data to the new database.

If you choose the **Use existing NA database** option, you must first run the migration tool to migrate the NA data, and then upgrade to NA 10.20. When you choose this option, make sure that the NA database user has at least one database instance associated to the PostgreSQL database. For more information, see the *Setting up a Database in the PostgreSQL Server* section in .

14. On the **Full Text Search** page, read the description of full-text search of the Configuration Text field. For information about configuring full-text search, see the *Administration guide*.

    Click **Next**.
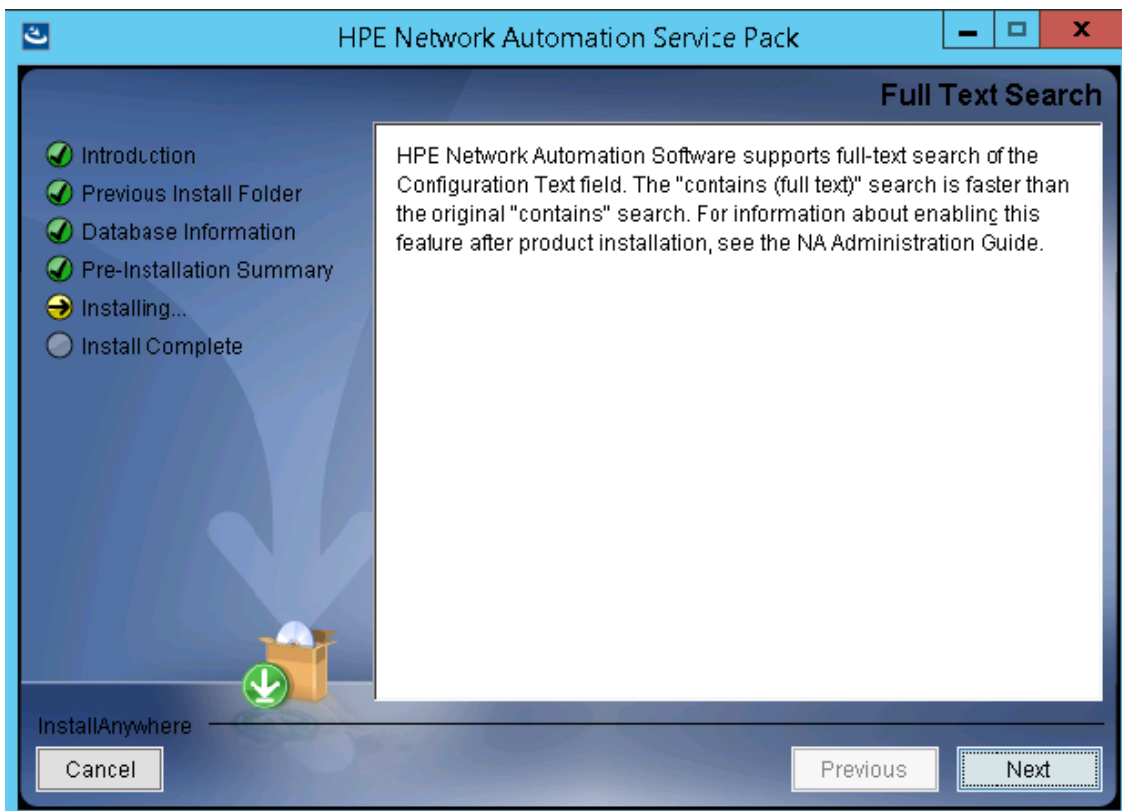
15. *Oracle or PostgreSQL only*. On the **Case-Sensitivity of Text Fields** page, select whether to enable case-insensitive search of most text fields. If your organization uses case-sensitivity to distinguish managed devices, do not enable case-insensitivity. (To change this configuration after product installation, see the *Administration guide*.)

    Click **Next**.

    > **Note:** While upgrading from NA 10.21, this screen does not appear if you had installed NA 10.21 with the *Case-Sensitivity of Text Fields* option set to Yes.
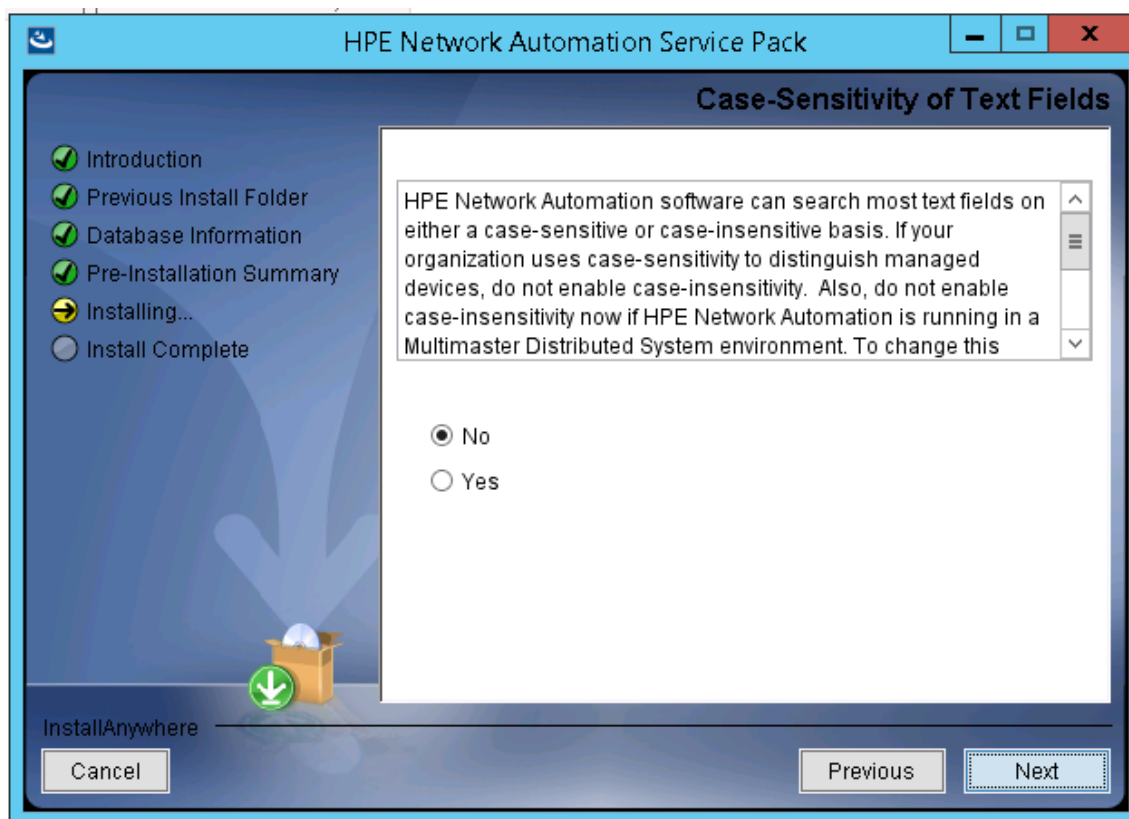
In a standalone NA core or Horizontal Scalability environment, you can enable this feature during upgrade.

> **Caution:** In a Multimaster Distributed System environment, do not enable case-insensitive search while upgrading NA. For information about enabling case-insensitive search after upgrading NA, see the *Administration guide*.

16. On the **Upgrading Database** page, wait for the database schema upgrade to finish.

17. The **HPE Network Automation** message box indicates that the Service Pack Installer is starting the NA services. Wait for the installation to finish.
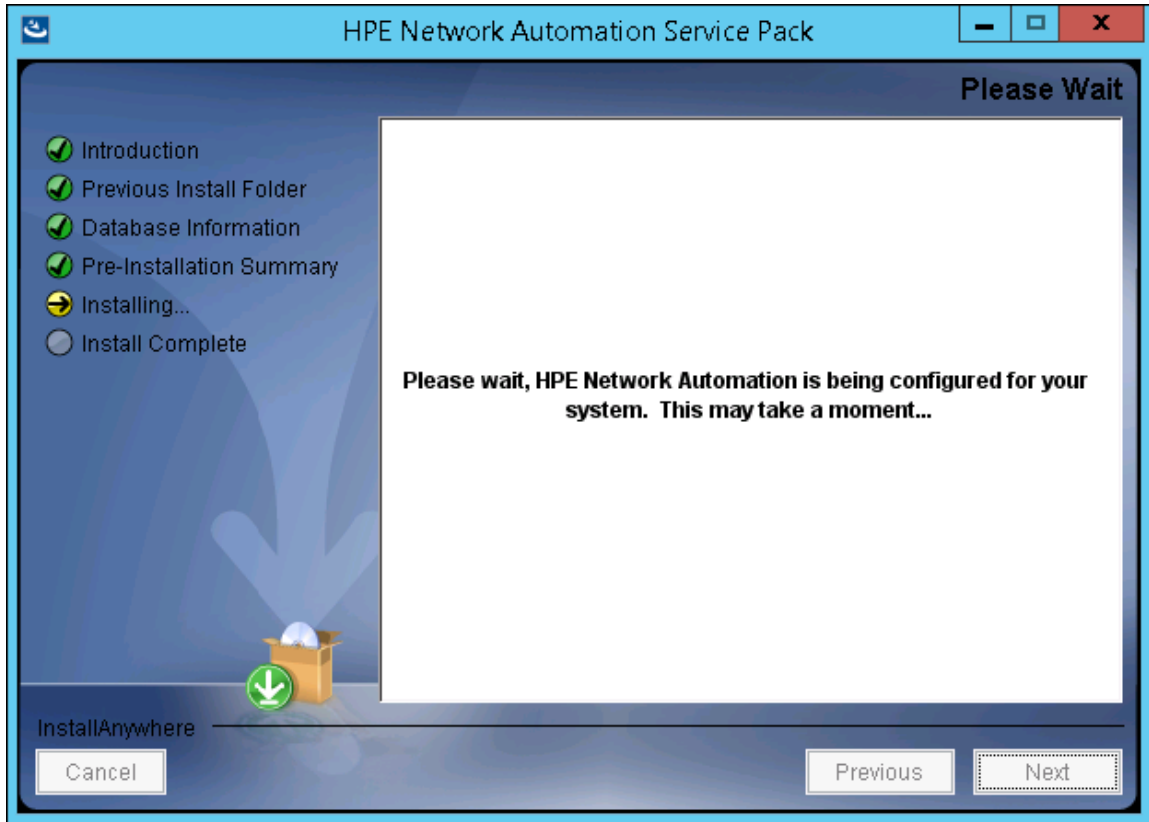
18. In the **FIPS MODE** message box, read the information about the Federal Information Processing Standardization (FIPS) mode in NA 10.30. (For more information about the FIPS mode, see the *Administration guide*.) Click **OK**.
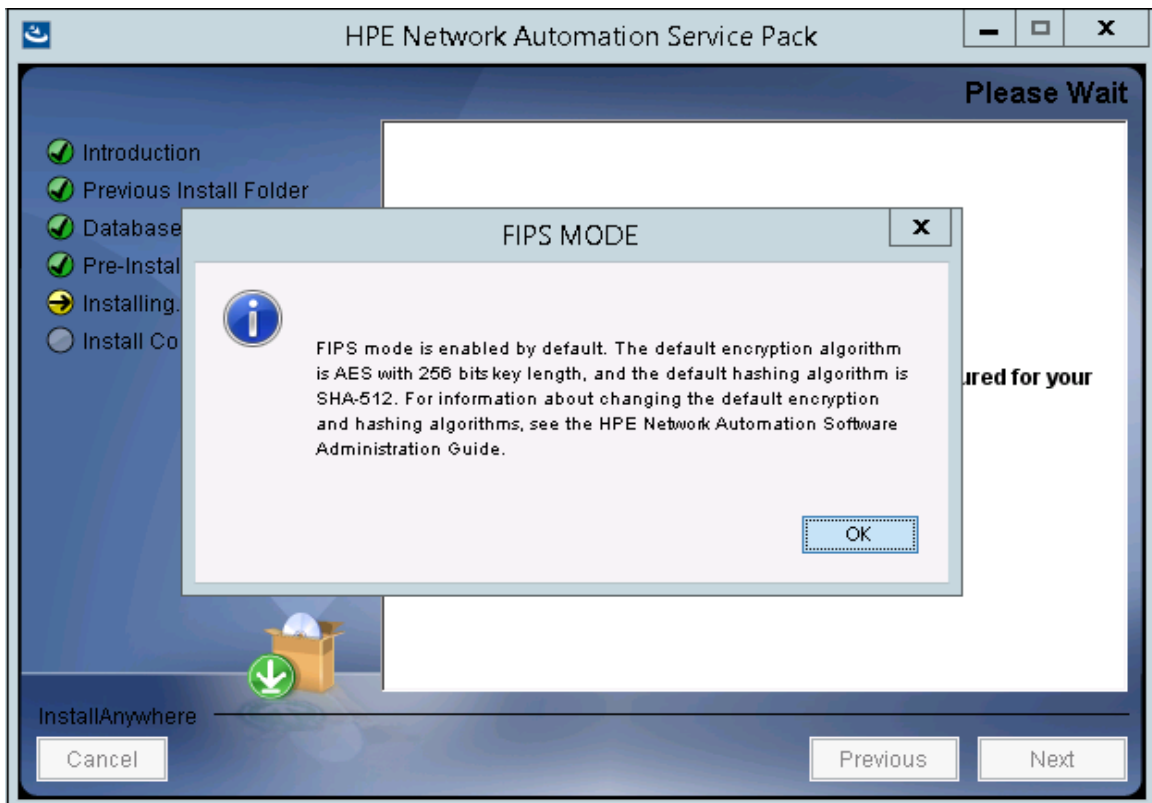
19. In the **HPE Marketplace** message box, read the information about HPE Marketplace. If the NA core server is connected to the Internet, you can use HPE Marketplace to receive free NA driver pack updates and subscription-based network security and compliance updates. Click **OK**.

20. In the NA-Perl API message box, read the instructions to install the Perl API manually, and then click **OK**.

21. On the **Install Complete** page, click **Done**.
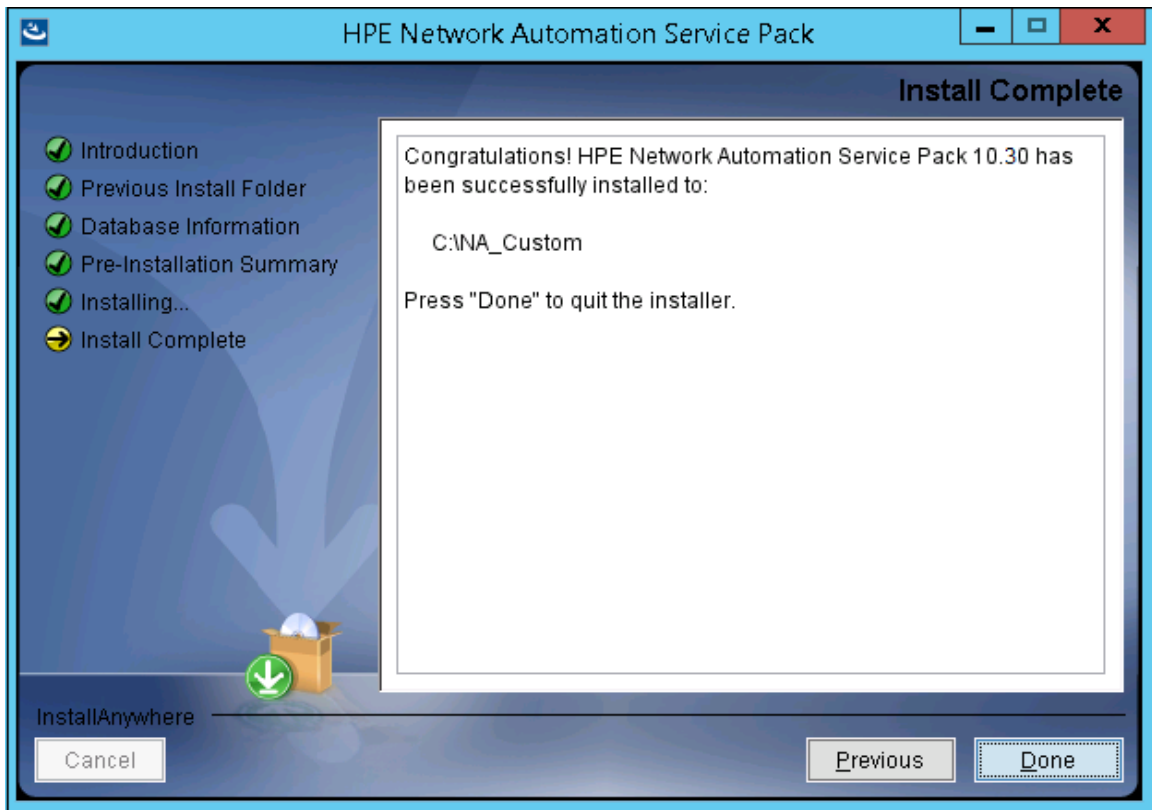
22. Relaunch the NA web user interface in a new browser session.

Linux Operating System

To upgrade NA on a Linux platform, do the following:

1. Locate the setup file in the release package, and then run it from the command line.

   The installer opens to the Introduction section.

```
Preparing to install...
Extracting the JRE from the installer archive...
Unpacking the JRE...
Extracting the installation resources from the installer archive...
Configuring the installer for this system's environment...

Launching installer...


================================================================================
HPE Network Automation                              (created with InstallAnywhere)
--------------------------------------------------------------------------------

Preparing CONSOLE Mode Installation...




================================================================================
Introduction
------------

This installer will guide you through the service pack installation of HPE
Network Automation 10.30.

If HPE Network Automation is running in a Horizontal Scalability or
Multimaster Distributed System environment, see the appropriate guide for
information about how to upgrade your HPE Network Automation environment.

Respond to each prompt to proceed to the next step in the installation.  If
you want to change something on a previous step, type 'back'.

You may cancel this installation at any time by typing 'quit'.

PRESS <ENTER> TO CONTINUE:
```

   Note that during the installation you can return to a previous step by typing **back**, or exit the installer by typing **quit**, and then pressing **Enter**.

   Press **Enter** to continue the installation process.

2. *Only when upgrading from NA 10.11.* The **Removing SWIM Server** message box indicates that

this upgrade removes the SWIM (Software Image Management) server and its functionality. Press **Enter**.

```
========================================================================
Removing SWIM server
--------------------

This upgrade removes the SWIM server and its functionalities. All scheduled
"OS analysis" or "Download image from Cisco" tasks will be skipped.

PRESS <ENTER> TO ACCEPT THE FOLLOWING (OK):


========================================================================
```

3. The **License Enforcement** message box indicates that this upgrade enforces the NA License structure. Press **Enter**.

```
========================================================================
License Enforcement
-------------------

This upgrade enforces the NA License structure. For information about the
available features and functionalities with the NA Premium and Ultimate
Licenses, see the NA User Guide.

PRESS <ENTER> TO ACCEPT THE FOLLOWING (OK):
```

4. The `Migration of Command Scripts to Change Plan` section indicates that this upgrade automatically migrates Command Scripts to Change Plan. Press **Enter**.

5. The `Stop Services` section indicates that the Service Pack Installer will stop the NA services. Press **Enter**.

```
========================================================================
Stop Services
-------------

Services are going to be stopped.

This may take up to a few minutes.

PRESS <ENTER> TO CONTINUE:



.......................
```

6. The Backup section reminds you to back up the NA file system and the NA database. If you have not completed both backups, do so now. After backing up the NA file system and the NA database, press **Enter**.

```
=========================================================================
Backup
------

Before continuing to the next step, make sure you have backed up both /opt/NA
and the database.

Select OK if you have finished backing up.

PRESS <ENTER> TO ACCEPT THE FOLLOWING (OK):
```

7. *Only when upgrading from NA 10.11.* NA 10.20 or higher replaces MySQL with the PostgreSQL database. Therefore, the following warning message appears if MySQL database is detected on your system:

```
MySQL installation detected --- upgrade to PostgresSQL database is required.

After a successful PostgreSQL configuration, you must migrate the data from
the MySQL server to the PostgreSQL database.
Also, you must migrate existing command scripts into the Change Plans.
For more information about the migration steps, see the HPE Network Automation
Install and Upgrade guide.
->1- OK
2- Cancel
ENTER THE NUMBER OF THE DESIRED CHOICE, OR PRESS <ENTER> TO ACCEPT THE
DEFAULT:
```

> **Note:** The message does not appear if you use an Oracle or Microsoft SQL Server database.

8. *PostgreSQL only*. For the `Postgres Installation` section, select the location of the PostgreSQL server, and then press **Enter**. Options are as follows:

   ○ Enter **1** if the NA installer should install PostgreSQL.

   ○ Enter **2** if the NA installer should connect to a separate database server that already has PostgreSQL installed.

```
===============================================================================
Postgres Installation
---------------------

Do you want to install Postgres, or do you already have an installation of
Postgres that NA can use?

  ->1- Install Postgres
    2- Use existing Postgres Server

ENTER THE NUMBER FOR YOUR CHOICE, OR PRESS <ENTER> TO ACCEPT THE DEFAULT::
```

If you enter **1**, specify the directory where you want to install the PostgreSQL software, and then setup the PostgreSQL admin user (`postgres`).

```
===============================================================================
Postgres Security Setup
-----------------------

Please setup Postgres admin user('postgres') password and other security
settings.
New Password:
Confirm Password:
```

If you enter **2**, specify whether the database is installed locally or remotely.

```
-------------------------------------------------------------------------------
Database Settings
-----------------

You chose to have HPE Network Automation use an existing database server to
store its data.  Where is the database software installed?

    1- The database software is installed on this computer
  ->2- The database software is installed on another server

ENTER THE NUMBER FOR YOUR CHOICE, OR PRESS <ENTER> TO ACCEPT THE DEFAULT:: 1
```

Specify the details of the PostgreSQL database server:

```
================================================================================
Database Admin Login
-------------------

In order to create the HPE Network Automation database on your existing database
server, the installer needs to know the hostname and port of the database server,
as well as the login information of the database administrator, who has
permissions to create new databases and new users.


Hostname (Default: localhost):
Port (Default: 5432):
User Name (Default: postgres):
Password:
```

9. For the Pre-Installation Summary section, review the information, and then press **Enter**.

```
================================================================================
Pre-Installation Summary
-----------------------

Please Review the Following Before Continuing:

Install Folder:
    /opt/NA

Product Name:
    HPE Network Automation Service Pack

Product Version:
    10.30


PRESS <ENTER> TO CONTINUE:
```

10. For the `Installing...` and `Setting up Environments...` sections, wait for the installation to finish.

11. Configure the NA database. For example, if you choose to use an existing PostgreSQL server, the following screen appears:

Enter **1** if you plan to upgrade to NA 10.30 and then migrate the data to the new database.

If you enter **2**, you must first run the migration tool to migrate the NA data, and then upgrade to NA 10.30. When you choose this option, make sure that the NA database user has at least one database instance associated to the PostgreSQL database. For more information, see the *Setting up a Database in the PostgreSQL Server* section in

12. For the `Full Text Search` section, read the description of full-text search of the Configuration Text field. For information about configuring full-text search, see the *Administration guide*.

    Press **Enter**.

```
================================================================================
Full Text Search
----------------

HPE Network Automation Software supports full-text search of the Configuration
Text field. The "contains (full text)" search is faster than the original
"contains" search. For information about enabling this feature after product
installation, see the NA Administration Guide.

PRESS <ENTER> TO CONTINUE:
```

13. *Oracle or PostgreSQL only*. For the `Case-Sensitivity of Text Fields` section, select whether to enable case-insensitive search of most text fields. If your organization uses case-sensitivity to distinguish managed devices, do not enable case-insensitivity. (To change this configuration after product installation, see the *Administration guide*.)

    Press **Enter**.

    > **Note:** While upgrading from NA10.21, this screen does not appear if you had installed NA10.21 with the *Case-Sensitivity of Text Fields* option set to Yes.

In a standalone NA core or Horizontal Scalability environment, you can enable this feature during upgrade.

> **Caution:** In a Multimaster Distributed System environment, do not enable case-insensitive search while upgrading NA. For information about enabling case-insensitive search after upgrading NA, see the *Administration guide*.

```
================================================================================
Case-Sensitivity of Text Fields
-------------------------------

HPE Network Automation software can search most text fields on a
case-sensitive or case-insensitive basis. If your organization uses
case-sensitivity to distinguish managed devices, do not enable
case-insensitivity. Also, do not enable case-insensitivity now if HPE Network
Automation is running in a Multimaster Distributed System environment. For
information about changing this configuration after product installation, see
the NA Administration Guide.

Do you want to enable case-insensitive search?


 ->1- No
   2- Yes

ENTER THE NUMBER FOR YOUR CHOICE, OR PRESS <ENTER> TO ACCEPT THE DEFAULT::
```

14. For the `Upgrading Database` section, wait for the database schema upgrade to finish.

```
================================================================================
Upgrading Database ...
--------------------

Depending on the size of the database, this may take up to a few hours.

Please do not interrupt.
```

15. The `Starting Services` section indicates that the Service Pack Installer is starting the NA services. Wait for the installation to finish.

```
================================================================================
Starting Services ...
--------------------

This may take up to a few minutes.

................................
```

16. For the `FIPS MODE` section, read the information about the Federal Information Processing Standardization (FIPS) mode in NA10.30. (For more information about the FIPS mode, see the *Administration guide*.). Press **Enter**.

```
================================================================================
FIPS MODE
---------

FIPS mode is enabled by default. The default encryption algorithm is AES with
256 bits key length, and the default hashing algorithm is SHA-512. For
information about changing the default encryption and hashing algorithms, see
the HPE Network Automation Software Administration Guide.

PRESS <ENTER> TO CONTINUE:
```

17. For the `HPE Marketplace` section, read the information about HPE Marketplace. In the **HPE Marketplace** message box, read the information about HPE Marketplace. If the NA core server is connected to the Internet, you can use HPE Marketplace to receive free NA driver pack updates and subscription-based network security and compliance updates. Press **Enter**.

18. For the `Installation Complete` section, note the location of the NA root directory, and then press **Enter**.

```
================================================================================
Installation Complete
---------------------

Congratulations. HPE Network Automation Service Pack 10.30 has been successfully
installed to:

/opt/NA
```

19. Relaunch the NA web user interface in a new browser session.

Send documentation feedback

If you have comments about this document, you can contact the documentation team by email. If an email client is configured on this system, click the link above and an email window opens with the following information in the subject line:

Feedback on Install and Upgrade guide (Network Automation 10.30)

Just add your feedback to the email and click send.

If no email client is available, copy the information above to a new message in a web mail client, and send your feedback to network-management-doc-feedback@hpe.com.

We appreciate your feedback.