

**Power Protection Manager (PPM) Manual
Cluster setup
NEXT UPS Systems
Power Protection Manager (PPM) for Proxmox VE –
v1.2.5 (build pve.20260324)**

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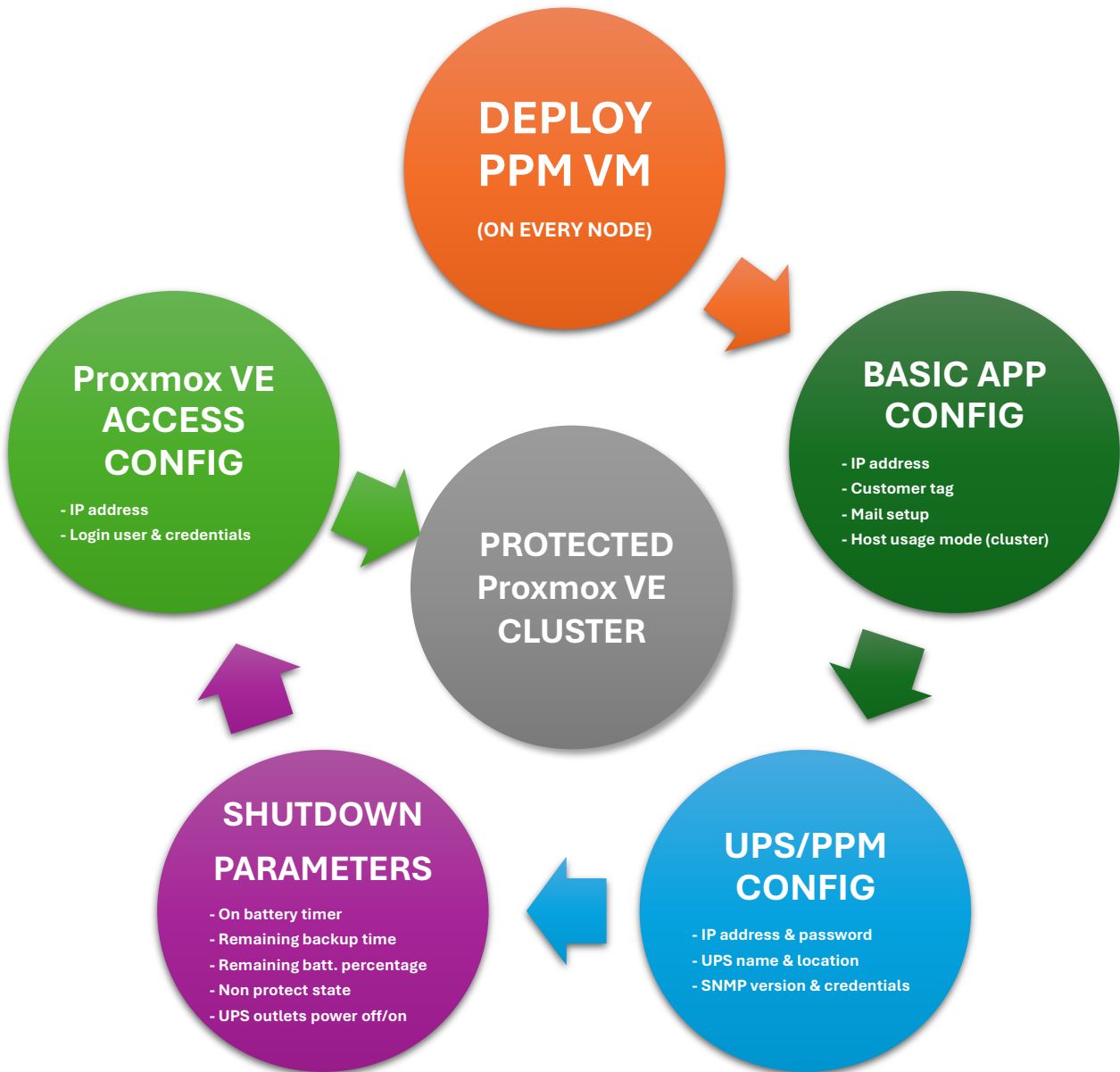
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1. Overview of the software and its features

NEXT UPS Systems Power Protection Manager (PPM) is a virtual appliance which communicates with SNMP/WEB Interface II and NMC III (Network Management 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 Proxmox VE 8 and up.
- 2 vCPU
- 2GB vMemory
- 25GB free space on storage

3. Steps and instructions for installation

In a cluster environment the PPM software needs to be installed on each node in the cluster. For deploying a virtual appliance in Proxmox VE to install Power Protection Manager (PPM), you need to:

STEP 1.

Download the PPM zip file on <https://nextups.eu/software/ppm-proxmox/#downloads>

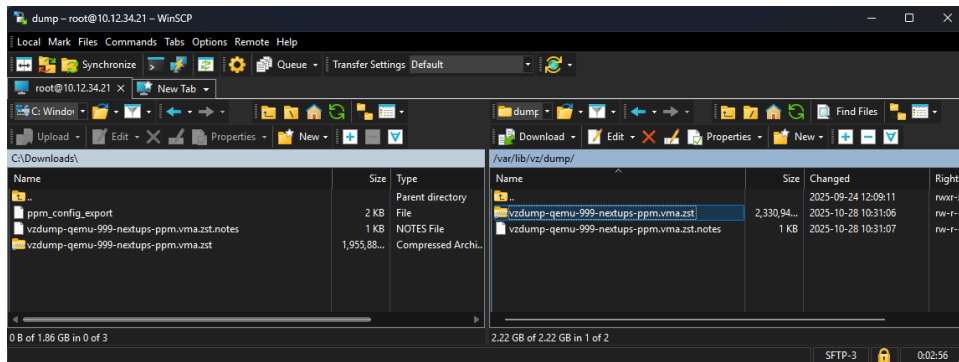
Extract the files from the downloaded file NEXTUPS-PPM-PROXMOX_v1.2.5.zip to an accessible location.

- vzdump-qemu-999-nextups-ppm.vma.zst
- vzdump-qemu-999-nextups-ppm.vma.zst.notes

[IMPORTANT] do not change these filenames.

STEP 2.

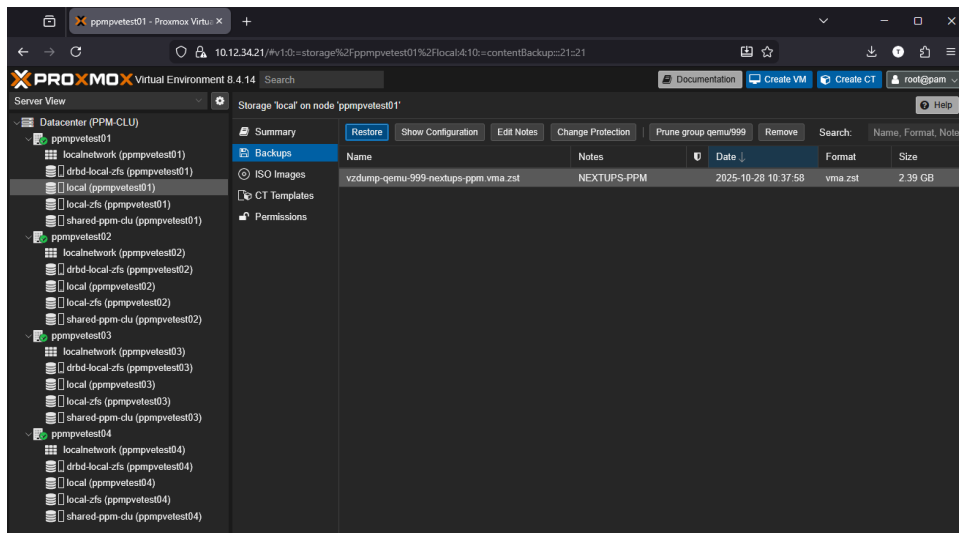
Connect to Proxmox VE from your client computer using a file manager such as WINSXP and copy these 2 files into the /var/lib/vz/dump directories on the Proxmox VE host's local storage. Do this for each node in the cluster.



STEP 3.

Connect to Proxmox from your client computer using a web browser and log in as a user that has permission to create, start, and stop virtual machines.

On the local storage of each node in the cluster – Backups directory look for the vzdump-qemu-999-nextups-ppm.vma.zst file and click the 'Restore' button.



STEP 4.

In the pop up window select the storage location where to deploy the VM for PPM.

Restore: VM

Source: vzdump-qemu-999-nextups-ppm.vma.zst

Storage: From backup configuration

VM:	Name ↑	Type	Avail	Capacity
Bandwidth Limit:	local-zfs	zfs pool	219.65 GB	246.13 GB

Unique: Start after restore:

Override Settings:

Name: NEXTUPS-PPM Memory: 2048

Cores: 2 Sockets: 1

Restore

STEP 5.

Proxmox will propose the next available VM ID number (eg. 100), but it can be changed to any available VM ID.

Restore: VM

Source: vzdump-qemu-999-nextups-ppm.vma.zst

Storage: local-zfs

VM: 100

Bandwidth Limit: Defaults to target storage restore limit MiB/s

Unique: Start after restore:

Override Settings:

Name: NEXTUPS-PPM Memory: 2048

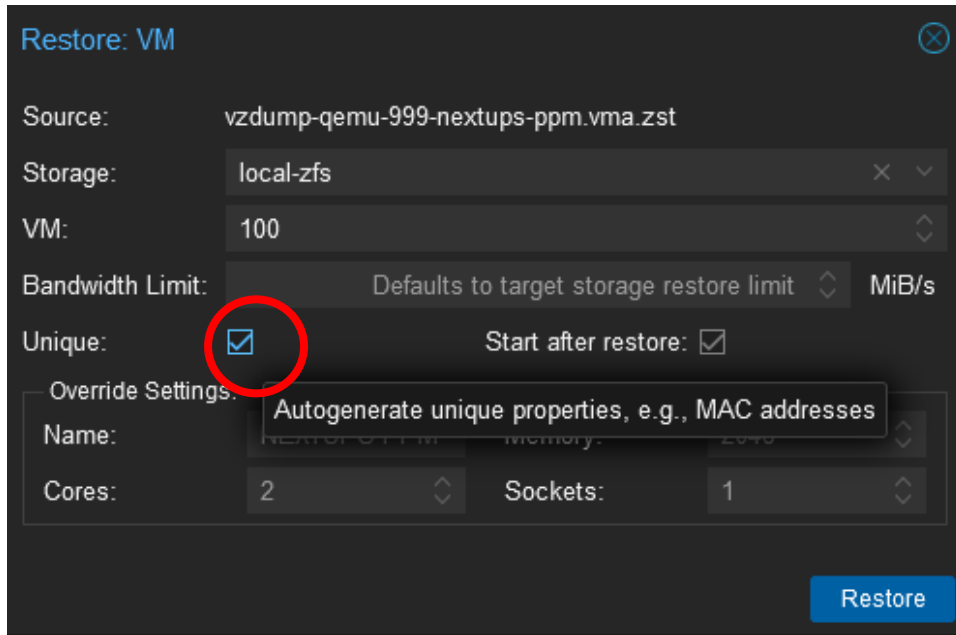
Cores: 2 Sockets: 1

Restore

STEP 6.

Enable both 'Unique' and 'Start after restore' checkboxes.

[IMPORTANT] It is mandatory to enable the 'Unique' checkbox to autogenerate unique properties for the VM.

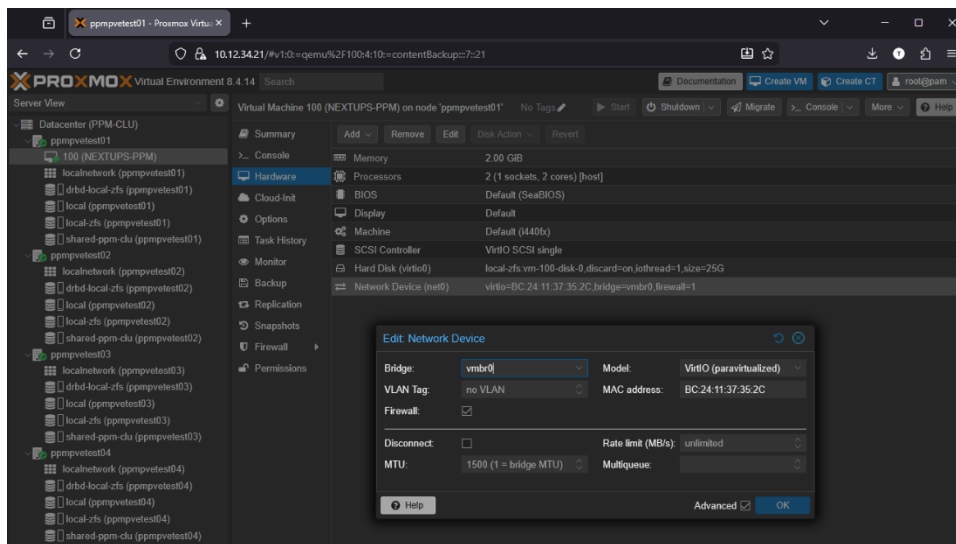


Click the Restore button to proceed

STEP 7.

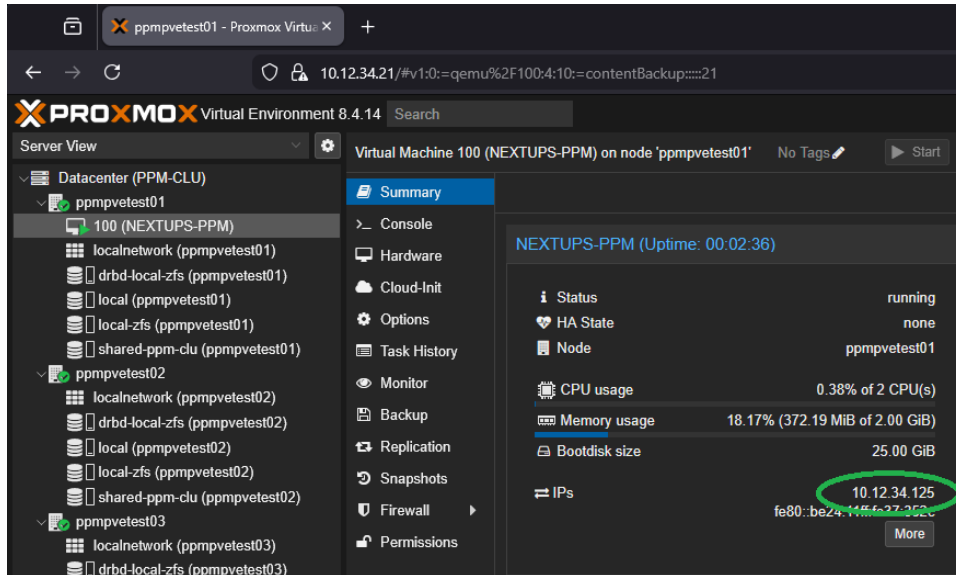
Wait for the VM to be imported and review your VM's bridge and network settings.

Select the appropriate virtual network device and set bridge and optional VLAN, according to your configuration.



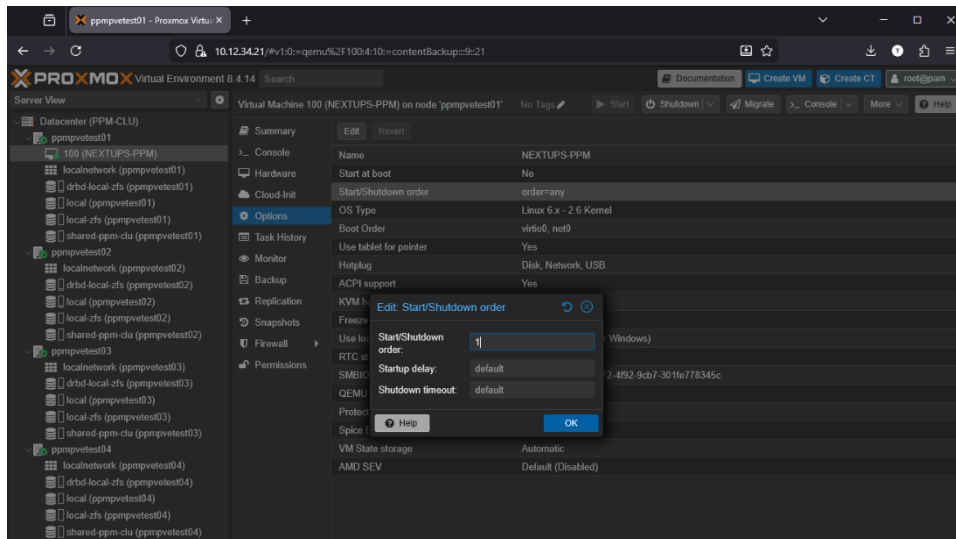
STEP 8.

Check the IP address of the NEXTUPS-PPM virtual machine and proceed to **4.2 CONFIGURATION** for configuration of PPM, UPS(s), Proxmox VE host(s) and shutdown parameters.



STEP 9.

For optimized protection, and in the case of shutting down multiple hosts, it is recommended to set the start/Shutdown order of the NEXTUPS-PPM virtual machine to '1'. For more information on the start/shutdown order in Proxmox VE, please see the 'Automatic Start and Shutdown of Virtual Machines' section of the Proxmox VE manual.



4. Configuration and instructions for setup

4.1 PPM COMMANDS INDEX (for cluster mode)

-h, --help	Show this help information
--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
upssnmpv3_userpriv	UPS SNMP v3 user private password
upssnmpv3_userprivprotocol	UPS SNMP v3 user private protocol
upssnmpv3_seclevel	UPS SNMP v3 security level
upsnonprotectstate_action	Action to take when UPS state is 'Unknown', 'Off/Standby' or 'On Bypass'
upsnonbattery_timer	Timer to elapse before executing shutdown procedure
upsremaining_minutes	UPS minimum remaining backup time in minutes before executing shutdown procedure
upsremaining_percentage	UPS minimum remaining backup percentage 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
ppmhostusage_mode	PPM host usage mode
vmhandling_mode	Virtual machine handling mode
vmhandlingshutdownpriogroup1_delay	Delay in seconds (s) to ensure virtual machines in priority group 1 have adequate time to shut down or suspend, before handling the next group
vmhandlingshutdownpriogroup2_delay	Delay in seconds (s) to ensure virtual machines in priority group 2 have adequate time to shut down or suspend, before handling the next group
vmhandlingshutdownpriogroup3_delay	Delay in seconds (s) to ensure virtual machines in priority group 3 have adequate time to shut down or suspend, before handling the next group
vmhandlingshutdownpriogroup4_delay	Delay in seconds (s) to ensure virtual machines in priority group 4 have adequate time to shut down or suspend, before handling the next group

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
ppmownernodepve_user	PPM owner node PVE root user
ppmownernode_ip	PPM owner node IPv4 address
ppmownernodepve_pass	PPM owner node PVE root password
pve1migrationnode_fqdn	PVE1 migration (target) node FQDN
pve2migrationnode_fqdn	PVE2 migration (target) node FQDN
pve3migrationnode_fqdn	PVE3 migration (target) node FQDN
mail_recipient1	Alert mail recipient1
mail_recipient2	Alert mail recipient2
-i, --import	Import configuration from given file
-e, --export	Export configuration file

Return Output:

```

192.168.241.248 - PuTTY
GNU nano 7.2 /opt/ppm/netplan/ppm appliance ip_static.yaml
This is the configuration template for setting static IP address on the available network interface on your system.
#####
#
# Please make the necessary changes and save them with CTRL+O. Then exit this template with CTRL+X. #
#
#####
network:
  version: 2
  ethernet:
    ens192:
      dhcp4: no
      optional: true
      addresses:
        # Change the below to the appropriate IP address, including subnet prefix [CIDR notation]. Don't change the indentation style.
        - 192.168.1.248/24
      nameservers:
        # Change the below to the appropriate IP address(es). Don't change the indentation style.
        addresses: [192.168.1.1, 1.1.1.1, 8.8.8.8]
      routes:
        - to: default
          # Change the below to the appropriate IP address. Don't change the indentation style.
          via: 192.168.1.1

```

- **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 subject field for mail communication:

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

[IMPORTANT] Only alphanumeric and `_` characters are allowed. The value is limited to 30 characters.

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 'service@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 Proxmox VE - 1.2.5 (build pve.20260324)

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 PRIVATE PROTOCOL : DES
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 HOST USAGE MODE         : single

PVE USER                     : root
PVE1 IP ADDRESS              :
PVE1 PASSWORD                :
PVE2 IP ADDRESS              :
PVE2 PASSWORD                :
PVE3 IP ADDRESS              :
PVE3 PASSWORD                :

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 SHUTDOWN CONFIGURATION 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.

The screenshot shows the 'Settings > NMC System' page. The 'System Configuration' section is expanded, showing the following settings:

BootP/DHCP	Disable
IP Address	192.168.1.251
Subnet Mask	255.255.255.0
Gateway Address	192.168.1.1
Primary DNS	1.1.1.1
Secondary DNS	8.8.8.8
IPv6	Enable
IPv6 Auto Configuration	Enable
IPv6 Address 1	::
Prefix length	0
IPv6 Gateway Tunnel	0.0.0.0
IPv6 Local Address	FE80::220:85FF:FEES:71DS
IPv6 Address 2	::

A 'Save' button is located at the bottom right of the configuration table.

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.

The screenshot shows the 'Settings > NMC System' page with the 'SNMP Support' section expanded. The following settings are visible:

SNMP Support	SNMP v3
SNMP Port Number	161
SNMP Trap Port Number	162
HTTP	Enable
SSH Connection	Enable
ModbusTCP Connection	Disable
SMTP	Enable
UPS Description	Demo Prometheus Liron
UPS Location	Server Rack Labo
Default Language	Auto
Session expiration(Min)	10
History Log Interval(Sec)	60
Statistics Log Interval(Min)	60

A 'Save' button is located at the bottom right of the configuration table.

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 SHUTDOWN CONFIGURATION 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>'`

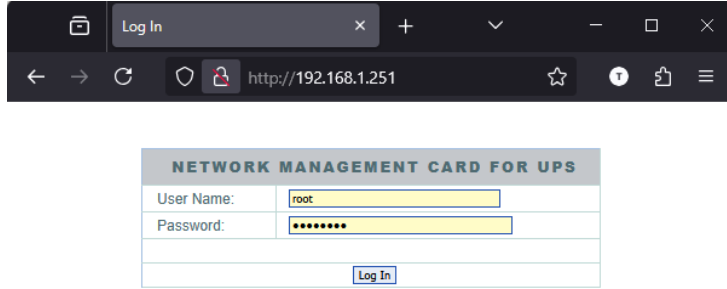
Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c -u ups1_ip '192.168.1.251'

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.

The screenshot shows the 'Settings - NMC System' page. The left sidebar contains a navigation menu with categories like 'UPS Monitoring', 'UPS Management', 'Settings', 'Logs', and 'System Log'. The main content area is titled 'System Configuration' and includes fields for:

- Boot/DHCP: Disable
- IP Address: 192.168.1.251
- Subnet Mask: 255.255.255.0
- Gateway Address: 192.168.1.1
- Primary DNS: 192.168.1.1
- Secondary DNS: 8.8.8.8
- IPv6: Enable
- IPv6 Auto Configuration: Enable
- IPv6 Address 1: [empty]
- Prefix length: 0
- IPv6 Gateway Tunnel: 0.0.0.0
- IPv6 Local Address: FE80::20:48FF:FE8C::C
- IPv6 Address 2: 1

 Below this is the 'SNMP Support' section:

- SNMP Support: SNMP v3 (dropdown menu is open showing v1, v2c, v3)
- SNMP Port Number: [empty]
- SNMP Trap Port Number: [empty]
- HTTP: Enable
- SSH Connection: Enable
- ModbusTCP Connection: Enable
- SMTP: Enable
- UPS Description: Demo Ppmox-Lion
- UPS Location: Server Rack Labo
- Default Language: Auto
- Session expiration(Min): 10
- History Log Interval(Sec): 60
- Statistics Log Interval(Min): 60

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>'`

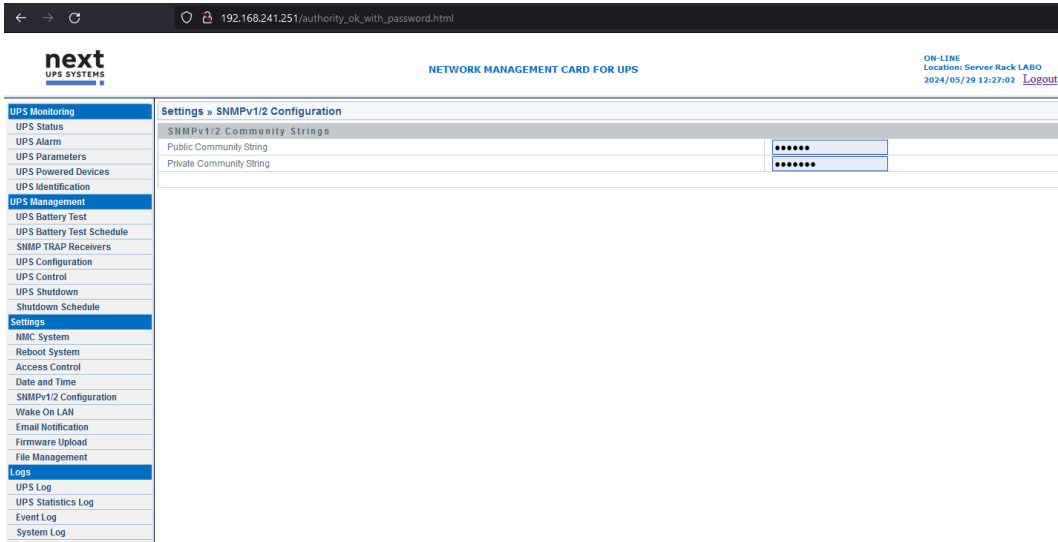
[IMPORTANT] Valid values are: 2c | 3

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. Set accordingly to the settings in the **UPS network interface – SNMPv1/2 Configuration page**. Only the Private Community String in the network interface is accepted. This community string can be changed in the **UPS network interface – SNMPv1/2 Configuration page**, parameter *Private Community String*. The default setting in the interface is 'private'.



Set the community string in PPM

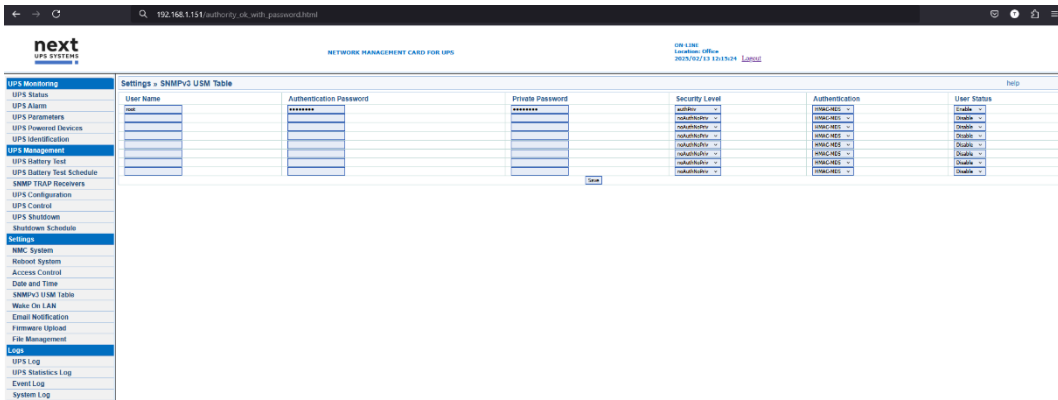
Set the community string in PPM accordingly to the **private** community string in the UPS network interface.

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



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 and `_` characters (max. 30) are allowed for the SNMPv3 user name.

Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c -u upssnmpv3_user 'root'
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 'password'
PPM: upssnmpv3_userauth option has been updated.
PPM: Restarting service to apply new value...
```

Set SNMP v3 authentication protocol

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 'Password'
PPM: upssnmpv3_userpriv option has been updated.
PPM: Restarting service to apply new value...
```

Set SNMP v3 private protocol

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

Command: `sudo PPM -c -u upssnmpv3_userprivprotocol '<value>'`

Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c -u upssnmpv3_userprivprotocol 'DES'

PPM: upssnmpv3_userprivprotocol 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 'authPriv'

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 Proxmox VE - 1.2.5 (build pve.20260324)

Configuration file:

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

UPS1 IP ADDRESS : 192.168.1.251
UPS1 PASSWORD : *****
UPS2 IP ADDRESS : 192.168.1.252
UPS2 PASSWORD : *****
UPS SNMP VERSION : 3
UPS SNMP V2C COMMUNITY : private
UPS SNMP V3 USER NAME : root
UPS SNMP V3 USER AUTHENTICATION PASSWORD : *****
UPS SNMP V3 USER AUTHENTICATION PROTOCOL : MD5
UPS SNMP V3 USER PRIVATE PASSWORD : *****
UPS SNMP V3 USER PRIVATE PROTOCOL : DES
UPS SNMP V3 USER SECURITY LEVEL : authPriv

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 HOST USAGE MODE : single

PVE USER : root
PVE1 IP ADDRESS :
PVE1 PASSWORD :
PVE2 IP ADDRESS :
PVE2 PASSWORD :
PVE3 IP ADDRESS :
PVE3 PASSWORD :

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 Proxmox VE

Service status           : Running
Service version          : 1.2.5 (build pve.20260324)
Mail agent status        : Running

Customer tag             : NUS-EMEA

UPS1
----
UPS IP address           : 192.168.1.251
UPS MAC address          : 00-20-85-C2-01-F7
UPS status                : On Line
UPS time on battery       : 00:00:00 (hh:mm:ss)
UPS battery status       : Normal
UPS battery voltage      : 84.4V
UPS battery capacity     : 100%
UPS battery remaining backup time : 86 minutes
UPS battery temperature  : 25 degrees Celsius
UPS output load           : 23%
UPS output AC voltage (configured) : 230V
UPS output frequency     : 50Hz
UPS name                  : Demo_Proxmox_Li-Ion
UPS location              : Server_Rack_LAB0
UPS technology            : ON-LINE
UPS network management card (NMC) firmware : 3.7.0.3
UPS serial number        : CP10P3312980004

Last 10 logs:
-----
21-01-2025 12:16:01 - The status of UPS "Demo_Proxmox_Li-Ion" with IP "192.168.1.251" is Not Detected
21-01-2025 12:16:07 - The status of UPS "Demo_Proxmox_Li-Ion" with IP "192.168.1.251" is On Line --
no timer activated (anymore)
21-01-2025 12:16:19 - The status of UPS "Demo_Proxmox_Li-Ion" with IP "192.168.1.251" is Not Detected
21-01-2025 12:16:25 - The status of UPS "Demo_Proxmox_Li-Ion" with IP "192.168.1.251" is On Line --
no timer activated (anymore)
21-01-2025 12:19:39 - The status of UPS "Demo_Proxmox_Li-Ion" with IP "192.168.1.251" is On Line --
no timer activated (anymore)
21-01-2025 12:43:05 - The status of UPS "Demo_Proxmox_Li-Ion" with IP "192.168.1.251" is On Line --
no timer activated (anymore)
21-01-2025 13:03:07 - The status of UPS "Demo_Proxmox_Li-Ion" with IP "192.168.1.251" is On Line --
no timer activated (anymore)
21-01-2025 13:03:51 - The status of UPS "Demo_Proxmox_Li-Ion" with IP "192.168.1.251" is On Line --
no timer activated (anymore)
```

4.2.3 MIGRATION/SHUTDOWN CONFIGURATION

This section covers the configuration of the parameters that will trigger a shutdown procedure for the Proxmox VE host(s). Please note that migration/shutdown configuration for Linux Containers (LXC) is not yet supported.

In case of a power failure and UPS working on battery power, 3 events can trigger the migration/shutdown procedure for the configured Proxmox VE 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

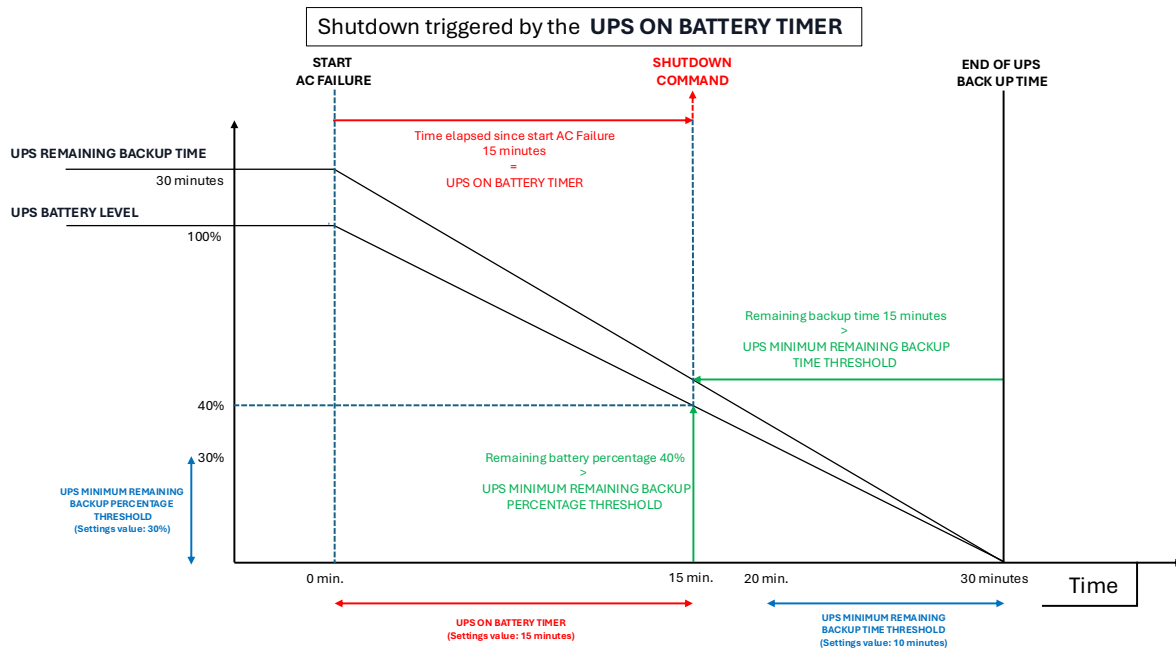
These 3 events that can trigger the shutdown procedure can be set individually in PPM; any event that occurs first will trigger the migration/shutdown procedure to be sent to the Proxmox VE host(s).

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 migration/shutdown procedure to the Proxmox VE 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 migration/shutdown of the Proxmox VE host(s).

Return Output:

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

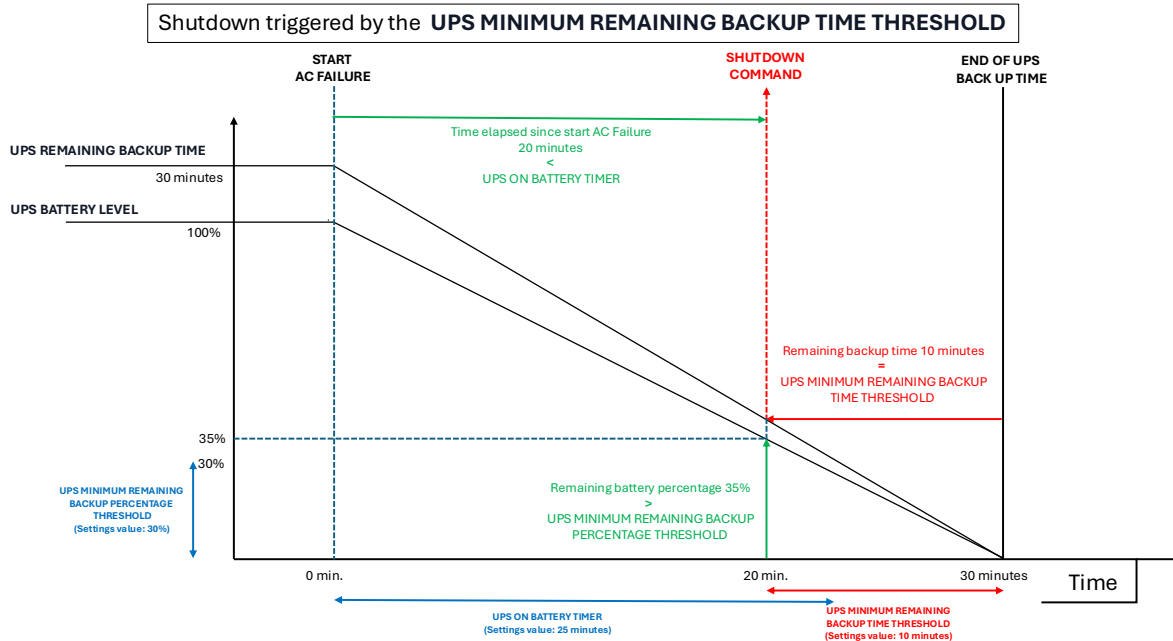
PPM: upsonbattery_timer option has been updated.
PPM: Restarting service to apply new value..
```

• **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 migration/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 migration/shutdown of the Proxmox VE host(s).

Return Output:

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

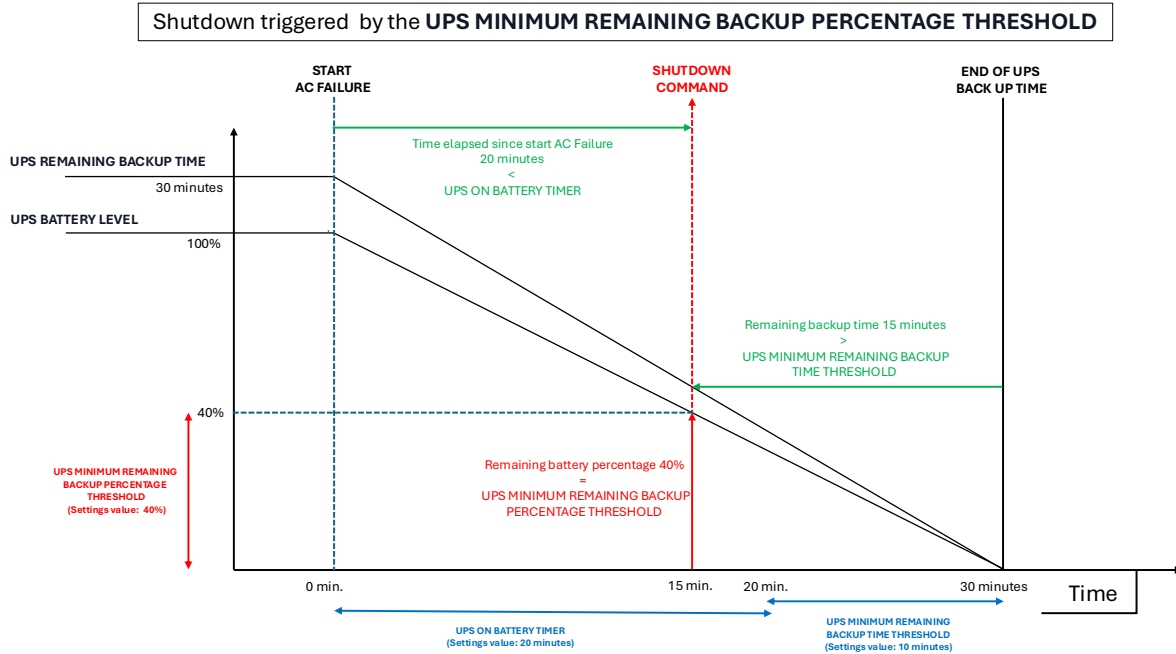
PPM: upsremaining_minutes option has been updated.
PPM: Restarting service to apply new value..
```

• **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 migration/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]

In addition to the configuration of the shutdown procedure in case of a power failure, it is also possible to trigger the migration/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:

- do nothing:** 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 migration/shutdown procedure for the Proxmox VE 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 migration/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.

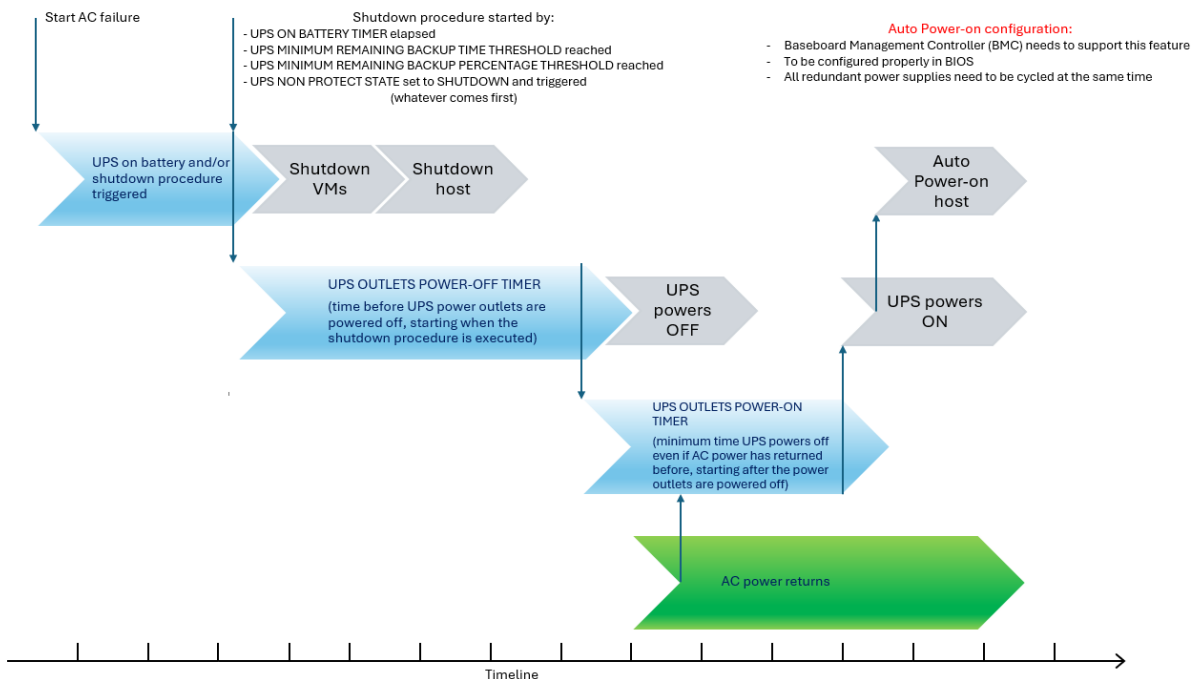
The **UPS OUTLETS POWER-OFF TIMER** is the time in minutes to elapse before the UPS power outlets are powered off, starting when the migration/shutdown procedure is started.

[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 '10'  
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..
```

- **PPM HOST USAGE MODE**

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

[IMPORTANT] Default setting is single. Valid values are: single | cluster

This manual only covers the setup for cluster mode, for single configurations please consult the Manual [‘Power Protection Manager \(PPM\) Manual Single setup for Proxmox VE’](#)

Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c -u ppmhostusage_mode 'cluster'  
PPM: ppmhostusage_mode option has been updated.  
PPM: Restarting service to apply new value..
```

- **VM HANDLING MODE**

PPM can be used to either migrate or shutdown the active VMs on his host by settings the vmhandling_mode parameter. See section 4.2.5 CLUSTER MIGRATION CONFIGURATION and 4.2.6 CLUSTER SHUTDOWN CONFIGURATION for detailed info on both modes.

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

[IMPORTANT] Default setting is migrate. Valid values are: migrate | shutdown

Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c -u vmhandling_mode 'shutdown'  
PPM: vmhandling_mode 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 Proxmox VE - 1.2.5 (build pve.20260324)

Configuration file:

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

UPS1 IP ADDRESS              : 192.168.1.251
UPS1 PASSWORD                : *****
UPS2 IP ADDRESS              : 192.168.1.252
UPS2 PASSWORD                : *****
UPS SNMP VERSION             : 3
UPS SNMP V2C COMMUNITY       : private
UPS SNMP V3 USER NAME       : root
UPS SNMP V3 USER AUTHENTICATION PASSWORD : *****
UPS SNMP V3 USER AUTHENTICATION PROTOCOL : MD5
UPS SNMP V3 USER PRIVATE PASSWORD : *****
UPS SNMP V3 USER PRIVATE PROTOCOL : DES
UPS SNMP V3 USER SECURITY LEVEL : authPriv

UPS NON PROTECT STATE ACTION : donothing
UPS ON BATTERY TIMER (seconds | minutes) : 15
UPS MINIMUM REMAINING BACKUP TIME THRESHOLD (minutes) : 25
UPS MINIMUM REMAINING BACKUP PERCENTAGE THRESHOLD (%) : 50

UPS OUTLETS POWER-OFF TIMER (minutes) : 10
UPS OUTLETS POWER-ON TIMER (minutes) : 5

PPM HOST USAGE MODE         : cluster
VM HANDLING MODE            : shutdown

VM HANDLING SHUTDOWN PRIORITY GROUP 1 DELAY (seconds) : default (60)
VM HANDLING SHUTDOWN PRIORITY GROUP 2 DELAY (seconds) : default (60)
VM HANDLING SHUTDOWN PRIORITY GROUP 3 DELAY (seconds) : default (60)
VM HANDLING SHUTDOWN PRIORITY GROUP 4 DELAY (seconds) : default (60)

PPM APPLIANCE VIRTUAL MACHINE TAG :
VSAN APPLIANCE VIRTUAL MACHINE TAG :

PPM OWNER NODE PVE USER     :
PPM OWNER NODE IP ADDRESS   :
PPM OWNER NODE PVE PASSWORD :

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

4.2.4 CLUSTER ACCESS CONFIGURATION

This section covers the configuration for the access to the PPM owner node and optional VSAN appliance. Please note that shutdown configuration for Linux Containers (LXC) is not yet supported.

- **Overview of the tags and cluster access credentials**

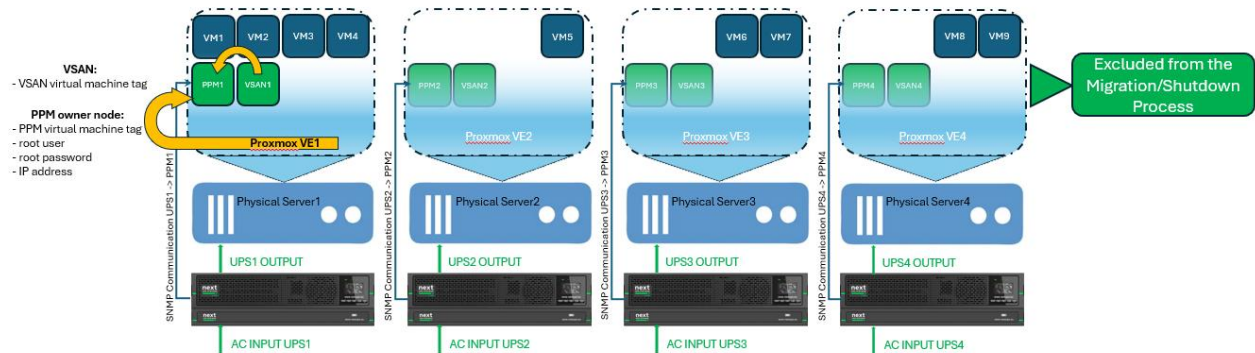
A typical cluster environment will consist of multiple Physical Servers, each hosting a Proxmox VE node. On each node an additional VM will host the Power Protection Manager (PPM), and an optional VM when using a VSAN (HCI storage). These two VM's should be excluded from the migration/shutdown process in case of a power failure.

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 (! case-sensitive !) of the appropriate VM on the Proxmox VE host.

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

- **PPM owner node PVE user**
- **PPM owner node PVE IP address**
- **PPM owner node PVE password**



Cluster Access Overview: (example with 4 nodes in a cluster)

- **Set PPM appliance virtual machine tag**

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

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

[IMPORTANT] Only alphanumeric and `._-` characters are allowed. The value is limited to 30 characters.

Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c -u ppmvm_tag 'NEXTUPS-PPM-PVETEST01'
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/shutdown process:

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

[IMPORTANT] Only alphanumeric and `._-` characters are allowed. The value is limited to 30 characters.

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 PPM owner node PVE user**

Set the PPM owner node PVE (root) user name:

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

```
ppm@nextups-ppm:~$ sudo PPM -c -u ppmownernodepve_user 'root'  
PPM: ppmownernodepve_user 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 '10.12.34.21'  
PPM: ppmownernode_ip option has been updated.  
PPM: Restarting service to apply new value...
```

- **Set PPM owner node PVE password**

Set the password for the PPM owner node PVE (root) user:

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

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

Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c -u ppmownernodepve_pass 'N3xt3M3A*-'  
PPM: ppmownernodepve_pass option has been updated.  
PPM: Restarting service to apply new value...
```

4.2.5 CLUSTER MIGRATION CONFIGURATION

This section covers the configuration for migrating the virtual machines in the cluster environment before shutting down the nodes powered by the specific UPS(s). Please note that migration/shutdown configuration for Linux Containers (LXC) is not yet supported.

To set the PPM action to migrating the VMs, the parameter `vmhandling_mode` should be set to 'migrate':

Command: `sudo PPM -c -u vmhandling_mode 'migrate'`

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

Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c -u vmhandling_mode 'migrate'
PPM: vmhandling_mode option has been updated.
PPM: Restarting service to apply new value...
```

- **Configuration parameters and migration process**

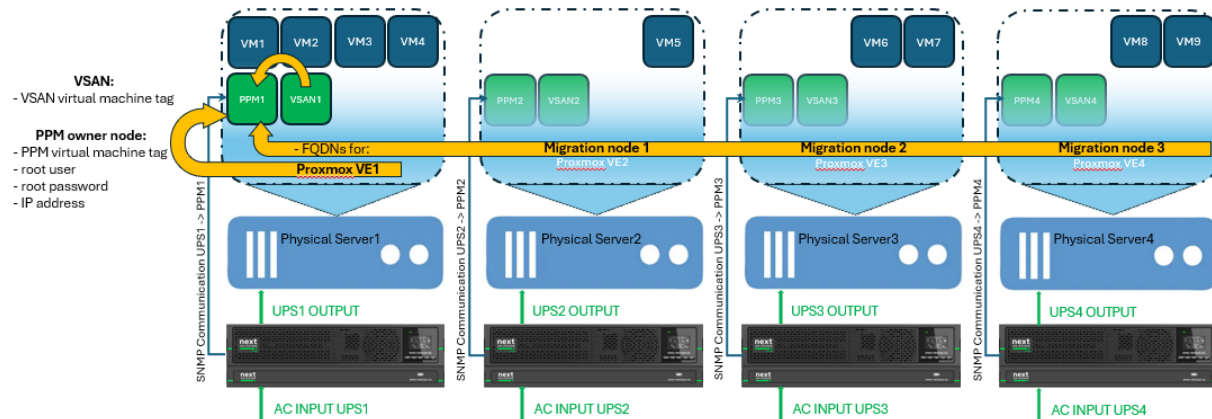
On each node in the cluster environment, the Power Protection Manager (PPM1-4) is installed to configure the migration procedure.

See chapter 4.2.3 CLUSTER ACCESS CONFIGURATION for configuring the tags (! case-sensitive !) for PPM, optional VSAN and the access parameters.

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 Proxmox VE host. At least one migration node is mandatory.

PPM will migrate the active VMs on his 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 host will be put in suspend mode.

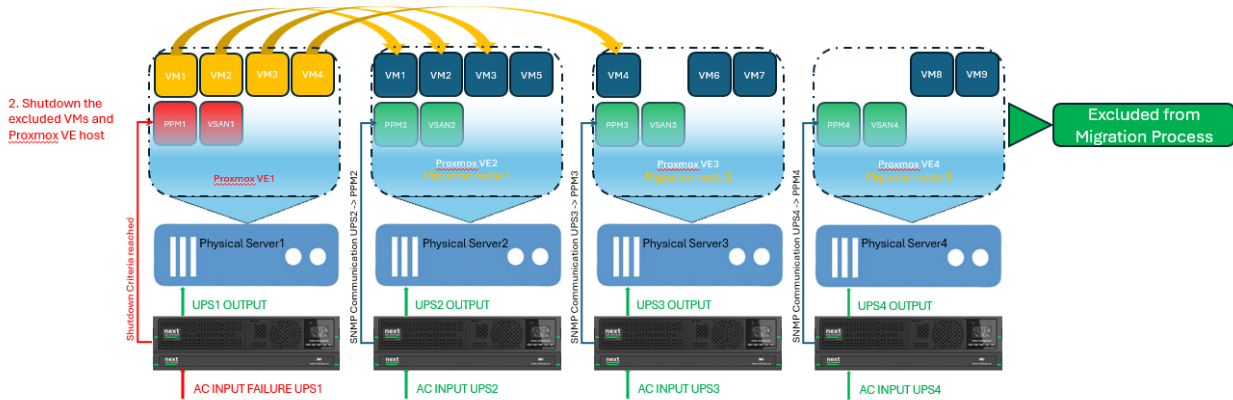
To set the preferred migration order, the **PVE1-3 migration nodes FQDN** need to be configured in each PPM.



Migration parameters overview

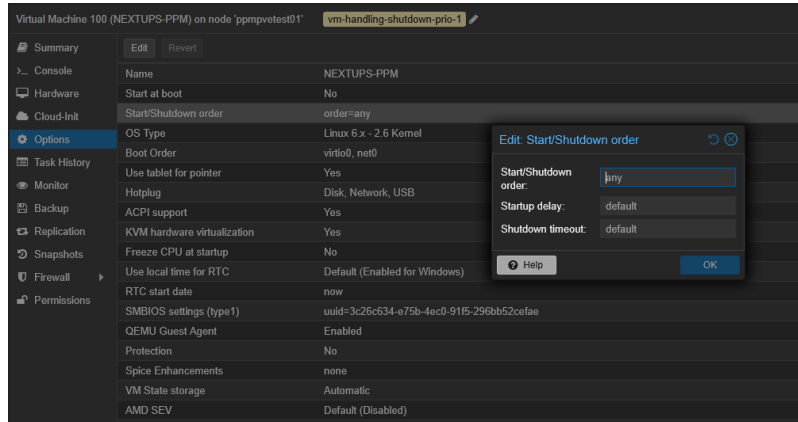
In case of a power failure and the UPS is working on battery power, reaching one of the migration/shutdown parameters (as configured in chapter 4.2.4 MIGRATION/SHUTDOWN PARAMETERS) will start the migration process from the node powered by the UPS to the set migration nodes (excluding the VMs for PPM and VSAN).

1. Migrate the active VMs to Migration nodes 1 to 3 (depending on specified order, accessibility and resources)



Migration process when UPS reaches migration criteria

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



- **Set PVE 1-3 migration nodes FQDN**

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

Command:

```
sudo PPM -c -u pve1migrationnode_fqdn '<value>'
sudo PPM -c -u pve2migrationnode_fqdn '<value>'
sudo PPM -c -u pve3migrationnode_fqdn '<value>'
```

Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c -u pve1migrationnode_fqdn 'ppmpvetest02.sxsr.vlan'
PPM: pve1migrationnode_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 Proxmox VE - 1.2.5 (build pve.20260324)

Configuration file:

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

UPS1 IP ADDRESS                            : 192.168.1.251
UPS1 PASSWORD                              : *****
UPS2 IP ADDRESS                            : 192.168.1.252
UPS2 PASSWORD                              : *****
UPS SNMP VERSION                           : 3
UPS SNMP V2C COMMUNITY                     : private
UPS SNMP V3 USER NAME                     : root
UPS SNMP V3 USER AUTHENTICATION PASSWORD  : *****
UPS SNMP V3 USER AUTHENTICATION PROTOCOL  : MD5
UPS SNMP V3 USER PRIVATE PASSWORD        : *****
UPS SNMP V3 USER PRIVATE PROTOCOL        : DES
UPS SNMP V3 USER SECURITY LEVEL           : authPriv

UPS NON PROTECT STATE ACTION               : donothing
UPS ON BATTERY TIMER (seconds | minutes)   : 15
UPS MINIMUM REMAINING BACKUP TIME THRESHOLD (minutes) : 25
UPS MINIMUM REMAINING BACKUP PERCENTAGE THRESHOLD (%) : 50

UPS OUTLETS POWER-OFF TIMER (minutes)     : 10
UPS OUTLETS POWER-ON TIMER (minutes)      : 5

PPM HOST USAGE MODE                        : cluster
VM HANDLING MODE                           : migrate

PPM APPLIANCE VIRTUAL MACHINE TAG         : NEXTUPS-PPM-TEST01
VSAN APPLIANCE VIRTUAL MACHINE TAG       : VSAN-JDS01

PPM OWNER NODE PVE USER                   : root
PPM OWNER NODE IP ADDRESS                 : 10.12.34.21
PPM OWNER NODE PVE PASSWORD              : *****

PVE1 MIGRATION (TARGET) NODE FQDN        : pmpvetest02.sxsrv.lan
PVE2 MIGRATION (TARGET) NODE FQDN        : pmpvetest03.sxsrv.lan
PVE3 MIGRATION (TARGET) NODE FQDN        : pmpvetest04.sxsrv.lan

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

4.2.6 CLUSTER SHUTDOWN CONFIGURATION

This section covers the configuration for shutting down the virtual machines in the cluster environment before shutting down the nodes powered by the specific UPS(s).

To set the PPM action to shutting down the VMs instead of migrating, the parameter `vmhandling_mode` should be set to 'shutdown':

Command: `sudo PPM -c -u vmhandling_mode 'shutdown'`

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

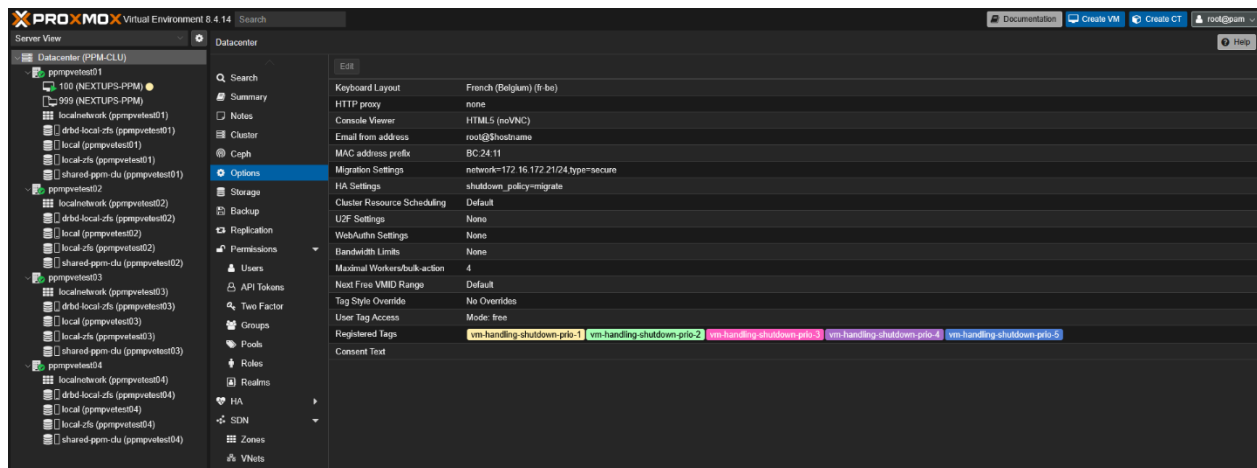
Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c -u vmhandling_mode 'shutdown'

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

After setting the **VM handling mode** to 'shutdown', or each time PPM is restarted, PPM will automatically create 5 tags in Proxmox Datacenter – Options - Registered Tags:

- [VM-HANDLING-SHUTDOWN-PRIO-1](#) -> VM Handling Shutdown Priority Group 1
- [VM-HANDLING-SHUTDOWN-PRIO-2](#) -> VM Handling Shutdown Priority Group 2
- [VM-HANDLING-SHUTDOWN-PRIO-3](#) -> VM Handling Shutdown Priority Group 3
- [VM-HANDLING-SHUTDOWN-PRIO-4](#) -> VM Handling Shutdown Priority Group 4
- [VM-HANDLING-SHUTDOWN-PRIO-5](#) -> VM Handling Shutdown Priority Group 5



These tags can be used to configure the shutdown sequence order for the VMs running on the Proxmox VE host. To configure the shutdown sequence order, these tags should be assigned to the different VMs on the Proxmox VE host.

PPM will shut down the VMs in order of the assigned tags VM-HANDLING-SHUTDOWN-PRIO groups 1 to 5, starting with group 1.

• **Configuration parameters and shutdown process**

On each node in the cluster environment, the Power Protection Manager (PPM1-4) is installed to configure the shutdown procedure.

See chapter 4.2.3 CLUSTER ACCESS CONFIGURATION for configuring the tags (! case-sensitive !) for PPM, optional VSAN and the access parameters.

PPM will shut down VMs (excluding PPM and optional VSAN) in order of the assigned tags VM-HANDLING-SHUTDOWN-PRIO groups 1 to 5, starting with group 1.

Before proceeding with the next group, PPM will wait the time as set in the **VM handling shutdown priority group 1 - 4 delay parameter**.

In case of a power failure and the UPS is working on battery power, reaching one of the migration/shutdown parameters as configured in chapter 4.2.4 MIGRATION/ SHUTDOWN CONFIGURATION, the PPM powered by this UPS will start a shutdown process of the virtual machines running on this node.

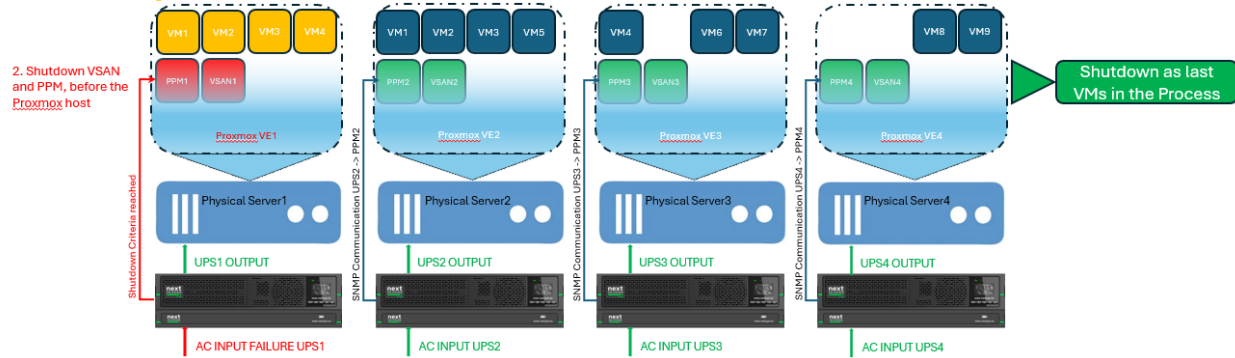
Shutdown of the actual VMs running on this node will start in order of the assigned VM-HANDLING-SHUTDOWN-PRIO group tags.

If no VMs of a particular group is running on this node, PPM will proceed with the next group without waiting for the related delay to expire:

- Start shutdown VMs with assigned tag 'VM Handling Shutdown Priority Group 1'
- Wait for timer 'VM HANDLING SHUTDOWN PRIORITY GROUP 1 DELAY' to expire (if any VMs in group)
- Shutdown VMs with assigned tag 'VM Handling Shutdown Priority Group 2'
- Wait for timer 'VM HANDLING SHUTDOWN PRIORITY GROUP 2 DELAY' to expire (if any VMs in group)
- Shutdown VMs with assigned tag 'VM Handling Shutdown Priority Group 3'
- Wait for timer 'VM HANDLING SHUTDOWN PRIORITY GROUP 3 DELAY' to expire (if any VMs in group)
- Shutdown VMs with assigned tag 'VM Handling Shutdown Priority Group 4'
- Wait for timer 'VM HANDLING SHUTDOWN PRIORITY GROUP 4 DELAY' to expire (if any VMs in group)
- Shutdown VMs with assigned tag 'VM Handling Shutdown Priority Group 5'

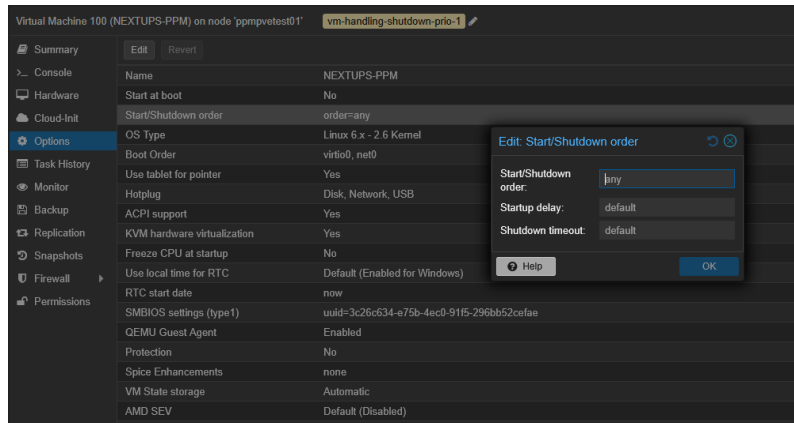
1. Shutdown the active VMs in sequence, as set with the priority tags and timers:

- Shutdown VMs with tag 1, and wait for delay 1
- Shutdown VMs with tag 2, and wait for delay 2
- Shutdown VMs with tag 3, and wait for delay 3
- Shutdown VMs with tag 4, and wait for delay 4
- Shutdown VMs with tag 5



Shutdown process when UPS reaches shutdown criteria

After shutting down the VMs, the remaining VSAN and PPM VMs will be shut down before a graceful shutdown of the host itself. VSAN and PPM shutdown will follow the order as set in the configured Start/Shutdown order:



- **Set VM handling shutdown priority group delay 1-4**

If no value is configured for the delay, 60 seconds will be used as a default value before proceeding to the next group. Set the VM handling shutdown priority group delay 1-4:

Command:

```
sudo PPM -c -u vmhandlingshutdownpriogroup1_delay '<value>'
sudo PPM -c -u vmhandlingshutdownpriogroup2_delay '<value>'
sudo PPM -c -u vmhandlingshutdownpriogroup3_delay '<value>'
sudo PPM -c -u vmhandlingshutdownpriogroup4_delay '<value>'
```

[IMPORTANT] Default value is 60 if setting is not set. Valid settings are: 0 to 9999 (seconds)

Return Output:

```
ppm@nextups-ppm:~$ sudo PPM -c -u vmhandlingshutdownpriogroup1_delay '120'
PPM: vmhandlingshutdownpriogroup1_delay 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 Proxmox VE - 1.2.5 (build pve.20260324)

Configuration file:

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

UPS1 IP ADDRESS : 192.168.1.251
UPS1 PASSWORD : *****
UPS2 IP ADDRESS : 192.168.1.252
UPS2 PASSWORD : *****
UPS SNMP VERSION : 3
UPS SNMP V2C COMMUNITY : private
UPS SNMP V3 USER NAME : root
UPS SNMP V3 USER AUTHENTICATION PASSWORD : *****
UPS SNMP V3 USER AUTHENTICATION PROTOCOL : MD5
UPS SNMP V3 USER PRIVATE PASSWORD : *****
UPS SNMP V3 USER PRIVATE PROTOCOL : DES
UPS SNMP V3 USER SECURITY LEVEL : authPriv

UPS NON PROTECT STATE ACTION : donothing
UPS ON BATTERY TIMER (seconds | minutes) : 15
UPS MINIMUM REMAINING BACKUP TIME THRESHOLD (minutes) : 25
UPS MINIMUM REMAINING BACKUP PERCENTAGE THRESHOLD (%) : 50

UPS OUTLETS POWER-OFF TIMER (minutes) : 10
UPS OUTLETS POWER-ON TIMER (minutes) : 5

PPM HOST USAGE MODE : cluster
VM HANDLING MODE : shutdown

VM HANDLING SHUTDOWN PRIORITY GROUP 1 DELAY (seconds) : 120
VM HANDLING SHUTDOWN PRIORITY GROUP 2 DELAY (seconds) : default (60)
VM HANDLING SHUTDOWN PRIORITY GROUP 3 DELAY (seconds) : default (60)
VM HANDLING SHUTDOWN PRIORITY GROUP 4 DELAY (seconds) : default (60)

PPM APPLIANCE VIRTUAL MACHINE TAG : NEXTUPS-PPM-TEST01
VSAN APPLIANCE VIRTUAL MACHINE TAG : VSAN-JDSS01

PPM OWNER NODE PVE USER : root
PPM OWNER NODE IP ADDRESS : 10.12.34.21
PPM OWNER NODE PVE PASSWORD : *****

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 Proxmox VE

Service status           : Running
Service version          : 1.2.5 (build pve.20260324)
Mail agent status        : Running

Customer tag             : NUS-EMEA

UPS1
----
UPS IP address           : 192.168.1.251
UPS MAC address          : 00-20-85-C2-01-F7
UPS status                : On Line
UPS time on battery       : 00:00:00 (hh:mm:ss)
UPS battery status        : Normal
UPS battery voltage       : 84.4V
UPS battery capacity      : 100%
UPS battery remaining backup time : 86 minutes
UPS battery temperature   : 25 degrees Celsius
UPS output load           : 23%
UPS output AC voltage (configured) : 230V
UPS output frequency      : 50Hz
UPS name                  : Demo_Proxmox_Li-Ion
UPS location              : Server_Rack_LAB0
UPS technology            : ON-LINE
UPS network management card (NMC) firmware : 3.7.0.3
UPS serial number         : CP10P331298004

UPS2
----
UPS IP address           : 192.168.1.252
UPS MAC address          : 00-20-85-C2-01-F8
UPS status                : On Line
UPS time on battery       : 00:00:00 (hh:mm:ss)
UPS battery status        : Normal
UPS battery voltage       : 84.4V
UPS battery capacity      : 100%
UPS battery remaining backup time : 82 minutes
UPS battery temperature   : 25 degrees Celsius
UPS output load           : 25%
UPS output AC voltage (configured) : 230V
UPS output frequency      : 50Hz
UPS name                  : Demo_Proxmox_Li-Ion
UPS location              : Server_Rack_LAB0
UPS technology            : ON-LINE
UPS network management card (NMC) firmware : 3.7.0.3
UPS serial number         : CP10P331298005

Last 10 logs:
-----
21-01-2025 12:16:01 - The status of UPS "Demo_Proxmox_Li-Ion" with IP "192.168.1.251" is Not Detected
21-01-2025 12:16:07 - The status of UPS "Demo_Proxmox_Li-Ion" with IP "192.168.1.251" is On Line --
no timer activated (anymore)
21-01-2025 12:16:19 - The status of UPS "Demo_Proxmox_Li-Ion" with IP "192.168.1.251" is Not Detected
21-01-2025 12:16:25 - The status of UPS "Demo_Proxmox_Li-Ion" with IP "192.168.1.251" is On Line --
no timer activated (anymore)
21-01-2025 12:17:04 - The status of UPS with IP "192.168.1.251" is Not Detected
21-01-2025 12:19:39 - The status of UPS "Demo_Proxmox_Li-Ion" with IP "192.168.1.251" 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 MAC address	: MAC address of the monitored UPS
UPS status	: shows the status/output of the monitored UPS. Depending on the UPS technology this can be: <ul style="list-style-type: none"> - 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 output AC voltage (configured)	: configured output AC voltage of the UPS
UPS output frequency	: actual output frequency of the UPS
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 network management card (NMC) firmware	: shows the FW version of the network management 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, Proxmox VE 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:

example of a
ppm_config_export file:

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

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

# SNTP timezone
TIMEZONE="Europe/Brussels"

# Path to script
UPSONBATTERYTIMERSSCRIPT="/opt/ppm/scripts/upsonbatterytimersshutdownPVE.sh"
UPSBATTCRITMINREMAINSCRIPT="/opt/ppm/scripts/upsbatcritminremainshutdownPVE.sh"
UPSBATTCRITPCNTSCRIPT="/opt/ppm/scripts/upsbatcritpcntshutdownPVE.sh"

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

# UPS1 IP address (IPv4)
UPS1IP="192.168.1.251"

# UPS2 IP address (IPv4)
UPS2IP="192.168.1.252"

# UPS SNMP version
UPSSNMPVERSION="3"

# UPS SNMP v2c community
UPSSNMPV2CCOMMUNITY="private"

# UPS SNMP v3 authentication
UPSSNMPV3USER="root"
UPSSNMPV3USERAUTHPASS="password"
UPSSNMPV3USERAUTHPROTOCOL="MD5"
UPSSNMPV3USERPRIVPASS="Password"
UPSSNMPV3USERPRIVPROTOCOL="DES"
UPSSNMPV3USERSECLEVEL="authPriv"

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

# Value in seconds (s) or minutes (m)
UPSONBATTERYTIMER="15m"

# Value in minutes (m)
UPSBATTCRITMINREMAIN="25"
UPSONLINEPOWEROUTLETSCONTROLLOFFTIMER="10"
UPSONLINEPOWEROUTLETSCONTROLONTIMER="5"
UPSLINEINPOWEROUTLETSCONTROLLOFFTIMER=""
UPSLINEINPOWEROUTLETSCONTROLONTIMER=""

# Value in percentage
UPSBATTCRITPCNT="50"

# PPM host usage mode
PPMHOSTUSAGEMODE="cluster"

# Virtual machine handling mode
VMHANDLINGMODE="shutdown"

# Virtual machine shutdown delay (in seconds) between tag priority groups
VMHANDLINGSHUTDOWNDELAYTAGPRIORGROUP1="120"
VMHANDLINGSHUTDOWNDELAYTAGPRIORGROUP2=""
VMHANDLINGSHUTDOWNDELAYTAGPRIORGROUP3=""
VMHANDLINGSHUTDOWNDELAYTAGPRIORGROUP4=""

# PPM appliance virtual machine tag (name)
PPMAPPTAG="NEXTUPS-PPM-TEST01"

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

```
# PVE root user
PVEUSER="root"
PPMOWNERNODEPVEUSER="root"

# PVE IP addresses (IPv4)
PVE1IP=""
PVE2IP=""
PVE3IP=""
PPMOWNERNODEIP="10.12.34.21"

# PVE FQDN
PVE1MIGNODEFQDN="ppmpvetest02.sxsr.v.lan"
PVE2MIGNODEFQDN="ppmpvetest03.sxsr.v.lan "
PVE3MIGNODEFQDN="ppmpvetest04.sxsr.v.lan "

# Alert mail sender
MAILSENDER="service@nextups.eu"

# 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 '/home/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 Proxmox VE - Software:

Date	Changes	Version No	Build version
21/01/2025	Initial release	1.0	build 20241206
28/02/2025	Cosmetic enhancement to configuration overview	1.0.1	build pve.20250226
01/07/2025	Add UPS power outlets control option	1.1	build pve.20250625
25/09/2025	Add failover cluster support (only VMs, no containers)	1.2	build pve.20250917
27/10/2025	Cosmetic enhancements	1.2.1	build pve.20251024
30/12/2025	Add MAC address to UPS system information	1.2.2	build pve.20251230
16/01/2026	Add support for Network Management Card III	1.2.3	build pve.20260116
08/03/2026	Add power outlets control support for UPSs with Network Management Card III Add 10 minutes timeout for inactive sessions	1.2.4	build pve.20260308
24/03/2029	Cosmetic enhancements	1.2.5	build pve.20260324

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 20241206 - Initial release
v1.0.1 - build pve.20250226 - Cosmetic enhancement to configuration overview
v1.1 - build pve.20250625 - Add power outlets control option
v1.2 - build pve.20250917 - Add failover cluster support (only VMs, no containers)
v1.2.1 - build pve.20251024 - Cosmetic enhancements
v1.2.2 - build pve.20251230 - Add MAC address to UPS system information
v1.2.3 - build pve.20260116 - Add support for Network Management Card III
v1.2.4 - build pve.20260308 - Add power outlets control support for UPSs with Network Management Card III
- Add 10 minutes timeout for inactive sessions
v1.2.5 - build pve.20260324 - Cosmetic enhancements
```

Release notes for the Power Protection Manager (PPM) for Proxmox VE - Manual:

Date	Changes	Version No
16/01/2026	First draft PPM manual for Proxmox Cluster	1.01
08/03/2026	Add power outlets control support for UPSs with Network Management Card III Add 10 minutes timeout for inactive sessions	1.02
24/03/2026	Cosmetic enhancements	1.03