Power Protection Manager (PPM) Manual
NEXT UPS Systems
Power Protection Manager (PPM) for VMware vCenter Server – v1.1.0 (build vmw-vcs.20250625)

BELGIUM

NEXT UPS Systems BV

Releghem Business Park
Poverstraat 138
1731 Relegem
Belgium

+32 2 540 89 14
info@nextups.eu
www.nextups.eu

THE NETHERLANDS

NEXT UPS Systems BV

Winthontlaan 200
3526KV Utrecht
The Netherlands

+31 492 54 18 17
info@nextups.eu
www.nextups.eu

DISCLAIMER

Software disclaimer and limited license

Scope.

By installing, copying, downloading, accessing or otherwise using the Software Product, you agree to be bound by the terms of this agreement. If you do not agree to the terms of this agreement, you may not install or use the Software Product.

Definitions.

"Software Product" means the Power Protection Manager (PPM) for VMware vSphere and VMware vCenter Server software and any corrections, patches, service packs, updates or upgrades thereto that Next UPS Systems or any of its affiliates provides or makes available to you.

"Next UPS Systems" means Next UPS Systems, a private limited company with company number 0846.607.387, with registered office situated at Poverstraat 138, 1731 Relegem, Belgium.

"Hardware" means any and all hardware components the Software Product interacts with, as provided by Next UPS Systems.

"VMware vSphere" and **"VMware vCenter Server"** mean third party software products commercialized by Broadcom Inc., a Delaware corporation headquartered in Palo Alto, California, to which a valid license is required in order to operate the Software Product,

License Grant.

Subject to the terms and conditions of this agreement, Next UPS Systems grants to you a non-exclusive, non-assignable and limited license to use the Software Product with the Hardware for your internal business operations.

You acknowledge and agree that all intellectual property rights that vest in the Software Product will remain with Next UPS Systems and nothing in this agreement will be considered a transfer of (intellectual property) rights to you.

Restrictions.

Notwithstanding anything to the contrary in this agreement:

a) **Limitations on reverse engineering, de-compilation, and disassembly.** Except to the extent otherwise required by applicable law, you may not reverse engineer, decompile, or disassemble the Software Product, or attempt to do any of these things, or otherwise attempt to derive or gain access to the source code of the Software Product. Furthermore, you may not enable or attempt to enable any additional functionality within the Software Product.

b) **Separation of components.** The Software Product is a single product. Its component parts may not be separated.

c) **Rental.** You may not rent, lease, lend, license or sublicense the Software Product to third parties.

d) **Third Party Technology.** The Software Product requires the use of the VMware vSphere and VMware vCenter Server software products which are owned by a third party and licensed to you for use with the Software Product and the Hardware (the "**Third Party Technology**"). The Third Party Technology is licensed to you under the terms of the relevant Third Party Technology license agreement and you shall be obligated to comply in all respects with the terms and conditions of each such Third Party Technology license agreements. In the event of a conflict between the terms of this agreement and the terms of any Third Party license agreement, the terms of such Third Party license agreement shall govern. The terms of such Third Party Technology license agreements may be found on the Third Party Technology web site.

   You acknowledge and agree that valid VMware vSphere and VMware vCenter Server software product licenses are required for the Software Product to perform.

Back-up, testing and development.

You may not copy the Software Product, in whole or in part, except that you may make and install one copy of the Software Product for use solely for your back-up, testing and development purposes, with it being understood that such copy shall be used only for internal business operations in the context of which this agreement is concluded, and not for commercial and/or production purposes (including without limitation the distribution of any code and/or materials created with such copy to any third party). Your license to utilize such copy shall terminate immediately upon the termination of your license to the Software Product of which it is a copy.

No Warranty.

The Software Product is offered at no cost to you and is provided "as is". Next UPS Systems and its suppliers hereby expressly disclaim all warranties, whether express, implied, statutory or otherwise, with respect to the Software Product, documentation, media and any other services and materials provided to you under this agreement, including all implied warranties of merchantability, quality, fitness for a particular purpose, non-infringement and warranties arising from a course of dealing, usage or trade practice.

Without limitation to the foregoing, Next UPS Systems provides no warranty or undertaking, and makes no representation of any kind, whether express, implied, statutory or otherwise, that the Software Product will meet your requirements, achieve any intended results, be compatible or work with any other software, applications, systems or services operate without interruption, meet any performance or reliability standards or be error-free.

Next UPS Systems entire responsibility and obligation, and your exclusive remedy, for the operation of the Product shall be for Next UPS Systems to use commercially reasonable efforts to provide support services in order to enable the Software Product to perform substantially in accordance with its documentation.

All tickets, issues, errors shall be delivered promptly to Next UPS Systems, at:

E-mail: info@nextups.eu
Telephone: +32(0)25408914

Limitation of Liability.

Next UPS Systems will only be liable for direct damages to the extent not prohibited by applicable law.

In no event, whether based in contract, tort (including negligence), product liability or otherwise, shall Next UPS Systems be liable to you or any other party for any lost profits, lost or damaged data, or any indirect, incidental, special, consequential or punitive damages whatsoever, whether arising out of, or in connection with, the download, installation or use of, or the inability to use the Software Product or any other matter relating to the Software Product or this agreement.

You acknowledge and agree that the maximum aggregate liability of Next UPS Systems and its affiliates and their respective directors, officers, employees, agents and representatives for all claims under any and all circumstances relating to the Software Product will be limited to the fees paid to Next UPS Systems or any supplier in respect of the Hardware the Software Product interacts with in the 6 (six) month period preceding the claim in respect of such liability.

Term and Termination.

The license granted under this agreement shall be of an indefinite duration.

The license shall terminate:

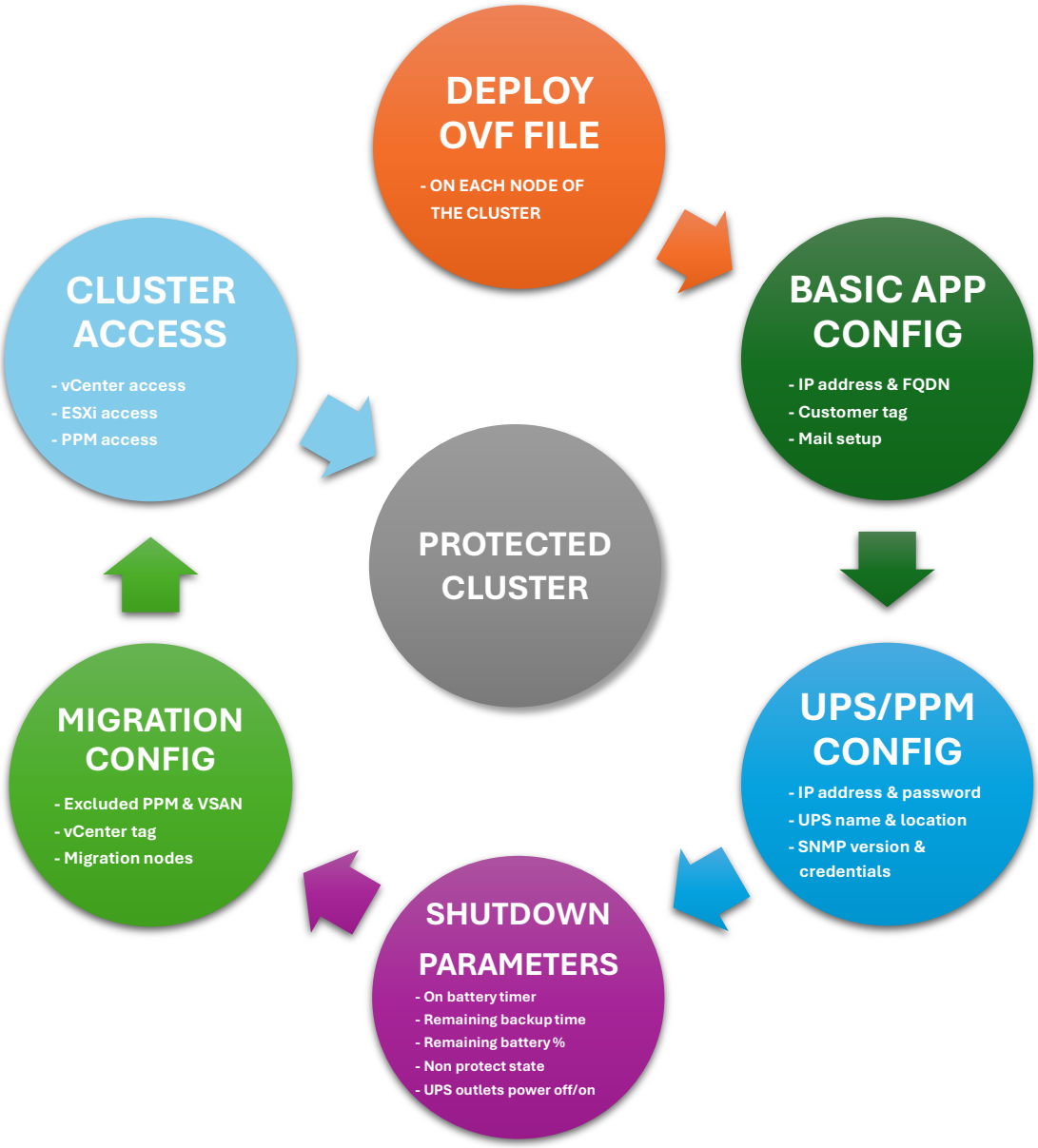
- Upon termination of one of the Third Party Technology licenses; or
- Upon termination by Next UPS Systems, providing a written notice to this end and a notice period of 3 (three) months.

Upon termination of this agreement for whatever reason, the license hereunder shall terminate and you shall immediately cease to have any right to use or possess the Software Product or any related documentation. Within 10 (ten) business days after the termination of this agreement, you shall provide to Next UPS Systems a written certification from an executive officer stating that you are no longer using the Software Product for any purpose and all copies of the Software Product and supporting documentation have been destroyed by you.

1. Overview of the software and its features

NEXT UPS Systems Power Protection Manager (PPM) is a virtual appliance which communicates with SNMP/WEB Interface II (Network Monitoring Card) for UPSs. PPM provides event logs, user notification and protects operation systems to shutdown gracefully. With PPM, applications can save data and documents before the operating system shuts down.

Installation & configuration overview:



2. Requirements for pre-installation (system requirements)

- The PPM virtual appliance can be installed on VMware vSphere 8.0 and up, managed by VMware vCenter Server 8.0 and up.
- 2 vCPU
- 2GB vMemory
- 25GB free space on datastore

3. Steps and instructions for installation

Install the virtual appliance on each node in the cluster. For cluster overview and configuration of the migration process see chapter **4.2.4 MIGRATION CONFIGURATION**.

For deploying a virtual appliance in VMware vCenter Server to install Power Protection Manager (PPM), you need to:

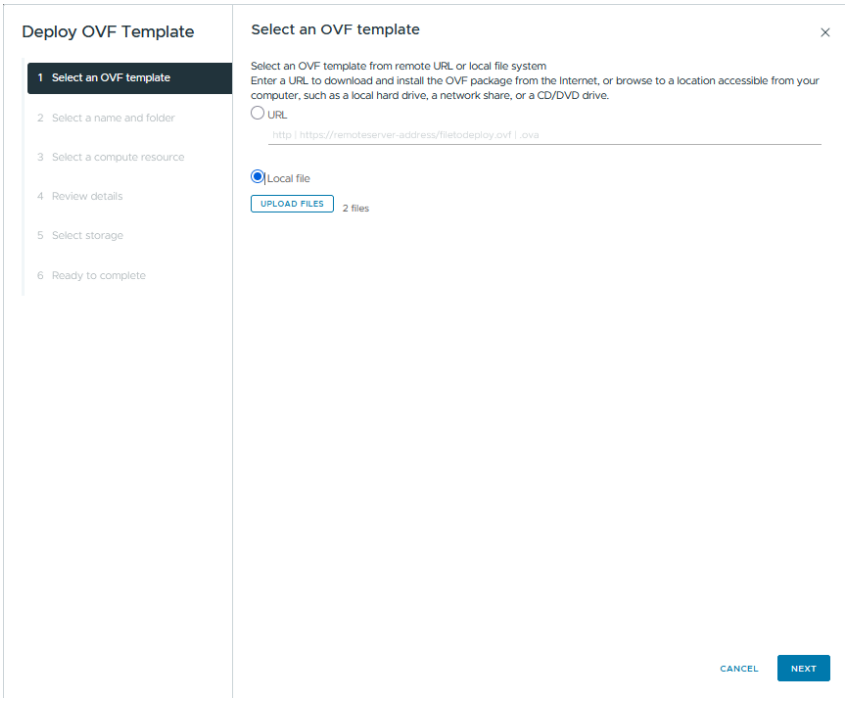
STEP 1.
Download the PPM zip file on https://nextups.eu/software/ppm-vmware/#downloads

Extract the files from the downloaded file NEXTUPS-PPM-VMWARE-VCS_v1.1.0.zip to an accessible location.

- NEXTUPS-PPM-VCS.ovf
- NEXTUPS-PPM-VCS-0.vmdk

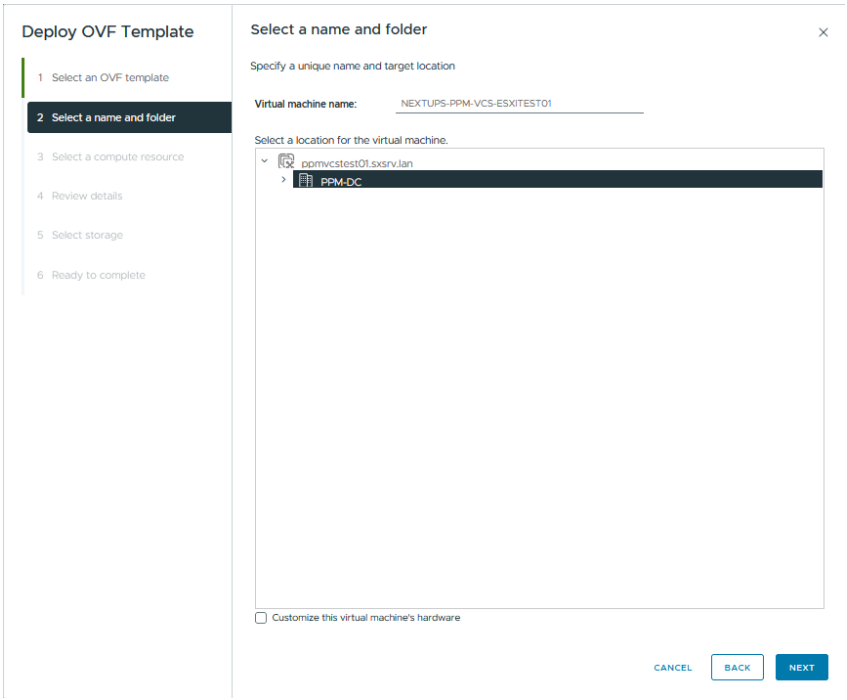
STEP 2.
Connect to VMware vCenter using a web browser and log in as a user that has permission to create, start, and stop virtual machines.

STEP 3.
Select 'Deploy OVF Template' and select the two locally extracted files:



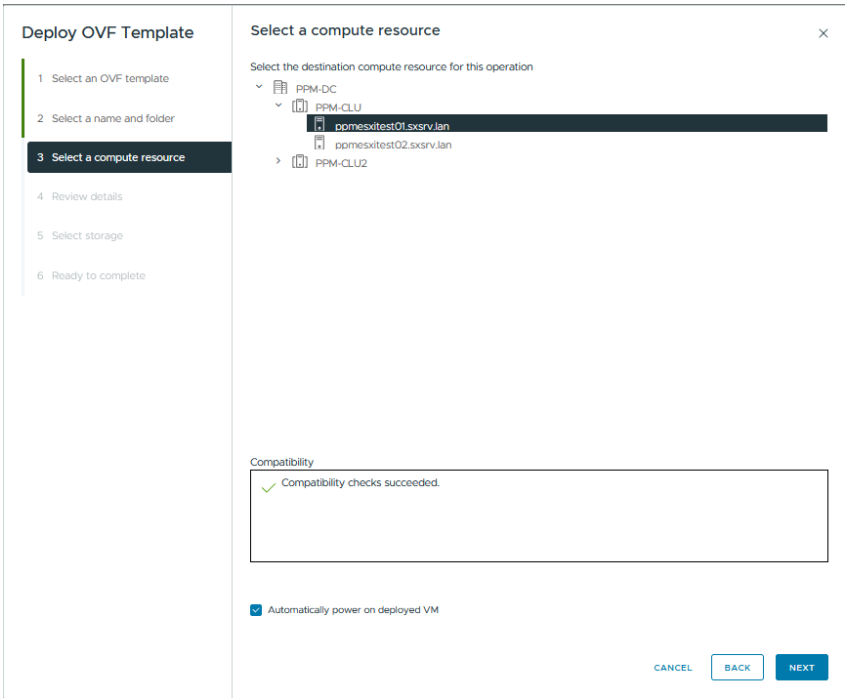
Click NEXT to proceed

STEP 4.
Enter a name for the virtual machine, e.g. NEXTUPS-PPM-VCS-ESXITEST01, and select a location (datacenter) for the virtual machine:



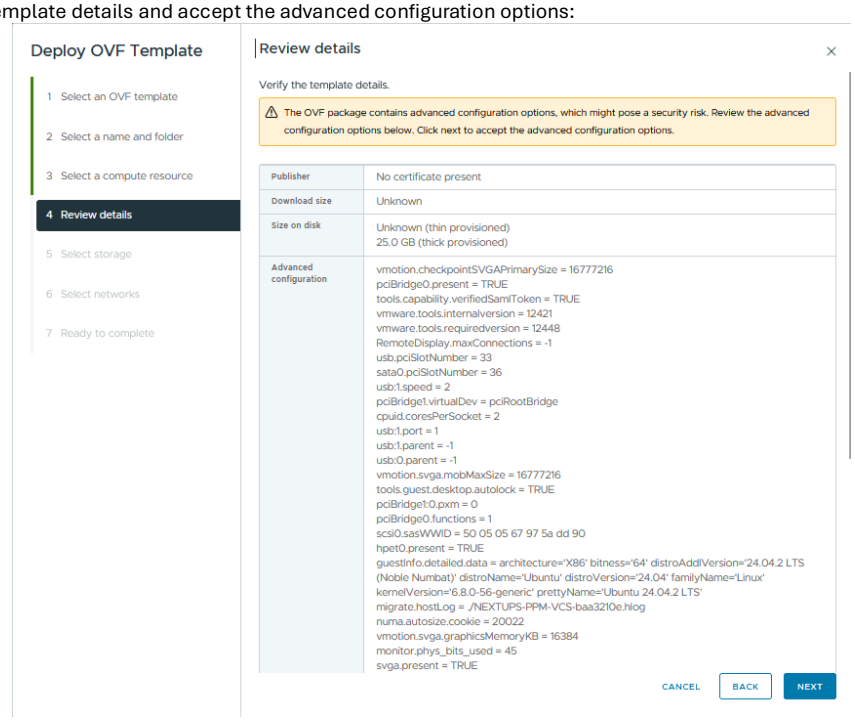
Click NEXT to proceed

STEP 5.
Select the desired node in the cluster and check the 'Automatically power on deployed VM' box:
PPM needs to be installed on each node in the cluster. For cluster overview and configuration of the migration process see chapter **4.2.4 MIGRATION CONFIGURATION**.



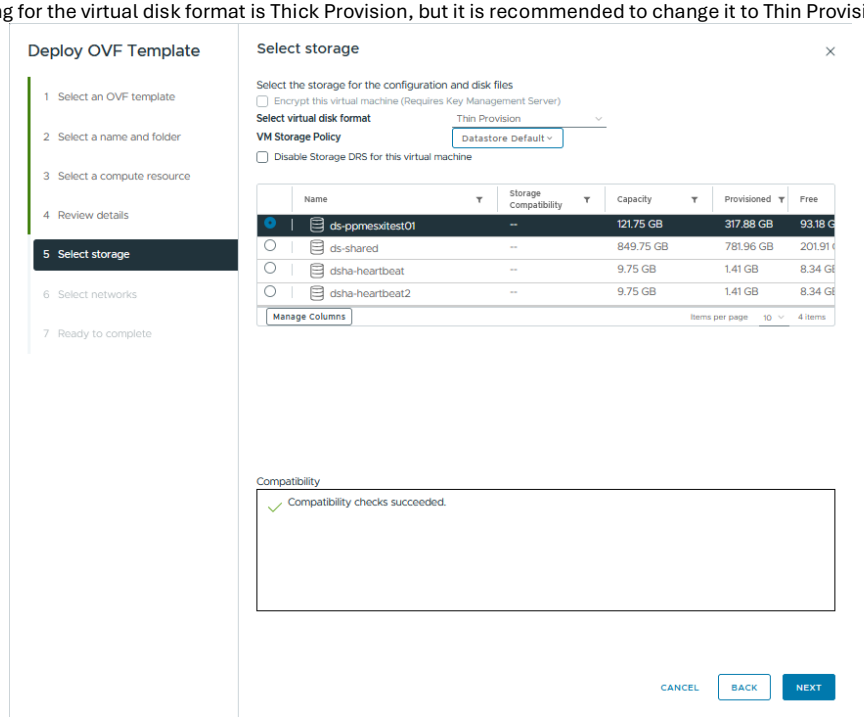
Click NEXT to proceed

STEP 6.
Review the template details and accept the advanced configuration options:



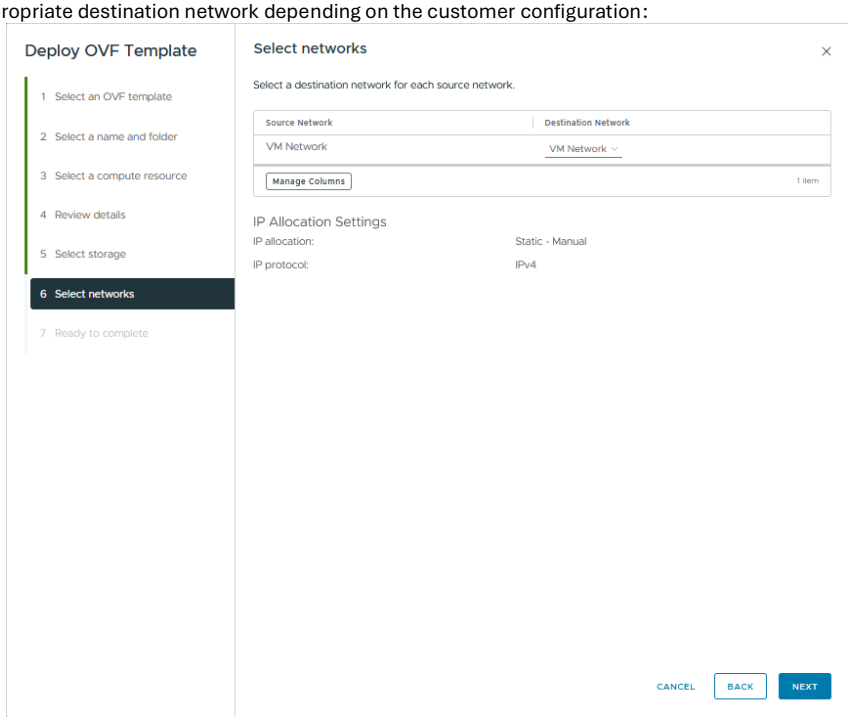
Click NEXT to proceed

STEP 7.
Select an appropriate local datastore depending on the customer configuration.
Default setting for the virtual disk format is Thick Provision, but it is recommended to change it to Thin Provision:



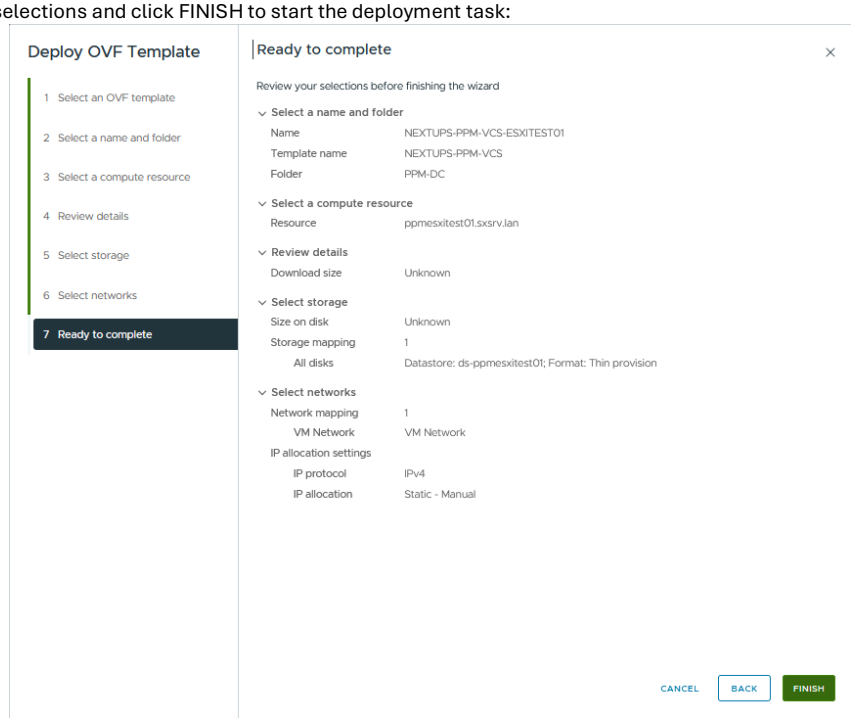
Click NEXT to proceed

STEP 8.
Select an appropriate destination network depending on the customer configuration:



Click NEXT to proceed

STEP 9.
Review your selections and click FINISH to start the deployment task:



Repeat these steps for each node in the cluster.
Wait for the VM's to be created and proceed to **4.2 CONFIGURATION** for configuration of PPM(s), UPS(s) and migration and shutdown parameters.

4. Configuration and instructions for setup

4.1 PPM COMMMANDS INDEX

-h, --help	Display this help message
--release-notes	Display release notes
--set-appliance-ip-dhcp	Set appliance DHCP IP configuration
--set-appliance-ip-static	Set appliance STATIC IP configuration
--set-ppm-password	Set ppm user password
--mail-setup	Set mail configuration
--mail-test	Test mail configuration
-S, --start	Start PPM monitoring
-R, --restart	Restart PPM monitoring
-K, --stop	Stop PPM monitoring
-s, --status	Display UPS system information
-l, --logs	Display all logs
-c, --clear	Clear all logs
-e, --export	Export log file
-c, --config	Display configuration file
-u, --update	Update (edit) configuration file
customer_tag	Customer tag (name) for use with mail communication
timezone	SNTP time zone
ups1_ip	UPS1 IPv4 address
ups1_pass	UPS1 root password
ups2_ip	UPS2 IPv4 address
ups2_pass	UPS2 root password
upssnmp_version	UPS SNMP version
upssnmpv2c_community	UPS SNMP v2c private configured community string
upssnmpv3_user	UPS SNMP v3 user
upssnmpv3_userauth	UPS SNMP v3 user authentication
upssnmpv3_userauthprotocol	UPS SNMP v3 user authentication protocol: MD5
upssnmpv3_userpriv	UPS SNMP v3 user private password
upssnmpv3_seclevel	UPS SNMP v3 security level
upsnonprotectstate_action	Action to take when UPS state is 'Unknown', 'Off/Standby' or 'On Bypass'
upsonbattery_timer	Timer to elapse before executing shutdown procedure
upsoutlets_timeroff	Timer in minutes (m) to elapse before UPS power outlets are powered off
upsoutlets_timeron	Timer in minutes (m) to elapse before UPS power outlets are powered on
upsremaining_minutes	UPS minimum remaining backup time in minutes before executing shutdown procedure
upsremaining_percentage	UPS minimum remaining backup percentage before executing shutdown procedure
ppmvm_tag	PPM appliance virtual machine tag (name). This virtual machine will be excluded from the migration process
vsanvm_tag	VSAN (HCI storage) appliance virtual machine tag (name). This virtual machine will be excluded from the migration process
vcsvm_tag	vCenter appliance virtual machine tag (name). When set with the virtual machine name of the vCenter appliance, this VM will receive a graceful shutdown before the node (hypervisor) itself shuts down
vcs_user	vCenter admin user
vcs_pass	vCenter admin password
vcs_fqdn	vCenter FQDN

ppmownernodeesxi_user	PPM owner node ESXi root user
ppmownernode_ip	PPM owner node IPv4 address
ppmownernode_fqdn	PPM owner node FQDN
ppmownernodeesxi_pass	PPM owner node ESXi root password
esxi1migrationnode_ip	ESXi1 migration node IPv4 address
esxi1migrationnode_fqdn	ESXi1 migration node FQDN
esxi2migrationnode_ip	ESXi2 migration node IPv4 address
esxi2migrationnode_fqdn	ESXi2 migration node FQDN
esxi3migrationnode_ip	ESXi3 migration node IPv4 address
esxi3migrationnode_fqdn	ESXi3 migration node FQDN
mail_recipient1	Alert mail recipient1
mail_recipient2	Alert mail recipient2

-i, --import	Import configuration from given file
-e, --export	Export configuration file

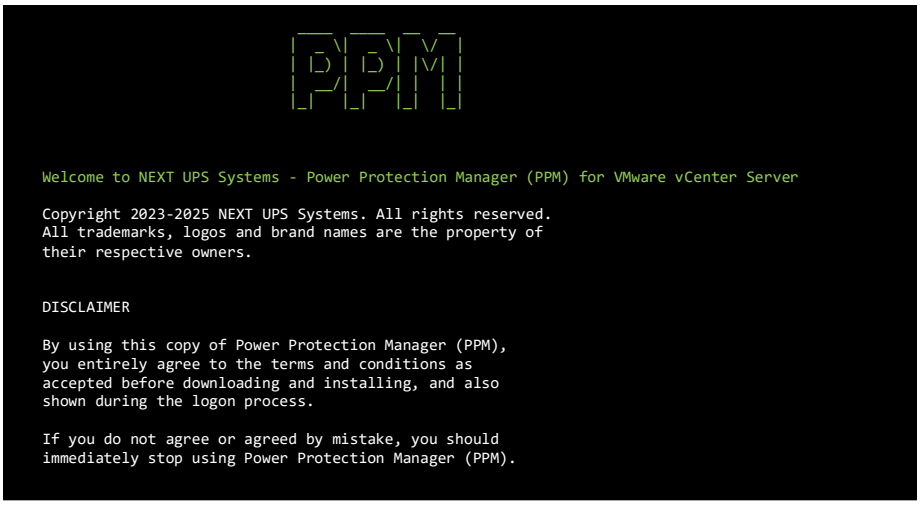
4.2 CONFIGURATION

4.2.1 BASIC APPLIANCE CONFIGURATION

This section covers all commands for configuring the PPM appliance and email notification.

Enter the appliance through a SSH connection:
-Set Function keys and keypad to Linux or VT100+ (applies when using PuTTY as SSH client)
-Log in on the virtual appliance using its IP address and port 22

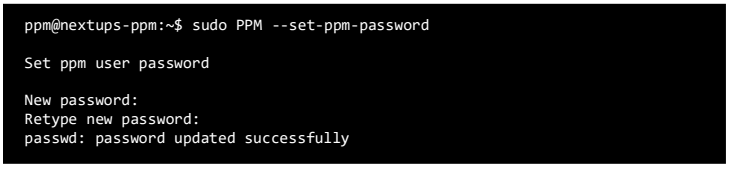
Log in using 'ppm' as user and 'ppm' as default password.



- **Set the PPM password**

After the first log in, it is recommended to change the default password by use of the command:

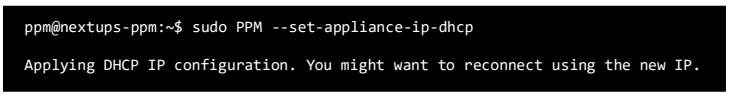
Command: sudo PPM --set-ppm-password
Return Output:



- **Set the appliance DHCP or STATIC IP address**

It is strongly advised that the IP address of the appliance is set to a static configuration, however a DHCP setting is also possible:

Command: sudo PPM --set-appliance-ip-dhcp
Return Output:



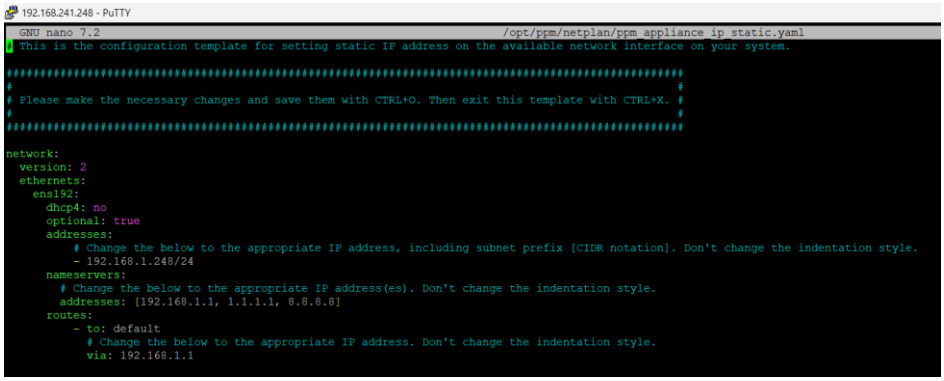
Check your DHCP server to retrieve the assigned IP address.

To set the IP settings manually, use the following command:

Command: sudo PPM --set-appliance-ip-static

Change the IP address/subnet mask/DNS/routes(gateway) according to your network settings in the pop-up editor window by changing the corresponding values and save with Ctrl-O, exit with Ctrl-X.

Return Output:



- **Set customer tag**

The customer tag (name) is a variable to identify your configuration. It will be used in the configuration files and in the s ubject field for mail communication:

Command: sudo PPM -c -u customer_tag '<value>'

[IMPORTANT] Only alphanumeric and _- characters are allowed.

Return Output:

```
sudo PPM -c -u customer_tag 'NUS-EMEA'

PPM: customer_tag option has been updated.
PPM: Restarting service to apply new value...
```

- **Set the SNTP time zone**

Default setting is 'Europe/Brussels'. Change if desired according to your current time zone:

Command: sudo PPM -c -u timezone 'Europe/Brussels'

[IMPORTANT] Possible values are only the official TZ identifier names, see:
https://en.wikipedia.org/wiki/List_of_tz_database_time_zones for the full list.
Example values are: Europe/Brussels | Europe/Amsterdam | Europe/Paris | GB | UTC | Etc/GMT+3 | CET | CEST

Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c -u timezone 'Europe/Brussels'

PPM: timezone option has been updated.
```

- **Set mail notification**

For configuring the mail notifications, an SMTP server, TLS encryption port, sender account, password and at least 1 recipient must be configured:

Command: sudo PPM --mail-setup
Return Output:

```
ppm@nextups-ppm:~$ sudo PPM --mail-setup

Enter the SMTP server: smtp.office365.com
Enter the SMTP port (TLS): 587
Enter the sender account address: service@nextups.eu
Enter the sender account password:

Enter the mail recipient1 address: service@nextups.eu
Enter the mail recipient2 address or press [ENTER] to leave blank:

Sending test mail From: service@nextups.eu, To: service@nextups.eu, SMTP:
smtp.office365.com, Port: 587
Please check your inbox.
```

A test mail will be sent, check the inbox of the provided recipient.
Both mail recipients can be reconfigured separately:

Command: sudo PPM -c -u mail_recipient1 '<value>'
sudo PPM -c -u mail_recipient2 '<value>'

Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c -u mail_recipient2 'service2@nextups.eu'

PPM: mail_recipient2 option has been updated.
PPM: Restarting service to apply new value...
```

After configuration of the mail recipients, the settings can be checked by sending a test mail:

Command: sudo PPM --mail-test
Return Output:

```
ppm@nextups-ppm:~$ sudo PPM --mail-test

Sending test mail From: service@nextups.eu, To: service@nextups.eu
Please check your inbox.
```

Check the configuration file

After modifying the values, the settings can be checked by displaying the configuration file:

Command: sudo PPM -c
Return Output:

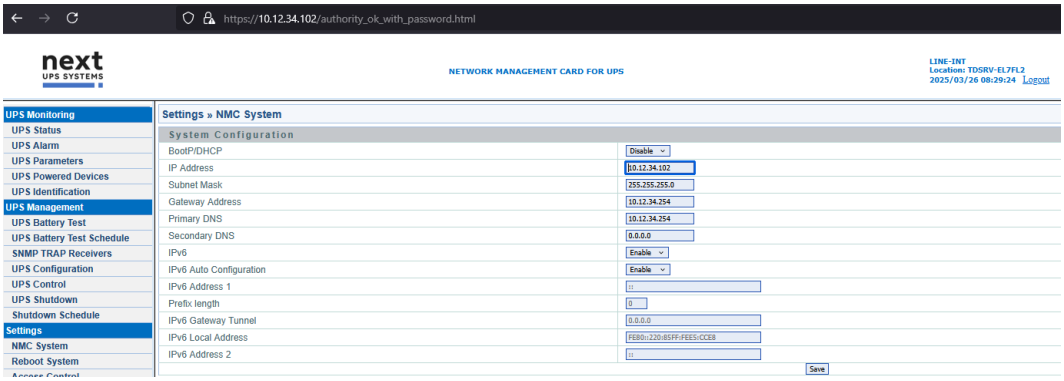
```
ppm@nextups-ppm:~$ sudo PPM -c

NEXT UPS Systems - Power Protection Manager (PPM) for VMware vCenter Server - v1.1.0 (build vmw-
vcs.20250625)

Configuration file:

CUSTOMER TAG                                          :   NUS-EMEA
SNTP TIMEZONE                                         :   Europe/Brussels

UPS1 IP ADDRESS                                       :
UPS1 PASSWORD                                         :
UPS2 IP ADDRESS                                       :
UPS2 PASSWORD                                         :
UPS SNMP VERSION                                      :   3
UPS SNMP V2C COMMUNITY                                :   private
UPS SNMP V3 USER NAME                                 :
UPS SNMP V3 USER AUTHENTICATION PASSWORD              :
UPS SNMP V3 USER AUTHENTICATION PROTOCOL              :   MD5
UPS SNMP V3 USER PRIVATE PASSWORD                     :
UPS SNMP V3 USER SECURITY LEVEL                       :   noAuthNoPriv

UPS NON PROTECT STATE ACTION                          :   donothing
UPS ON BATTERY TIMER (seconds | minutes)              :   disabled
UPS MINIMUM REMAINING BACKUP TIME THRESHOLD (minutes) :   disabled
UPS MINIMUM REMAINING BACKUP PERCENTAGE THRESHOLD (%) :   30

UPS OUTLETS POWER-OFF TIMER (minutes)                 :
UPS OUTLETS POWER-ON TIMER (minutes)                  :

PPM APPLIANCE VIRTUAL MACHINE TAG                     :
VSAN APPLIANCE VIRTUAL MACHINE TAG                    :
VCENTER SERVER APPLIANCE VIRTUAL MACHINE TAG          :

VCENTER SERVER USER                                   :
VCENTER SERVER FQDN                                   :
VCENTER SERVER PASSWORD                               :

PPM OWNER NODE ESXI USER                              :
PPM OWNER NODE IP ADDRESS                             :
PPM OWNER NODE FQDN                                   :
PPM OWNER NODE ESXI PASSWORD                          :

ESXI1 MIGRATION NODE IP ADDRESS                       :
ESXI1 MIGRATION NODE FQDN                             :
ESXI2 MIGRATION NODE IP ADDRESS                       :
ESXI2 MIGRATION NODE FQDN                             :
ESXI3 MIGRATION NODE IP ADDRESS                       :
ESXI3 MIGRATION NODE FQDN                             :

MAIL SENDER                                           :   service@nextups.eu
MAIL RECIPIENT1                                       :   service@nextups.eu
MAIL RECIPIENT2                                       :
```

4.2.2 UPS/PPM CONFIGURATION

This section covers the configuration for communications with one or two UPSs. See chapter 4.2.3 MIGRATION/SHUTDOWN PARAMETERS for more info on how to configure the timings for the shutdown.

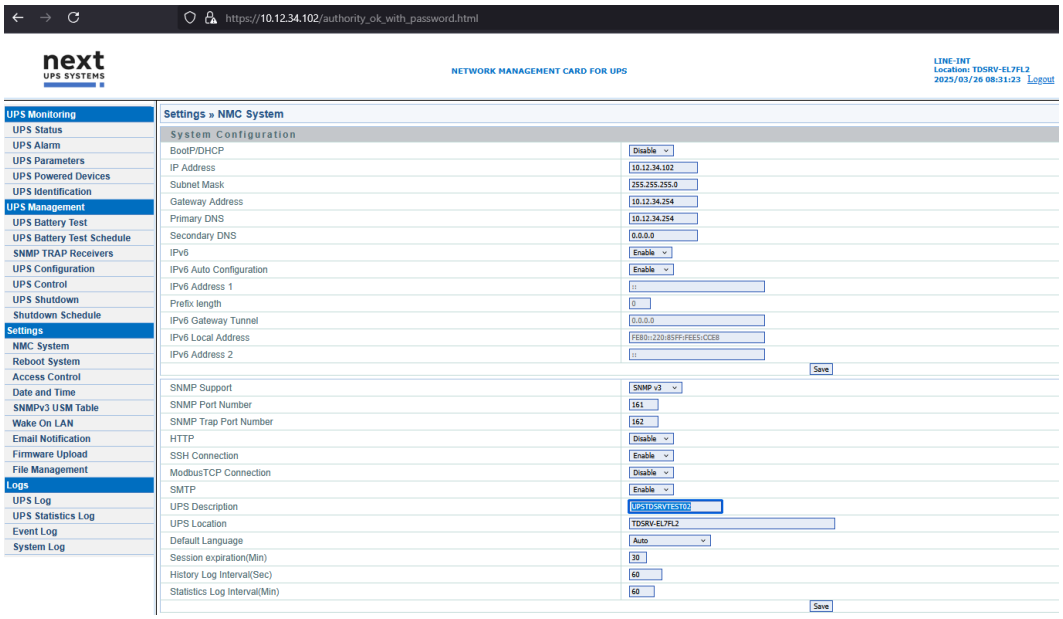
- **Set up the UPS IP address/password and UPS name/location**

First configure the SNMP settings in the **UPS network interface – *NMC System* page**. It is strongly recommended to configure both UPS and PPM with a static IP address in your network. Set the IP address, subnet mask, gateway and DNS and click the save button.



In addition to the IP address, a UPS description (name) and UPS location can be set in the **UPS network interface – *NMC System* page**. Fill in an appropriate name and location for the UPS and click the below save button.

[IMPORTANT] any blank characters (space) in these settings will be converted to _ (underscore) in the PPM.



After configuring the UPS IP address, up to 2 UPSs can be monitored in the PPM, if two UPSs are configured both will be monitored simultaneously for executing the shutdown settings. See chapter 4.2.3 MIGRATION/SHUTDOWN PARAMETERS for more information on the shutdown configuration.

Set the UPS(s) IP address(es) in PPM

To set the IP address(es) of the monitored UPS(s) in PPM:

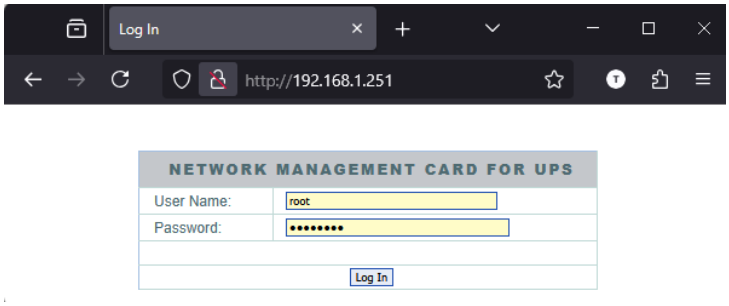
Command: sudo PPM -c -u ups1_ip '<value>'
sudo PPM -c -u ups2_ip '<value>'

Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c -u ups1_ip '10.12.34.102'

PPM: ups1_ip option has been updated.
PPM: Restarting service to apply new value...
```

Set the UPS(s) password(s) in PPM (optional)

In order to use the UPS power outlets off/on control after the shutdown command, it is mandatory to configure the SNMP interface password for the root user, as used in the web interface login.



To set the UPS root password(s) of the monitored UPS(s) in PPM:

Command: sudo PPM -c -u ups1_pass '<value>'
sudo PPM -c -u ups2_pass '<value>'

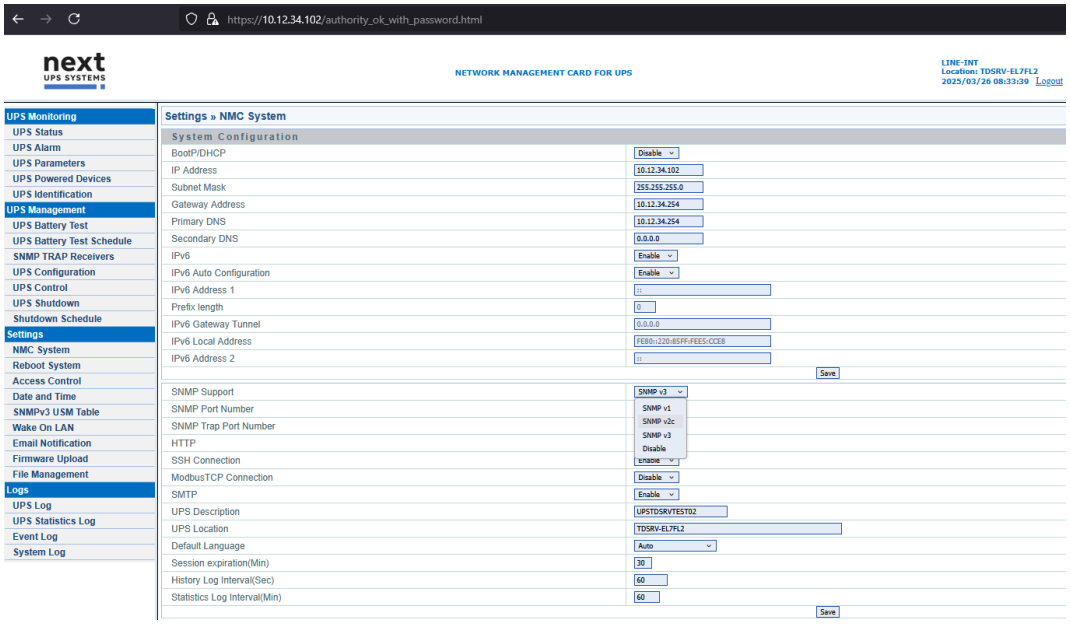
[IMPORTANT] Only alphanumeric and !*#$&:_- characters are allowed

Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c -u ups1_pass 'password'

PPM: ups1_pass option has been updated.
PPM: Restarting service to apply new value...
```

- **Set up the UPS SNMP version**

For secure communication with the UPS either SNMP v2c or SNMP v3 can be used.
Default setting on the network card of the UPS is version SNMP v3 but it can be changed to SNMP v2c. However, for security reasons it is recommended to use SNMP v3.
Set accordingly to the settings in the **UPS network interface – *NMC System* page**, parameter *SNMP Support*: (default setting SNMP v3).
For both communication methods additional settings are mandatory, first configure those on the SNMP interface of the UPS before proceeding the config of the PPM.



Set the selected SNMP version in PPM

Default setting is SNMP v3 but can be changed to SNMP v2c. However, for security reasons it is recommended to use SNMP v3:

Command: sudo PPM -c -u upssnmp_version '<value>'

[IMPORTANT] Valid values are: 2c | 3

Return Output:

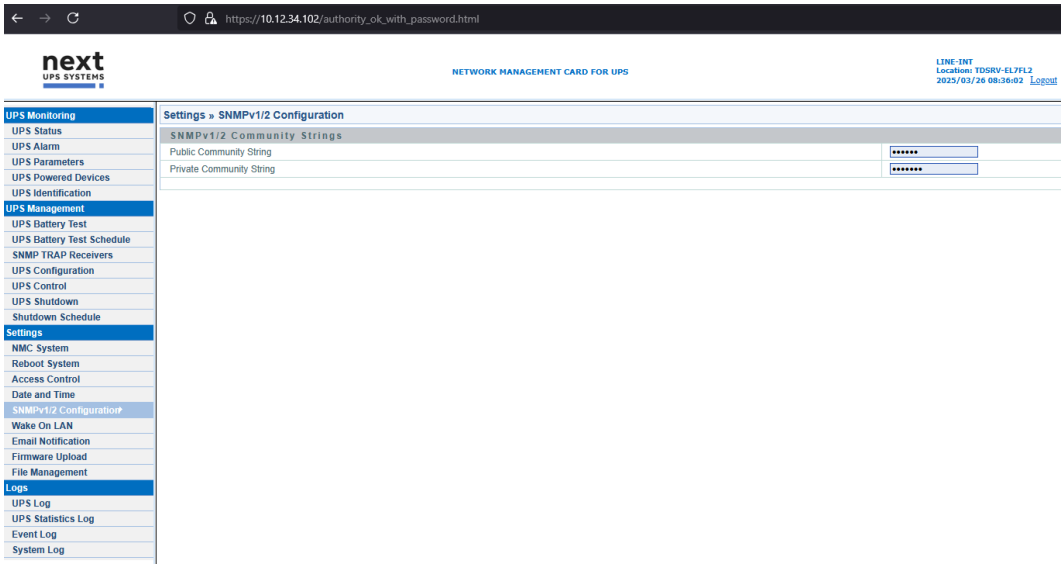
```
ppm@nextups-ppm:~$ sudo PPM -c -u upssnmp_version '3'

PPM: upssnmp_version option has been updated.
PPM: Restarting service to apply new value...
```

- **Set up the SNMP v2c parameters**

By selecting the SNMP v2c communication the private community string is mandatory.

The private community string, as used by PPM, can be changed in the **UPS network interface – *SNMPv1/2 Configuration* page**. The default value for *Private Community String* in the interface is 'private', but can be changed to any value up to 20 characters.

Set the community string in PPM



Default value is 'private'.
Set the community string in PPM accordingly to the private community string in the UPS network interface:

Command: sudo PPM -c -u upssnmpv2c_community '<value>'

[IMPORTANT] Only alphanumeric and ._- characters allowed with a maximum of 20 characters

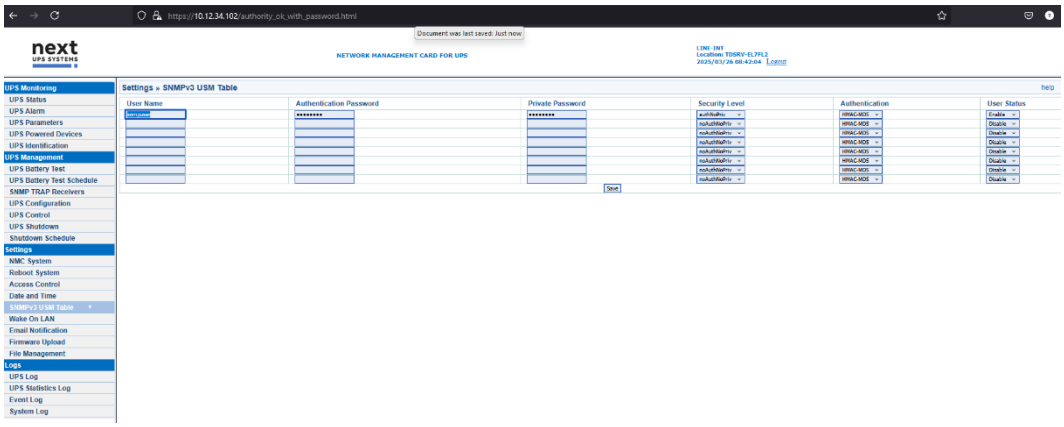
Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c -u upssnmpv2c_community 'private'

PPM: upssnmpv2c_community option has been updated.
PPM: Restarting service to apply new value...
```

- **Set up SNMP v3 parameters**

By selecting the SNMP v3 communication a username, authentication method and password(s) needs to be set.
First configure the credentials and security level in the **UPS network interface – *SNMPv3 USM Table* page**.

[IMPORTANT] Only minor alphanumeric characters are allowed for the SNMPv3 user name.



Set the SNMP v3 parameters of the PPM accordingly to the settings in the UPS network interface.

Set SNMP v3 user name

Set accordingly to the settings in the **UPS network interface – *SNMPv3 USM Table* page**:

Command: sudo PPM -c -u upssnmpv3_user '<value>'

[IMPORTANT] Only minor alphanumeric characters are allowed for the SNMPv3 user name.

Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c -u upssnmpv3_user 'snmpuser'

PPM: upssnmpv3_user option has been updated.
PPM: Restarting service to apply new value...
```

Set SNMP v3 user authentication password

Set accordingly to the settings in the **UPS network interface – *SNMPv3 USM Table* page**:

Command: sudo PPM -c -u upssnmpv3_userauth '<value>'

[IMPORTANT] Only alphanumeric and _- characters are allowed and needs to have a minimum of 8 characters.

Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c -u upssnmpv3_userauth 'snmppass'

PPM: upssnmpv3_userauth option has been updated.
PPM: Restarting service to apply new value...
```

Set SNMP v3 authentication protocol

Only valid value is 'MD5', set accordingly to the settings in the **UPS network interface – *SNMPv3 USM Table* page**:

Command: sudo PPM -c -u upssnmpv3_userauthprotocol '<value>'
Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c -u upssnmpv3_userauthprotocol 'MD5'

PPM: upssnmpv3_userauthprotocol option has been updated.
PPM: Restarting service to apply new value...
```

Set SNMP v3 user private password

Set accordingly to the settings in the **UPS network interface – *SNMPv3 USM Table* page**:

Command: sudo PPM -c -u upssnmpv3_userpriv '<value>'

[IMPORTANT] Only alphanumeric and _- characters are allowed and needs to have a minimum of 8 characters.

Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c -u upssnmpv3_userpriv 'snmppass'

PPM: upssnmpv3_ userpriv option has been updated.
PPM: Restarting service to apply new value...
```

Set SNMP v3 security level

Default value is 'noAuthNoPriv'. Set accordingly to the settings in the **UPS network interface – *SNMPv3 USM Table* page**:

Command: sudo PPM -c -u upssnmpv3_seclevel '<value>'

[IMPORTANT] Valid values are: noAuthNoPriv | authNoPriv | authPriv'

Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c -u upssnmpv3_seclevel 'authNoPriv'

PPM: upssnmpv3_ seclevel option has been updated.
PPM: Restarting service to apply new value...
```

Check the configuration file

All settings can be checked in the configuration file or with below command:

Command: sudo PPM -c
Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c

NEXT UPS Systems - Power Protection Manager (PPM) for VMware vCenter Server - v1.1.0 (build vmw-
vcs.20250625)

Configuration file:

CUSTOMER TAG                                          :   NUS-EMEA
SNTP TIMEZONE                                         :   Europe/Brussels

UPS1 IP ADDRESS                                       :   10.12.34.102
UPS1 PASSWORD                                         :   ********
UPS2 IP ADDRESS                                       :   10.12.34.103
UPS1 PASSWORD                                         :   ********
UPS SNMP VERSION                                      :   3
UPS SNMP V2C PRIVATE COMMUNITY                        :   private
UPS SNMP V3 USER NAME                                 :   snmpuser
UPS SNMP V3 USER AUTHENTICATION PASSWORD              :   snmppass
UPS SNMP V3 USER AUTHENTICATION PROTOCOL              :   MD5
UPS SNMP V3 USER PRIVATE PASSWORD                     :   snmppass
UPS SNMP V3 USER SECURITY LEVEL                       :   authNoPriv

UPS NON PROTECT STATE ACTION                          :   donothing
UPS ON BATTERY TIMER (seconds | minutes)              :   disabled
UPS MINIMUM REMAINING BACKUP TIME THRESHOLD (minutes) :   disabled
UPS MINIMUM REMAINING BACKUP PERCENTAGE THRESHOLD (%) :   30

UPS OUTLETS POWER-OFF TIMER (minutes)                 :   disabled
UPS OUTLETS POWER-ON TIMER (minutes)                  :   disabled

PPM APPLIANCE VIRTUAL MACHINE TAG                     :
VSAN APPLIANCE VIRTUAL MACHINE TAG                    :
VCENTER SERVER APPLIANCE VIRTUAL MACHINE TAG          :

VCENTER SERVER USER                                   :
VCENTER SERVER FQDN                                   :
VCENTER SERVER PASSWORD                               :

PPM OWNER NODE ESXI USER                              :
PPM OWNER NODE IP ADDRESS                             :
PPM OWNER NODE FQDN                                   :
PPM OWNER NODE ESXI PASSWORD                          :

ESXI1 MIGRATION NODE IP ADDRESS                       :
ESXI1 MIGRATION NODE FQDN                             :
ESXI2 MIGRATION NODE IP ADDRESS                       :
ESXI2 MIGRATION NODE FQDN                             :
ESXI3 MIGRATION NODE IP ADDRESS                       :
ESXI3 MIGRATION NODE FQDN                             :

MAIL SENDER                                           :   service@nextups.eu
MAIL RECIPIENT1                                       :   service@nextups.eu
MAIL RECIPIENT2                                       :
```

Check the UPS Status and Communication

After configuring the SNMP settings, the UPS status can be checked by using the status command. It will show the status of the PPM service and configured UPS. Also, the last 10 log entries will be shown.

Command: sudo PPM -s
Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -s

NEXT UPS Systems - Power Protection Manager (PPM) for VMware vCenter Server

Service status                      :   Running
Service version                     :   v1.1.0 (build vmw-vcs.20250625)
Mail agent status                   :   Running

Customer tag                        :   NUS-EMEA

UPS1
----
UPS IP address                      :   10.12.34.102
UPS status                          :   On Line
UPS time on battery                 :   00:00:00 (hh:mm:ss)
UPS battery status                  :   Normal
UPS battery voltage                 :   40.8V
UPS battery capacity                :   100%
UPS battery remaining backup time   :   15 minutes
UPS battery temperature             :   29 degrees Celsius
UPS output load                     :   42%
UPS name                            :   UPSTDSRVTEST02
UPS location                        :   TDSRV-EL7FL2
UPS technology                      :   LINE-INT
UPS SNMP card firmware              :   3.7.0.3
UPS serial number                   :   715319800125


Last 10 logs:
-------------
12-03-2025 01:36:40 - The status of UPS "UPSTDSRVTEST02" with IP "10.12.34.102" is On Line -- no
timer activated (anymore)
12-03-2025 07:42:20 - The status of UPS "UPSTDSRVTEST02" with IP "10.12.34.102" is On Line -- no
timer activated (anymore)
12-03-2025 07:42:26 - The status of UPS "UPSTDSRVTEST02" with IP "10.12.34.102" is On Line -- no
timer activated (anymore)
12-03-2025 09:09:21 - The status of UPS "UPSTDSRVTEST02" with IP "10.12.34.102" is On Line -- no
timer activated (anymore)
12-03-2025 09:09:26 - The status of UPS "UPSTDSRVTEST02" with IP "10.12.34.102" is On Line -- no
timer activated (anymore)
13-03-2025 13:05:02 - The status of UPS "UPSTDSRVTEST02" with IP "10.12.34.102" is On Line -- no
timer activated (anymore)
13-03-2025 13:05:23 - The status of UPS "UPSTDSRVTEST02" with IP "10.12.34.102" is On Line -- no
timer activated (anymore)
13-03-2025 13:06:24 - The status of UPS "UPSTDSRVTEST02" with IP "10.12.34.102" is On Line -- no
timer activated (anymore)
13-03-2025 13:06:39 - Test mail configuration
13-03-2025 13:08:00 - The status of UPS "UPSTDSRVTEST02" with IP "10.12.34.102" is On Line -- no
timer activated (anymore)
```

4.2.3 MIGRATION/SHUTDOWN PARAMETERS

This section covers the configuration of the parameters that will trigger a migration process for the virtual machines in the cluster and the shutdown procedure for the ESXi host(s).
In case of a power failure and UPS working on battery power, 3 events can trigger the shutdown procedure for the configured ESXi host(s):

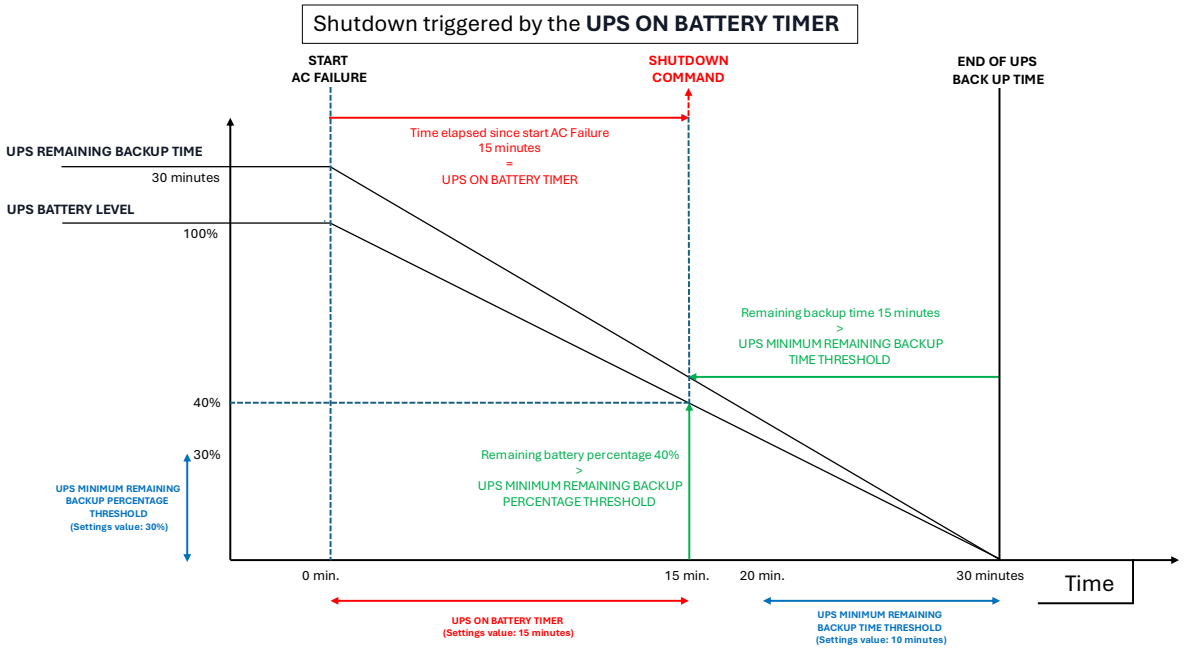
- **UPS ON BATTERY TIMER** (seconds/minutes) reaching a specified value
- **UPS MINIMUM REMAINING BACKUP TIME THRESHOLD** (minutes) drops below a specific value
- **UPS MINIMUM REMAINING BACKUP PERCENTAGE THRESHOLD** (%) drops below a specific value

These 3 events that can trigger the shutdown procedure can be set individually in PPM; any event that occurs first will trigger the shutdown procedure to be sent to the ESXi host(s).

Default settings are that only a UPS MINIMUM REMAINING BACKUP PERCENTAGE THRESHOLD of 30% will trigger the shutdown action. The default settings for the UPS ON BATTERY TIMER and UPS MINIMUM REMAINING BACKUP TIME THRESHOLD are blank and will not be considered.
The settings can be changed by configuring the values for these 3 parameters:

- **UPS ON BATTERY TIMER**

In case of a power failure and the UPS is working on battery power, PPM will launch a timer before sending the shutdown procedure to the ESXi host(s). The UPS ON BATTERY TIMER setting is a value in seconds (s) or minutes (m) to elapse before executing the shutdown procedure.



The timer can be set in seconds or minutes using unit ‘s’ or ‘m’ in the parameter value:

Command: sudo PPM -c -u upsonbattery_timer '<value>'
Example: sudo PPM -c -u upsonbattery_timer '600s'
sudo PPM -c -u upsonbattery_timer '10m'

[IMPORTANT] Default setting is blank. Valid settings are numeric values with additions 's' or 'm' and blank. If set to blank (sudo PPM -c -u upsonbattery_timer '') the UPS ON BATTERY TIMER will not be considered to trigger the shutdown of the ESXi host(s).

Return Output:

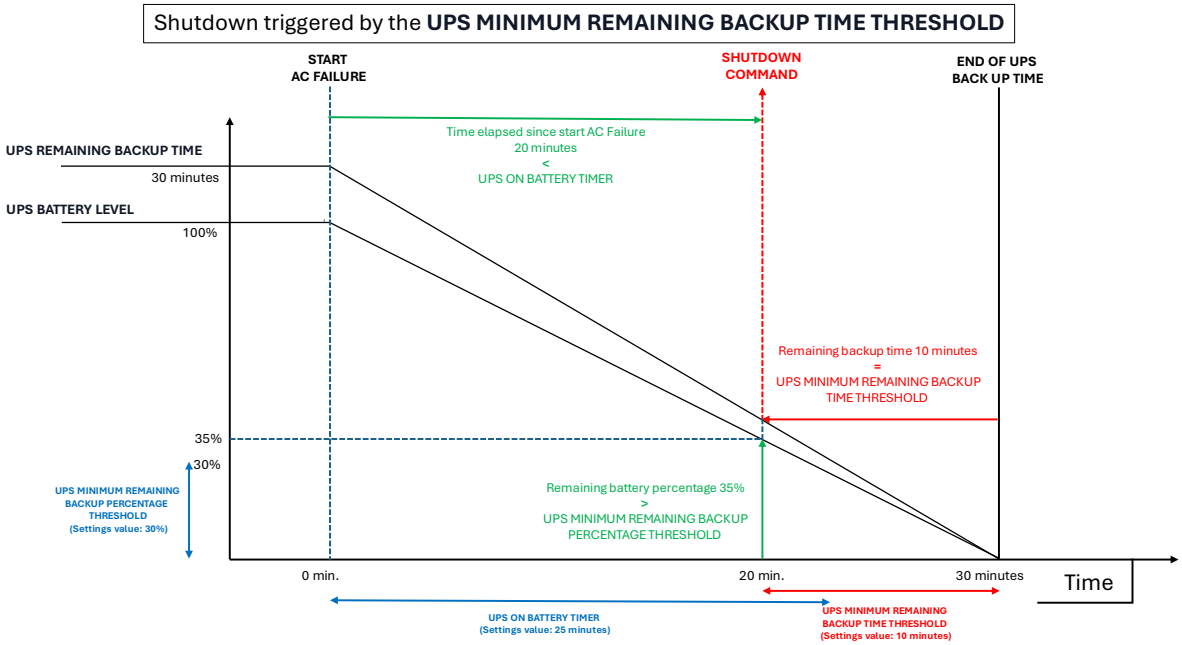
```
ppm@nextups-ppm:~$ sudo PPM -c -u upsonbattery_timer '15m'

PPM: upsonbattery_timer option has been updated.
PPM: Restarting service to apply new value...
```

- **UPS MINIMUM REMAINING BACKUP TIME THRESHOLD**

Depending on the actual load and battery level, the UPS will calculate an estimated remaining *Backup Time*. This time can be checked in the status command (sudo PPM -s) and on the **UPS network interface – *UPS STATUS* page**.

- If two UPSs are configured, the remaining *Backup Times* for both UPSs will be add up to compare with the configured value of the UPS MINIMUM REMAINING BACKUP TIME THRESHOLD.

The UPS MINIMUM REMAINING BACKUP TIME THRESHOLD, as set in PPM, is the minimum value for the remaining backup time before executing the shutdown procedure.



This threshold is being set in minutes (m) in the parameter value:

Command: sudo PPM -c -u upsremaining_minutes '<value>'

[IMPORTANT] Default setting is blank. Valid settings are numeric values and blank. If set to blank (sudo PPM -c -u upsremaining_minutes '') the UPS MINIMUM REMAINING BACKUP TIME THRESHOLD will not be considered to trigger the shutdown of the ESXi host(s).

Return Output:

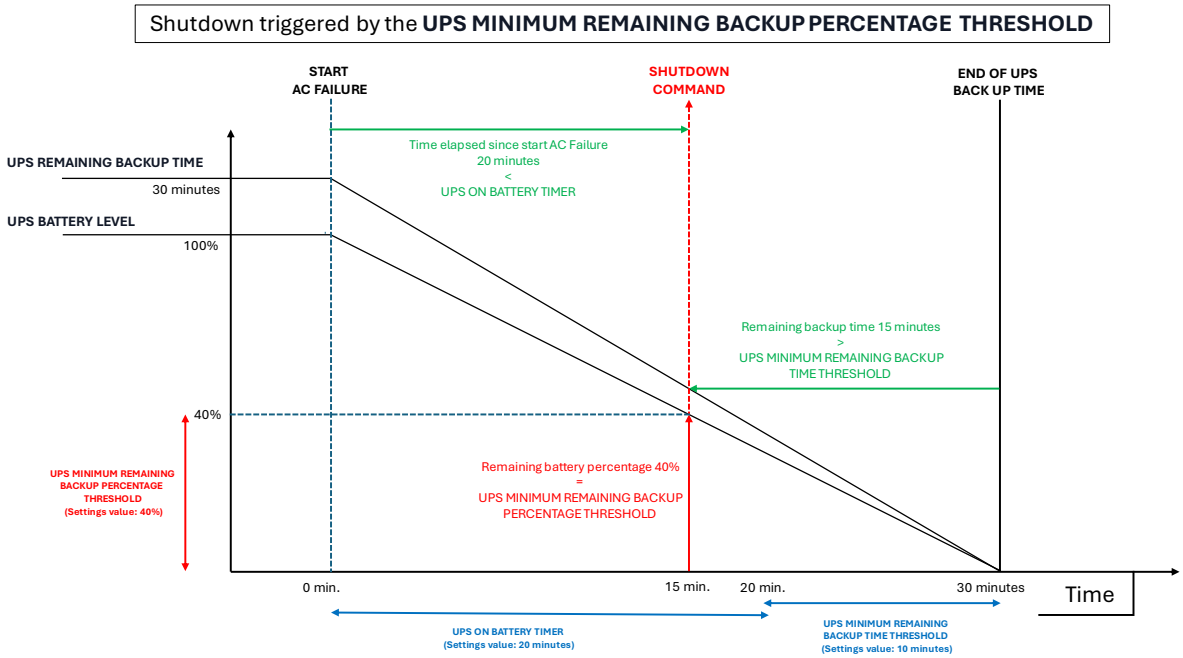
```
ppm@nextups-ppm:~$ sudo PPM -c -u upsremaining_minutes '25'

PPM: upsremaining_minutes option has been updated.
PPM: Restarting service to apply new value...
```

- **UPS MINIMUM REMAINING BACKUP PERCENTAGE THRESHOLD**

The battery level of the UPS depends on the actual state of the battery. This battery level can be checked in the status command (sudo PPM -s) and on the **UPS network interface – *UPS STATUS* page**.

- If two UPSs are configured, the percentages for both will be add up to compare with the configured value of the UPS MINIMUM REMAINING BACKUP PERCENTAGE THRESHOLD.

The UPS MINIMUM REMAINING BACKUP PERCENTAGE THRESHOLD, as set in PPM, is the minimum value for the UPS battery level in percentage (%) before executing the shutdown procedure.



This threshold is being set in percentage (%) in the parameter value:

Command: sudo PPM -c -u upsremaining_percentage '<value>'

[IMPORTANT] Default setting is 30. Valid settings are numeric values from 0 to 100. This value cannot be left blank. If desired not to be used this value can be set to 0.

Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c -u upsremaining_percentage '50'

PPM: upsremaining_percentage option has been updated.
PPM: Restarting service to apply new value...
```

- **UPS NON PROTECT STATE ACTION**

[IMPORTANT] - UPS NON PROTECT STATE ACTION:

In addition to the configuration of the shutdown procedure in case of a power failure, it is also possible to trigger the shutdown when the UPS is in a 'non protective' state. This will be the case if the UPS is in one of these states:

'Unknown', **'Off/Standby'** or **'On Bypass'**, even if the mains supply (UPS input) is still present.
In these states the UPS will not switch to battery power in case of a power failure and therefore the attached devices are not protected.

This setting can be configured through the 'upsnonprotectstate_action' parameter and can be set to:

donothing: PPM will not consider the non-protective state of the UPS. Only in case of a power failure and the UPS is on battery power, it launches the UPS ON BATTERY TIMER and/or checks both values for:
- UPS MINIMUM REMAINING BACKUP TIME THRESHOLD (minutes)
- UPS MINIMUM REMAINING BACKUP PERCENTAGE THRESHOLD (%)

shutdown: In case the UPS is in a 'non protective' state, PPM will act as if the UPS is working on battery power and starts the shutdown procedure for the ESXi host(s) by launching the UPS ON BATTERY TIMER and/or checking both values for:
- UPS MINIMUM REMAINING BACKUP TIME THRESHOLD (minutes)
- UPS MINIMUM REMAINING BACKUP PERCENTAGE THRESHOLD (%)

Command: sudo PPM -c -u upsnonprotectstate_action '<value>'

[IMPORTANT] Default setting is donothing. Valid settings are: donothing | shutdown

Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c -u upsnonprotectstate_action 'donothing'

PPM: upsnonprotectstate_action option has been updated.
PPM: Restarting service to apply new value...
```

- **UPS OUTLETS POWER OFF/ON TIMER**

After triggering the shutdown procedure, PPM can also control the UPS power outlets. This can be done to preserve the remaining battery capacity and/or auto power-on of the server(s) when AC power returns.
The UPS outlets can be controlled by configuring two timers:

- **UPS OUTLETS POWER-OFF TIMER** in minutes
- **UPS OUTLETS POWER-ON TIMER** in minutes

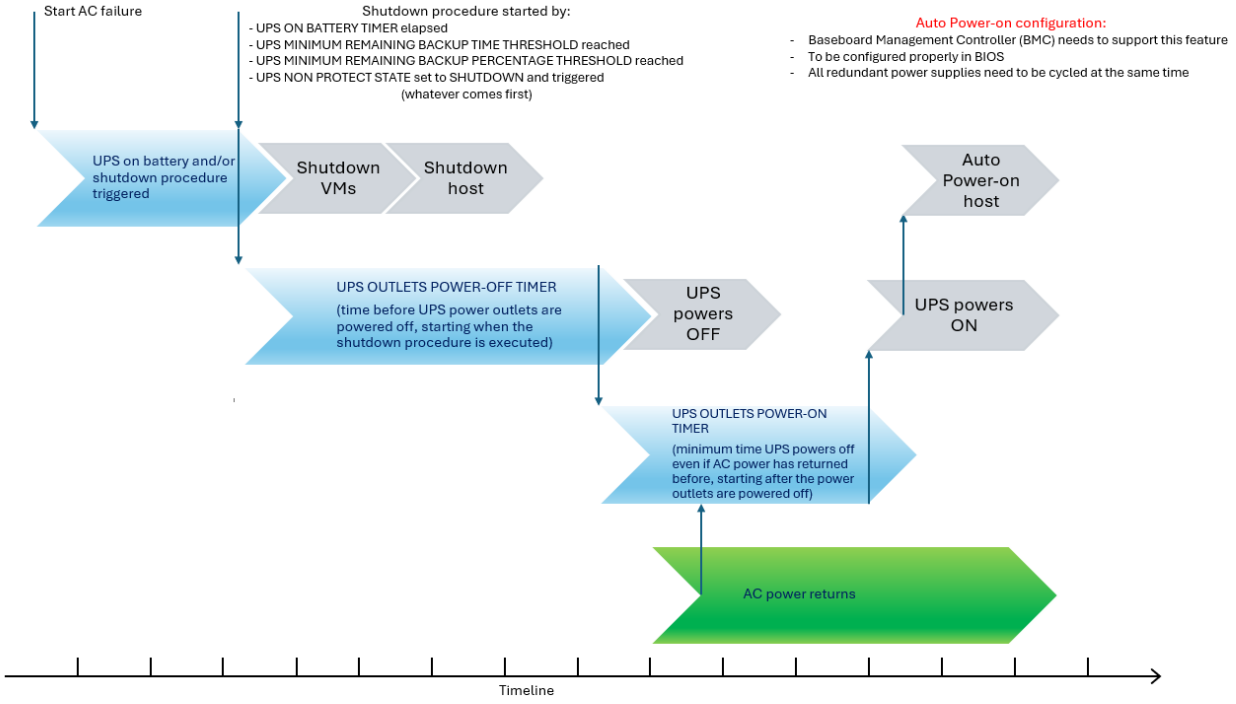
[IMPORTANT] Great care should be taken by setting these timers because of the risk of cutting off the power to the host prior to the complete shutdown of the VMs and the host itself.

To configure these timers, the UPS root password and correct SNMP V2C/V3 settings need to be set in PPM. Otherwise, the configuration overview will show 'unavailable' at these settings.
The **UPS OUTLETS POWER-OFF TIMER** is the time in minutes to elapse before the UPS power outlets are powered off, starting when the shutdown procedure is started.

[IMPORTANT] Consider the maximum time needed for shutting down all VMs and the host itself before setting this timer, as this function will cut off the power to the host when the timer expired.

The **UPS OUTLETS POWER-ON TIMER** is the minimum time in minutes to elapse before the UPS power outlets are powered back on, starting after the power outlets are being powered off. Even if the AC power returns before this timer has elapsed, the UPS will wait the configured amount of time before power on the outlets.

The configuration of the auto power-on function must be set separately in the server BIOS and needs a Baseboard Management Controller (BMC) that supports the auto power-on. In case of multiple power supplies in the host's chassis, all power supplies need to be cycled at the same time for the auto power-on to be effective.



Set the UPS OUTLET POWER-OFF TIMER by this command:

Command: sudo PPM -c -u upsoutlets_timeroff '<value>'

[IMPORTANT] Default setting is disabled. Valid settings are depending on UPS technology. On-line UPSs supports values from 5 to 60, in increments of 5. Line-interactive UPSs supports values from 5 to 10, in increments of 5.

Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c -u upsoutlets_timeroff '15'

PPM: upsoutlets_timeroff option has been updated.
PPM: Restarting service to apply new value...
```

Set the UPS OUTLET POWER-ON TIMER by this command:

Command: sudo PPM -c -u upsoutlets_timeron '<value>'

[IMPORTANT] Default setting is disabled. Valid settings are depending on UPS technology. On-line UPSs supports values from 5 to 60, in increments of 5. Line-interactive UPSs supports values from 5 to 10, in increments of 5.

Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c -u upsoutlets_timeron '5'

PPM: upsoutlets_timeron option has been updated.
PPM: Restarting service to apply new value...
```

Check the configuration file

All settings can be checked in the configuration file or with below command:

Command: sudo PPM -c

Return Output:

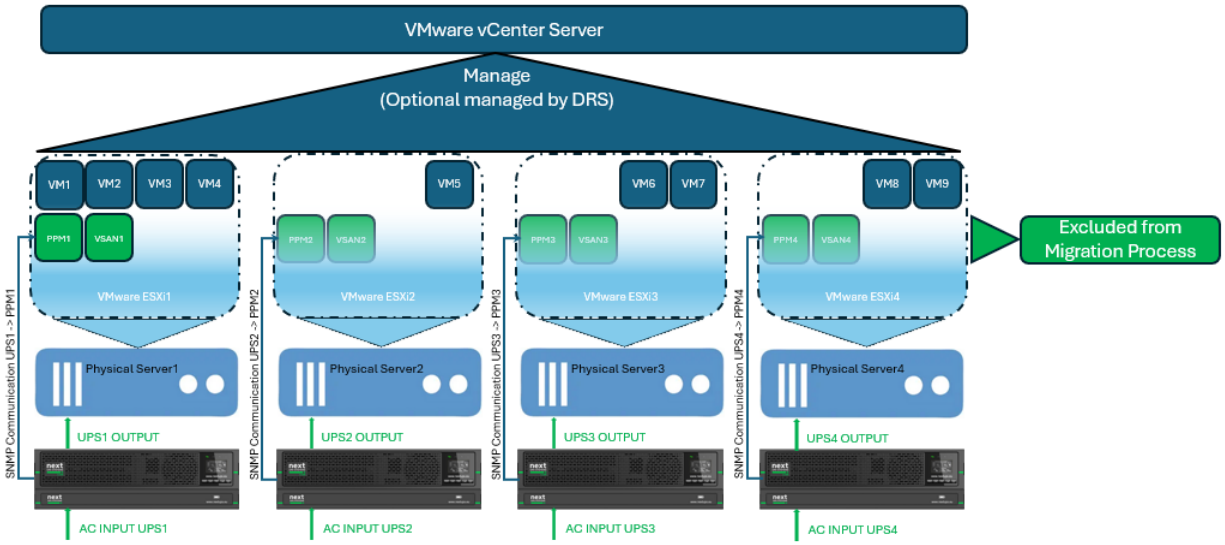
```
ppm@nextups-ppm:~$ sudo PPM -c

NEXT UPS Systems - Power Protection Manager (PPM) for VMware vCenter Server - v1.1.0 (build vmw-
vcs.20250625)

Configuration file:

CUSTOMER TAG                                              :   NUS-EMEA
SNTP TIMEZONE                                             :   Europe/Brussels

UPS1 IP ADDRESS                                           :   10.12.34.102
UPS1 PASSWORD                                             :   ********
UPS2 IP ADDRESS                                           :   10.12.34.103
UPS1 PASSWORD                                             :   ********
UPS SNMP VERSION                                          :   3
UPS SNMP V2C PRIVATE COMMUNITY                            :   private
UPS SNMP V3 USER NAME                                     :   snmpuser
UPS SNMP V3 USER AUTHENTICATION PASSWORD                  :   snmppass
UPS SNMP V3 USER AUTHENTICATION PROTOCOL                  :   MD5
UPS SNMP V3 USER PRIVATE PASSWORD                         :   snmppass
UPS SNMP V3 USER SECURITY LEVEL                           :   authNoPriv

UPS NON PROTECT STATE ACTION                              :   donothing
UPS ON BATTERY TIMER (seconds | minutes)                  :   10s
UPS MINIMUM REMAINING BACKUP TIME THRESHOLD (minutes)     :   15
UPS MINIMUM REMAINING BACKUP PERCENTAGE THRESHOLD (%)     :   30

UPS OUTLETS POWER-OFF TIMER (minutes)                     :   15
UPS OUTLETS POWER-ON TIMER (minutes)                      :   5

PPM APPLIANCE VIRTUAL MACHINE TAG                         :
VSAN APPLIANCE VIRTUAL MACHINE TAG                        :
VCENTER SERVER APPLIANCE VIRTUAL MACHINE TAG              :

VCENTER SERVER USER                                       :
VCENTER SERVER FQDN                                       :
VCENTER SERVER PASSWORD                                   :

PPM OWNER NODE ESXI USER                                  :   root
PPM OWNER NODE IP ADDRESS                                 :
PPM OWNER NODE FQDN                                       :
PPM OWNER NODE ESXI PASSWORD                              :

ESXI1 MIGRATION NODE IP ADDRESS                           :
ESXI1 MIGRATION NODE FQDN                                 :
ESXI2 MIGRATION NODE IP ADDRESS                           :
ESXI2 MIGRATION NODE FQDN                                 :
ESXI3 MIGRATION NODE IP ADDRESS                           :
ESXI3 MIGRATION NODE FQDN                                 :

MAIL SENDER                                               :   service@nextups.eu
MAIL RECIPIENT1                                           :   service@nextups.eu
MAIL RECIPIENT2                                           :
```

4.2.4 MIGRATION CONFIGURATION

This section covers the configuration for migrating or shutting down the Virtual Machines in the Cluster environment before shutting down the nodes powered by the specific UPS(s).

- **Overview of the cluster configuration**

A typical cluster environment will consist of multiple Physical Servers, each hosting a VMware ESXi. The Virtual Machines in the cluster will be managed by the VMware vCenter Server, overviewing the cluster. Optional, it is possible to enable the DRS functionality to spread the virtual machine workloads across the vSphere hosts.
On each ESXi an additional VM will host the Power Protection Manager (PPM), and an optional VM when using a VSAN (HCI storage). These two VM's should be excluded from the migration process in case of a power failure.



Config Overview: (example with 4 nodes in a cluster)

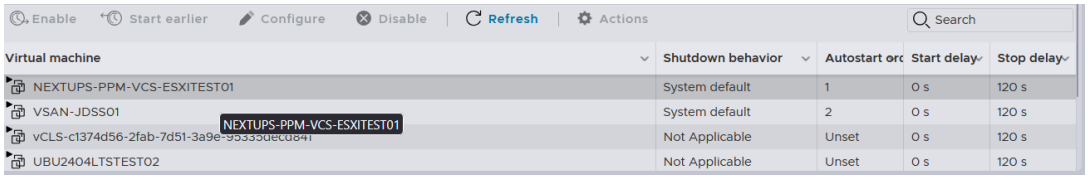
- **Parameters for migration/shutdown configuration**

On each node in the cluster environments (VMware ESXi1-4) the Power Protection Manager (PPM1-4) is installed to configure the migration/shutdown procedure.

In order to exclude the VMs hosting PPM (and an optional VSAN environment) from the migration process, both the ***PPM Appliance Virtual Machine tag*** and ***VSAN Appliance Virtual Machine tag*** need to be configured in PPM.

[IMPORTANT] The value of these tags should correspond to the exact name of the appropriate VM on the ESXi host.

[IMPORTANT] For correct shutdown order of those two VMs, the autostart order should be set on the ESXi host. Please remember that ESXi is using the opposite autostart order of those VMs to define their shutdown order.
The PPM and VSAN autostart order should be set to 1 and 2, so VSAN will shut down first.



Also the ***vCenter Server appliance virtual machine tag*** must be configured in PPM.

[IMPORTANT] The value of this tag should correspond to the exact name of the appropriate VM in the cluster.

PPM will migrate the vCenter Server appliance VM first, before migrating the other HA VMs. The vCenter Server appliance will only receive a graceful shutdown when no other migration node is available.

Up to 3 migration nodes can be configured to determine the sequence in which PPM should try to migrate the VMs before shutting down the ESXi host. At least one migration node is mandatory.
PPM will first try to migrate the active VMs on this host to the set *migration node 1*. If this node is not reachable or lack resources, PPM will try to use *migration node 2* and *migration node 3* (if configured), in this sequence. In case of insufficient resources on the last configured migration node, the active VMs still running on the ESXi host will be put in suspend mode.

[IMPORTANT] If DRS is enabled on the vCenter Server, it will be disabled before starting the migration process.

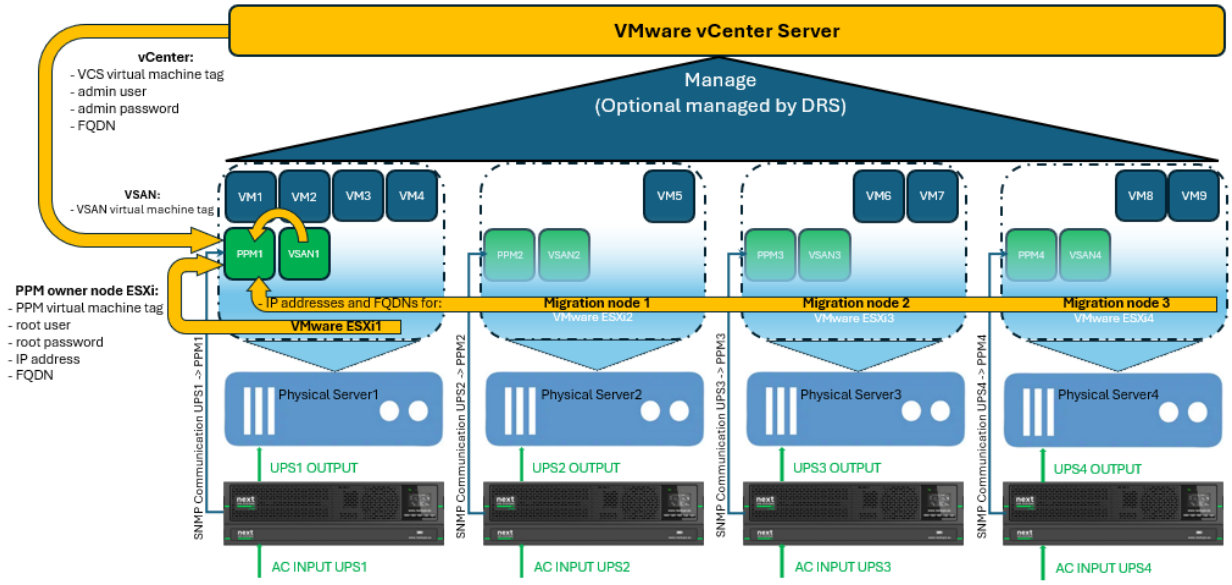
To set the preferred migration order, ***ESXi1-3 migration nodes IP address*** and ***ESXi1-3 migration nodes FQDN*** needs to be configured in each PPM.
In case of a power failure and an UPS is working on battery power, reaching one of the migration/shutdown parameters (as configured in chapter 4.2.3 MIGRATION/SHUTDOWN PARAMETERS) will start the migration process from the node powered by the UPS to the set migration nodes (excluding the VMs for PPM and VSAN).

For accessing and sending the correct migration commands to the vCenter Server appliance, the access parameters should be set:

- ***vCenter admin user***
- ***vCenter admin password***
- ***vCenter FQDN***

For accessing and sending the correct shutdown commands to the parent ESXi host, the access parameters should be set:

- ***PPM owner node ESXi root user***
- ***PPM owner node ESXi root password***
- ***PPM owner node ESXi IP address***
- ***PPM owner node ESXi FQDN***



Parameters overview

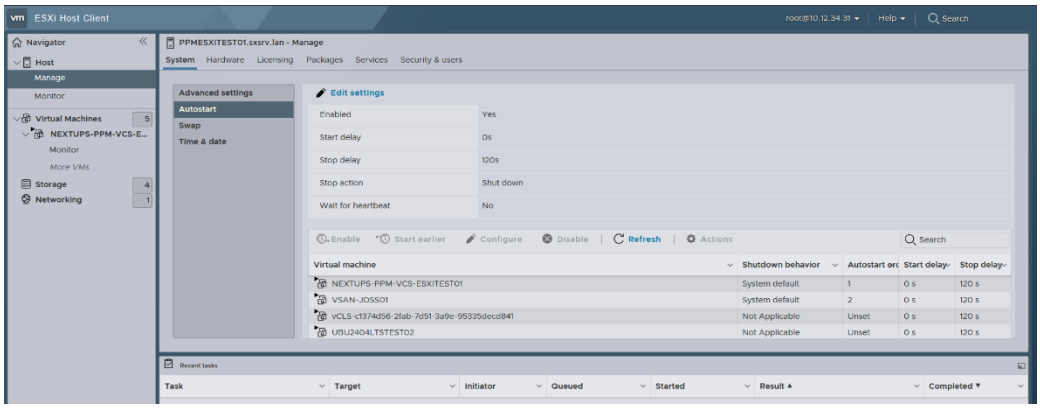
- **Migration/shutdown process**

In case of a power failure and the UPS is reaching one of the shutdown parameters as configured in chapter 4.2.3 MIGRATION/SHUTDOWN CONFIGURATION**,** the PPM powered by this UPS will start a migration process of the virtual machines running on this node. The virtual machines for PPM itself and optional VSAN will be excluded from this migration process.

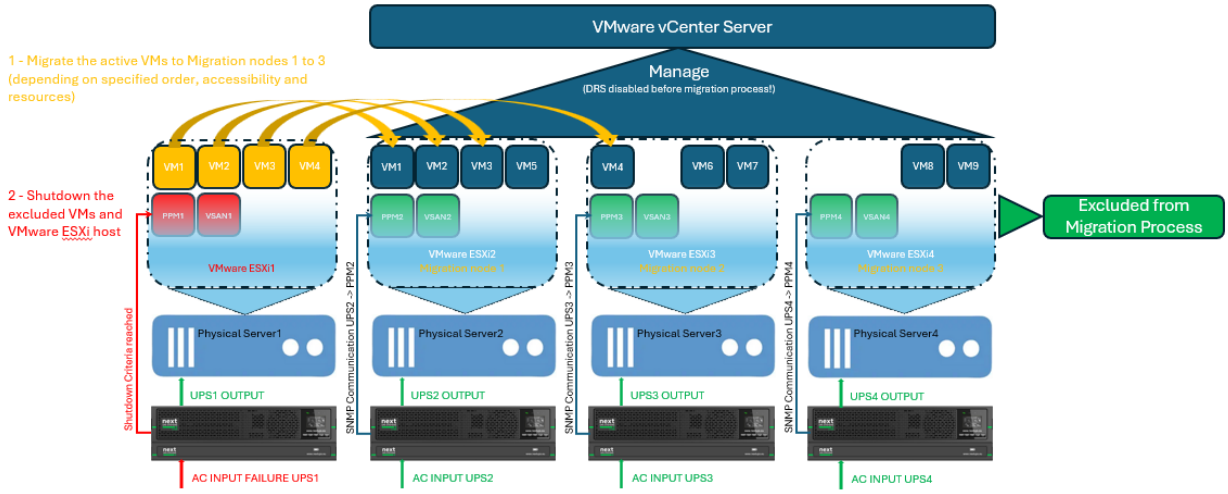
[IMPORTANT] In case vSphere DRS is turned on, PPM will disable this functionality before starting a controlled migration process.

PPM will try to migrate the HA VMs to the configured migration nodes in the same order (1 – 3).
E.g. PPM will try to migrate the VMs first to ***Migration node 1***. If this node is not reachable or lack resources, PPM will try to migrate the VMs to ***Migration node 2*** and ***Migration node 3*** (if configured)**.** If any VMs cannot be migrated they will be put in suspend mode.

After migrating the VMs, the remaining VSAN and PPM VMs will be shut down before a graceful shutdown of the ESXi host itself. VSAN and PPM shutdown will follow the opposite order as set in the configured ESXi autostart order:



The vCenter appliance will receive a graceful shutdown before the last available node (hypervisor) itself shuts down.



Migration process when UPS reaches migration/shutdown criteria

- **Set PPM appliance virtual machine tag**

Set the PPM appliance virtual machine tag (name). This virtual machine will be excluded from the migration process:

Command: sudo PPM -c -u ppmvm_tag '<value>'
Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c -u ppmvm_tag 'NEXTUPS-PPM-VCS-ESXITEST01'

PPM: ppmvm_tag option has been updated.
PPM: Restarting service to apply new value...
```

- **Set VSAN appliance virtual machine tag (optional)**

When using a VSAN (HCI storage) set the appliance virtual machine tag (name). This virtual machine will be excluded from the migration process:

Command: sudo PPM -c -u vsanvm_tag '<value>'
Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c -u vsanvm_tag 'VSAN-JDSS01'

PPM: vsanvm_tag option has been updated.
PPM: Restarting service to apply new value...
```

- **Set vCenter Server appliance virtual machine tag**

Set the vCenter appliance virtual machine tag (name). When set with the virtual machine name of the vCenter appliance, this VM will receive a graceful shutdown before the last available node (hypervisor) itself shuts down:

Command: sudo PPM -c -u vcsvm_tag '<value>'

[IMPORTANT] Only alphanumeric and ._- characters are allowed

Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c -u vcsvm_tag 'PPMVCSTEST01'

PPM: vcsvm_tag option has been updated.
PPM: Restarting service to apply new value...
```

- **Set ESXi1-3 migration nodes IP address(es)**

Set the migration node IPv4 address(es):

Command: sudo PPM -c -u esxi1migrationnode_ip '<value>'
sudo PPM -c -u esxi2migrationnode_ip '<value>'
sudo PPM -c -u esxi3migrationnode_ip '<value>'
Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c -u esxi1migrationnode_ip '10.12.34.32'

PPM: esxi1migrationnode_ip option has been updated.
PPM: Restarting service to apply new value...
```

- **Set ESXi1-3 migration nodes FQDN**

Set the migration node fully qualified domain name(s):

Command: sudo PPM -c -u esxi1migrationnode_fqdn '<value>'
sudo PPM -c -u esxi2migrationnode_fqdn '<value>'
sudo PPM -c -u esxi3migrationnode_fqdn '<value>'

Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c -u esxi1migrationnode_fqdn 'ppmesxitest02.sxsrv.lan'

PPM: esxi1migrationnode_fqdn option has been updated.
PPM: Restarting service to apply new value...
```

4.2.5 CLUSTER ACCESS CONFIGURATION

This section covers the configuration for the access to the vCenter Server appliance and PPM owner node ESXi.

- **Set vCenter admin user**

Set the admin username to login on the vCenter Server appliance:

Command: sudo PPM -c -u vcs_user '<value>'
Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c -u vcs_user 'administrator@vsphere.local'

PPM: vcs_user option has been updated.
PPM: Restarting service to apply new value...
```

- **Set vCenter admin password**

Set the password to login on the vCenter Server appliance:

Command: sudo PPM -c -u vcs_pass '<value>'

[IMPORTANT] Only alphanumeric and !*#$&:_- characters are allowed

Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c -u vcs_pass 'N3xt3M3A*-'

PPM: vcs_pass option has been updated.
PPM: Restarting service to apply new value...
```

- **Set vCenter FQDN**

Set the fully qualified domain name of the vCenter Server appliance:

Command: sudo PPM -c -u vcs_fqdn '<value>'
Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c -u vcs_fqdn 'ppmvcstest01.sxsrv.lan'

PPM: vcs_fqdn option has been updated.
PPM: Restarting service to apply new value...
```

- **Set PPM owner node ESXi root user**

Set the PPM owner node user name:

Command: sudo PPM -c -u ppmownernodeesxi_user '<value>'
Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c -u ppmownernodeesxi_user 'root'

PPM: ppmownernodeesxi_user option has been updated.
PPM: Restarting service to apply new value...
```

- **Set PPM owner node ESXi root password**

Set the password for the PPM owner node ESXi root user:

Command: sudo PPM -c -u ppmownernodeesxi_pass '<value>'

[IMPORTANT] Only alphanumeric and !*#$&:_- characters are allowed

Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c -u ppmownernodeesxi_pass 'N3xt3M3A*-'

PPM: ppmownernodeesxi_pass option has been updated.
PPM: Restarting service to apply new value...
```

- **Set PPM owner node IP address**

Set the IPv4 address of the PPM owner node:

Command: sudo PPM -c -u ppmownernode_ip '<value>'
Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c -u ppmownernode_ip '10.12.34.31'

PPM: ppmownernode_ip option has been updated.
PPM: Restarting service to apply new value...
```

- **Set PPM owner node FQDN**

Set the fully qualified domain name of the PPM owner node:

Command: sudo PPM -c -u ppmownernode_fqdn '<value>'
Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c -u ppmownernode_fqdn 'ppmesxitest01.sxsrv.lan'

PPM: ppmownernode_fqdn option has been updated.
PPM: Restarting service to apply new value...
```

Check the configuration file

All settings can be checked in the configuration file or with below command:

Command: sudo PPM -c
Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c

NEXT UPS Systems - Power Protection Manager (PPM) for VMware vCenter Server - v1.1.0 (build vmw-
vcs.20250625)

Configuration file:

CUSTOMER TAG                                              :   NUS-EMEA
SNTP TIMEZONE                                             :   Europe/Brussels

UPS1 IP ADDRESS                                           :   10.12.34.102
UPS1 PASSWORD                                             :   ********
UPS2 IP ADDRESS                                           :   10.12.34.103
UPS2 PASSWORD                                             :   ********
UPS SNMP VERSION                                          :   3
UPS SNMP V2C PRIVATE COMMUNITY                            :   private
UPS SNMP V3 USER NAME                                     :   snmpuser
UPS SNMP V3 USER AUTHENTICATION PASSWORD                  :   snmppass
UPS SNMP V3 USER AUTHENTICATION PROTOCOL                  :   MD5
UPS SNMP V3 USER PRIVATE PASSWORD                         :   snmppass
UPS SNMP V3 USER SECURITY LEVEL                           :   authNoPriv

UPS NON PROTECT STATE ACTION                              :   donothing
UPS ON BATTERY TIMER (seconds | minutes)                  :   10s
UPS MINIMUM REMAINING BACKUP TIME THRESHOLD (minutes)     :   15
UPS MINIMUM REMAINING BACKUP PERCENTAGE THRESHOLD (%)     :   30

UPS OUTLETS POWER-OFF TIMER (minutes)                     :   15
UPS OUTLETS POWER-ON TIMER (minutes)                      :   5

PPM APPLIANCE VIRTUAL MACHINE TAG                         :   NEXTUPS-PPM-VCS-ESXITEST01
VSAN APPLIANCE VIRTUAL MACHINE TAG                        :   VSAN-JDSS01
VCENTER SERVER APPLIANCE VIRTUAL MACHINE TAG              :   PPMVCSTEST01

VCENTER SERVER USER                                       :   administrator@vsphere.local
VCENTER SERVER FQDN                                       :   ppmvcstest01.sxsrv.lan
VCENTER SERVER PASSWORD                                   :   ********

PPM OWNER NODE ESXI USER                                  :   root
PPM OWNER NODE IP ADDRESS                                 :   10.12.34.31
PPM OWNER NODE FQDN                                       :   ppmesxitest01.sxsrv.lan
PPM OWNER NODE ESXI PASSWORD                              :

ESXI1 MIGRATION NODE IP ADDRESS                           :   10.12.34.32
ESXI1 MIGRATION NODE FQDN                                 :   ppmesxitest02.sxsrv.lan
ESXI2 MIGRATION NODE IP ADDRESS                           :   10.12.34.33
ESXI2 MIGRATION NODE FQDN                                 :   ppmesxitest03.sxsrv.lan
ESXI3 MIGRATION NODE IP ADDRESS                           :   10.12.34.34
ESXI3 MIGRATION NODE FQDN                                 :   ppmesxitest04.sxsrv.lan

MAIL SENDER                                               :   service@nextups.eu
MAIL RECIPIENT1                                           :   service@nextups.eu
MAIL RECIPIENT2                                           :
```

4.3 STATUS

After configuring the PPM and SNMP settings, the service and UPS status can be checked by using the status command. It will show the status of the PPM service, and actual values for the monitored parameters of the configured UPSs.
Also, the last 10 log entries will be shown.

Command: sudo PPM -s
Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -s

NEXT UPS Systems - Power Protection Manager (PPM) for VMware vCenter Server

Service status                      :   Running
Service version                     :   v1.1.0 (build vmw-vcs.20250625)
Mail agent status                   :   Running

Customer tag                        :   NUS-EMEA


UPS1
----
UPS IP address                      :   10.12.34.102
UPS status                          :   On Line
UPS time on battery                 :   00:00:00 (hh:mm:ss)
UPS battery status                  :   Normal
UPS battery voltage                 :   40.8V
UPS battery capacity                :   100%
UPS battery remaining backup time   :   15 minutes
UPS battery temperature             :   29 degrees Celsius
UPS output load                     :   42%
UPS name                            :   UPSTDSRVTEST02
UPS location                        :   TDSRV-EL7FL2
UPS technology                      :   LINE-INT
UPS SNMP card firmware              :   3.7.0.3
UPS serial number                   :   715319800125

UPS2
----
UPS IP address                      :   10.12.34.103
UPS status                          :   On Line
UPS time on battery                 :   00:00:00 (hh:mm:ss)
UPS battery status                  :   Normal
UPS battery voltage                 :   39.0V
UPS battery capacity                :   100%
UPS battery remaining backup time   :   999 minutes
UPS battery temperature             :   30 degrees Celsius
UPS output load                     :   0%
UPS name                            :   UPSTDSRVTEST01
UPS location                        :   TDSRV-EL7FL2
UPS technology                      :   ON-LINE
UPS SNMP card firmware              :   3.7.0.3
UPS serial number                   :   CPEXN1686200018


Last 10 logs:
-------------
12-03-2025 01:36:40 - The status of UPS "UPSTDSRVTEST02" with IP "10.12.34.102" and UPS
"UPSTDSRVTEST01" with IP "10.12.34.103" is On Line -- no timer activated (anymore)
12-03-2025 07:42:20 - The status of UPS "UPSTDSRVTEST02" with IP "10.12.34.102" is On Line and UPS
"UPSTDSRVTEST01"with IP "10.12.34.103" is Not Detected -- no timer activated (anymore)
12-03-2025 07:42:26 - The status of UPS "UPSTDSRVTEST02" with IP "10.12.34.102" and UPS
"UPSTDSRVTEST01" with IP "10.12.34.103" is On Line -- no timer activated (anymore)
12-03-2025 09:09:21 - The status of UPS "UPSTDSRVTEST02" with IP "10.12.34.102" is On Line and UPS
"UPSTDSRVTEST01"with IP "10.12.34.103" is Not Detected -- no timer activated (anymore)
12-03-2025 09:09:26 - The status of UPS "UPSTDSRVTEST02" with IP "10.12.34.102" and UPS
"UPSTDSRVTEST01" with IP "10.12.34.103" is On Line -- no timer activated (anymore)
13-03-2025 13:05:02 - The status of UPS "UPSTDSRVTEST02" with IP "10.12.34.102" and UPS
"UPSTDSRVTEST01" with IP "10.12.34.103" is On Line -- no timer activated (anymore)
13-03-2025 13:05:23 - The status of UPS "UPSTDSRVTEST02" with IP "10.12.34.102" and UPS
"UPSTDSRVTEST01" with IP "10.12.34.103" is On Line -- no timer activated (anymore)
13-03-2025 13:06:24 - The status of UPS "UPSTDSRVTEST02" with IP "10.12.34.102" and UPS
"UPSTDSRVTEST01" with IP "10.12.34.103" is On Line -- no timer activated (anymore)
13-03-2025 13:06:39 - Test mail configuration
13-03-2025 13:08:00 - The status of UPS "UPSTDSRVTEST02" with IP "10.12.34.102" and UPS
"UPSTDSRVTEST01" with IP "10.12.34.103" is On Line -- no timer activated (anymore)
```

4.3.1 PPM Service status values

Service status	: shows the status of the PPM Service: 'Running' or 'Not running'
Service version	: version of the PPM service
Mail agent status	: shows the status of the mail agent
Customer tag	: the customer tag (PPM name) as set in the PPM configuration. This is a variable to identify (name) your configuration. It will be used in the configuration files and in the subject field for mail communication

4.3.2 UPS status values

UPS IP address	: IP address of the monitored UPS. Can be set in the UPS configuration
UPS status	: shows the status/output of the monitored UPS. Depending on the UPS technology this can be: - On Line - On Bypass - Boosting - Reducing - Off/Standby - On battery - Unknown
UPS time on battery	: time the UPS is working on battery power
UPS battery status	: status of the UPS battery
UPS battery voltage	: actual battery voltage of the UPS battery
UPS battery capacity	: actual battery percentage of the UPS battery
UPS battery remaining backup time	: remaining backup time, calculated by the UPS depending on load and battery level
UPS battery temperature	: actual UPS temperature
UPS output load	: actual load of the UPS in percentage of its maximum
UPS name	: UPS description as defined in the UPS network card
UPS location	: UPS location as defined in the UPS network card
UPS technology	: type of UPS, ON-LINE or LINE-INTERACTIVE
UPS SNMP card firmware	: shows the FW version of the network card in the UPS
UPS serial number	: shows the Serial no of the monitored UPS

4.3.3 PPM Service commands

The PPM service can be started (-S), restarted (-R) or stopped (-K):

Commands: sudo PPM -S
sudo PPM -R
sudo PPM -K

Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -R

PPM has restarted.
```

4.4 LOGS

PPM will log all events (status changes) from the UPSs and events from the PPM service into a log file. This log can be checked in the console or exported into a text file.

4.4.1 Display all logs

To view all log entries the sudo PPM -l command can be used:

Command: sudo PPM -l
Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -l

There are no available logs.
```

If no logs are available it will state 'There are no available logs', otherwise it will list all log entries stored in the log file.

4.4.2 Clear logs

To clear all log entries the sudo PPM -l -c command can be used:

Command: sudo PPM -l -c
Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -l –c

Logs have been cleared.
```

4.4.3 Export log file

For backup or evaluation purposes the log entries are saved in a log file. This log file can be exported as a text file.
The file 'ppm_log_export' will be placed in the '/home/ppm/' directory and with the use of an SCP client (e.g. WinSCP), it can be transferred to your local device for reviewing.

Command: sudo PPM -l -e
Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -l –e

PPM: Logs have been exported. A file called 'ppm_log_export' is placed in
'/home/ppm/' directory.
```

4.5 EXPORT/IMPORT CONFIG FILE

All configuration settings for PPM, UPS, ESXi and Shutdown parameters can be exported to a configuration file.

4.5.1 EXPORT

For backup or editing purposes it is possible to export the configuration settings as a text file. The file 'ppm_config_export' will be placed in '/home/ppm/' directory and with the use of an SCP client (e.g. WinSCP), it can be transferred to your local device.

Command: sudo PPM -c -e

Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c -e

PPM: Configuration has been exported. A file called 'ppm_config_export' is
placed in '/home/ppm/' directory.
```

Example of a ppm_config_export file:

```
# Customer tag (name)
CUSTTAG="NUS-EMEA"

# SNTP timezone
TIMEZONE="Europe/Brussels"

# Path to script
UPSONBATTERYTIMERSCRIPT="/opt/ppm/scripts/upsonbatterytimershutdownVCS.sh"
UPSBATTCRITMINREMAINSCRIPT="/opt/ppm/scripts/upsbattcritminremainshutdownVCS.sh"
UPSBATTCRITPCNTSCRIPT="/opt/ppm/scripts/upsbattcritpcntshutdownVCS.sh"

# Value in seconds (s)
POLLINGINTERVAL="5s"

# UPS1 IP address (IPv4)
UPS1IP="10.12.34.102"

# UPS2 IP address (IPv4)
UPS2IP="10.12.34.103"

# UPS SNMP version
UPSSNMPVERSION="3"

# UPS SNMP v2c private community
UPSSNMPV2CCOMMUNITY="private"

# UPS SNMP v3 authentication
UPSSNMPV3USER="snmpuser"
UPSSNMPV3USERAUTHPASS="snmppass"
UPSSNMPV3USERAUTHPROTOCOL="MD5"
UPSSNMPV3USERPRIVPASS="snmppass"
UPSSNMPV3USERPRIVPROTOCOL=""
UPSSNMPV3USERSECLEVEL="authNoPriv"

# Action when UPS state Unknown, Off/Standby or On Bypass
UPSNONPROTECTSTATEACTION="donothing"

# Value in seconds (s) or minutes (m)
UPSONBATTERYTIMER="10s"

# Value in minutes (m)
UPSBATTCRITMINREMAIN="15"
UPSONLINEPOWEROUTLETSCONTROLOFFTIMER="15"
UPSONLINEPOWEROUTLETSCONTROLONTIMER="5"
UPSLINEINTPOWEROUTLETSCONTROLOFFTIMER=""
UPSLINEINTPOWEROUTLETSCONTROLONTIMER=""

# Value in percentage
UPSBATTCRITPCNT="30"

# PPM appliance virtual machine tag (name)
PPMAPPTAG="NEXTUPS-PPM-VCS-ESXITEST01"

# VSAN appliance virtual machine tag (name)
VSANAPPTAG="VSAN-JDSS01"

# VCENTER SERVER appliance virtual machine tag (name)
VCSAPPTAG="PPMVCSTEST01"

# VCENTER SERVER admin user
VCSUSER="administrator@vsphere.local"

# VCENTER SERVER FQDN
VCSFQDN="ppmvcstest01.sxsrv.lan"

# PPM owner node ESXi root user
PPMOWNERNODEESXIUSER="root"

# ESXi IP addresses (IPv4)
PPMOWNERNODEIP="10.12.34.31"
ESXI1MIGNODEIP="10.12.34.32"
ESXI2MIGNODEIP="10.12.34.33"
ESXI3MIGNODEIP="10.12.34.34"

# ESXi FQDN
PPMOWNERNODEFQDN="ppmesxitest01.sxsrv.lan"
ESXI1MIGNODEFQDN="ppmesxitest02.sxsrv.lan"
ESXI2MIGNODEFQDN="ppmesxitest03.sxsrv.lan"
ESXI3MIGNODEFQDN="ppmesxitest04.sxsrv.lan"

# Alert mail recipients
MAILRECIPIENT1="service@nextups.eu"
MAILRECIPIENT2=""
```

4.5.2 IMPORT

With the use of an SCP client (e.g. WinSCP) a saved configuration file can be transferred from your local device to the '/hom e/ppm/' directory and reloaded to the PPM service.

[IMPORTANT] Great care in the syntax and layout of the config file must be taken to ensure a good function of the PPM service

Command: sudo PPM -c -i '/home/ppm/new_ppm_config_file'
Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c -i '/home/ppm/new_ppm_config_file'

PPM: Restarting service to apply new value...
```

5. Release notes

Release notes for the Power Protection Manager (PPM) for VMware vCenter Server - Software:

Date	Changes	Version No	Build version
22/03/2025	Initial release	1.0	build vmw-vcs.20250322
01/07/2025	Add UPS power outlets control option	1.1	build vmw-vcs.20250625

The software release notes and changes can be checked with the following command:

Command: sudo PPM --release-notes
Return Output:

```
ppm@nextups-ppm:~$ sudo PPM --release-notes

Release notes:
--------------
v1.0     - build vmw-vcs.20250322 - Initial release
v1.1     - build vmw-vcs.20250625 - Add power outlets control option
```

Release notes for the Power Protection Manager (PPM) for VMware vCenter Server - Manual:

Date	Changes	Version No
31/03/2025	First draft PPM-VCS manual	1.01
05/05/2025	Steps for installation adapted to vCenter environment	1.02
16/05/2025	Layout enhancement and corrected typos	1.03
01/07/2025	Add UPS power outlets control option	1.04