



# Pulse One

## Getting Started Guide

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Pulse One Getting Started Guide

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# Introduction

The PSA7000 line of appliances support three personalities: Pulse Connect Secure, Pulse Policy Secure and Pulse One. Pulse One is a management platform that provides unified management and troubleshooting for Pulse Connect Secure (PCS) and Pulse Policy Secure (PPS).

Pulse One provisioning is a two-steps process:

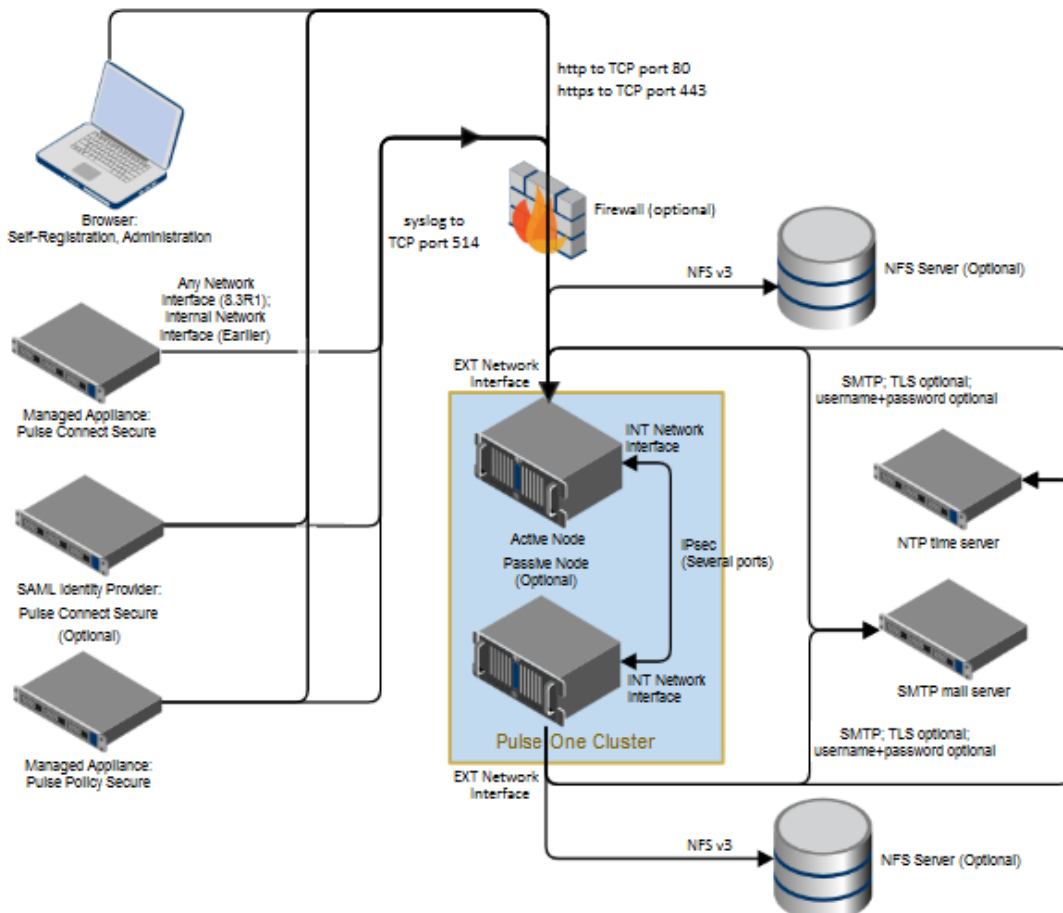
1. bring the appliance online and
2. upgrade the appliance to a current version

This document highlights:

- Pulse One Appliance Architecture
- First Time Setup - the initial configuration using the Pulse One Command Line Interface (CLI)
- Upgrade Pulse One Appliance
- Set Up Pulse One Appliance as a Syslog Server
- Mount NFS Share on Pulse One
- Set Up a Two-node Active/Passive Cluster

## Pulse One Appliance Architecture

The following diagram shows the Pulse One appliance architecture.



# First Time Setup

When accessing the Pulse One CLI for the first time, the system prompts to set up a user name and password for terminal access. On subsequent login attempts, the system prompts with "Press <Enter> to log into Pulse One". Please follow the on-screen instructions to complete this step.

```
You need to set a username and password for your terminal user
Username [serveradmin]:
```

To set up the Pulse One appliance, it is recommended to have the following information handy before beginning the process:

- Static IP Address along with:
  - Default Gateway
  - Network Mask
- Unique Hostname - Optional
- Unique Fully Qualified Domain Name
- Email Information
  - SMTP server IP address or FQDN
  - SMTP server port
  - SMTP Username
  - SMTP Password
- NTP server IP address (to diagnose NTP client)
- Five DNS Records for Pulse One:
  - DNS entry for the Pulse One FQDN. Example: pulseone.example.com
  - DNS entry for Pulse One API Access. Example: **api**.example.com (if Pulse One FQDN is pulseone.example.com)
  - DNS entry for Pulse One UI Access. Example: **ui**.example.com (if Pulse One FQDN is pulseone.example.com)
  - DNS entry for Pulse One OCSP Support. Example: **ocsp**.example.com (If Pulse One FQDN ends with example.com)
  - DNS Entry for Pulse One iOS Support. Example: **iosmdm**.example.com (If Pulse One FQDN ends with example.com)

---

 **Note:** In the examples above, the sub-domains api, ui, ocsp and iosmdm must match exactly.

---

- One Wildcard or SAN certificate (with the FQDN as the common name and the other two DNS entries as Subject Alternative Names)
- SSL Certificates – RSA 2048-bit server certificates (please note that it is required to paste the contents of the key, cert, and ca-chain into the Pulse One Appliance CLI):
  - Public key in PEM format
  - Private key in PEM format. Ensure the Private key is neither encrypted nor password protected.
  - Certificate Chain in PEM format
- One Administrative Email Address – to set up the Pulse One Super Admin account

# CLI Commands

The Pulse One appliance is configured using a command line interface. Screenshots of each CLI command accompany the instructions below. The commands needed to fully provision the Pulse One appliance are listed in order.

## Help

Help command gives a list of all commands, or gives help on individual commands.

To get started, type `help`.

```
Pulse One > help
Usage: [OPTIONS] COMMAND [ARGS]...

Pulse One

Options:
  --help Show this message and exit.

Commands:
  account      Manage admin accounts
  cluster      Manage cluster
  help         Show command help
  https        Configure HTTPS SSL/TLS settings
  licenses     Manage licenses
  log-aggregator Manage log-aggregator component settings.
  logout       Log out
  network      Configure network settings
  ntp          A command to configure and diagnose problems...
  services     Manage services
  smtp        Configure SMTP settings
  system       Manage system
```

To get help on sub-commands, type the following command:

```
help <command>
```

or

```
<command> --help
```

## Network Setup

### Configure network interfaces

```
Pulse One > help network
Usage: network [OPTIONS] COMMAND [ARGS]...

Configure network settings

Options:
  --help Show this message and exit.

Commands:
  arp          Address resolution utility
  dns          Configure DNS lookup servers
  hostname     Set hostname
  interface    Configure interface settings
  nslookup     DNS lookup utility
  ping        Ping utility Will send 10 packets or execute...
  show         Show network settings
  traceroute   Traceroute utility
```

The Pulse One appliance has following two ports:

- **eth0** = external = labeled **EXT** on hardware  
The external port is used for all communication to the Pulse One appliance and between the Pulse One Appliance and PCS/PPS appliances.
- **eth1** = internal = labeled **INT** on hardware  
The internal port is only used for communicating between the Pulse One appliances for data replication and failover purposes.

To configure the external and internal interfaces, type the following commands:

```
network interface external --ip <ip address> --netmask <netmask address> --gateway <gateway address>
network interface internal --ip <ip address> --netmask <netmask address>
```

---

 **Note:**

- The external interface requires gateway IP.
  - Network **internal** | **external** interfaces no longer take **enable** | **disable** options. In order to disable the internal interface, disconnect the network connection; for example, physically unplug the internal interface network cable.
  - The Pulse One appliance reserves network 192.170.0.0/24 for its internal functions. Do not use the IP addresses 192.170.0.1 to 192.170.0.254 to configure the external or internal interface on the Pulse One appliance. Doing so will affect the proper functioning of Pulse One.
- 

## Configure DNS

To configure the primary and secondary DNS addresses, type the following command:

```
network dns -p <ip> -s <ip>
```

## Configure Hostname - Optional

To configure the Pulse One hostname, type the following command:

```
network hostname <hostname>
```

---

 **Note:** Reboot the appliance after changing the hostname.

---

To verify the hostname change, type the following command:

```
network show
```

## Configure SMTP

```
Pulse One > help smtp
Usage: smtp [OPTIONS] COMMAND [ARGS]...

  Configure SMTP settings

Options:
  --help  Show this message and exit.

Commands:
  set      Modify SMTP configuration
  show     Show SMTP settings
```

To configure the SMTP settings, type the following command:

```
smtp set --sender <from email address> -s <server address> -p <port> -u <username> --password
```

**i** Note: The --password option will prompt for a password.

To verify the SMTP settings change, type the following command:

```
smtp show
```

## Configure NTP

```
Pulse One > help ntp
Usage: ntp [OPTIONS] COMMAND [ARGS]...

  A command to configure and diagnose problems with ntp client

Options:
  --help  Show this message and exit.

Commands:
  pool      Add or update NTP pool See...
  remove    Remove server or pool.
  server    Add or update NTP server See...
  show      Show NTP settings
```

To configure the NTP settings, type the following command:

```
ntp server <ntp server address or name> --enable
```

To verify the NTP settings change, type the following command:

```
ntp show
```



## Configure HTTPS

**Note:** Each "set" command will prompt to paste certificate info from the PEM files.

```
Pulse One > help https set
Usage: https set [OPTIONS] COMMAND [ARGS]...

  Set HTTPS settings

Options:
  --help  Show this message and exit.

Commands:
  ca-bundle  Set the HTTPS certificate authority bundle
  cert       Set the HTTPS certificate
  key        Set the HTTPS certificate key
```

To set the key (key file typically has a .key extension), type the following command:

```
https set key
```

To set the certificate (certificate file typically has a .cert extension), type the following command:

```
https set cert
```

To set the CA bundle (CA bundle file typically has .ca-bundle or .cert extension), type the following command:

```
https set ca-bundle
```

To verify the certificate setting, type the following command:

```
https show cert
```

```
Pulse One > help https show
Usage: https show [OPTIONS] SETTING

  Show HTTPS setting

Options:
  --help  Show this message and exit.
```

## Add Licenses

To add licenses, type the following commands:

For configuration distribution:

```
licenses add <license_key_1>
```

For logging (sending syslog data from PCS/PPS):

```
licenses add <license_key_2>
```

For reports:

```
licenses add <license_key_3>
```

```
Pulse One > help licenses
Usage: licenses [OPTIONS] COMMAND [ARGS]...

Manage licenses

Options:
  --help Show this message and exit.

Commands:
  add Add license KEY to system
```

## Create Pulse One Domain

It is required to initialize the database and create a single domain name.

```
Pulse One > help system
Usage: system [OPTIONS] COMMAND [ARGS]...

Manage system

Options:
  --help Show this message and exit.

Commands:
  backup      Backup and restore system
  destroy     Reset various data on appliance to factory...
  provision   Provision new Pulse One environment
  reboot      Reboot system
  snapshot    Take snapshot of application logs and system...
  upgrade     Upgrade Pulse One.
  version     Display Pulse One version info
```

To create the domain name, type the following command:

```
system provision <Pulse One FQDN name in lower-case characters> --admin-username <username> --admin-email <admin email address>
```

Ensure to use only lower-case characters for FQDN name; pulseone.example.com is an example of an FQDN.

**Note:** The system prompts for a password. This admin username/password combination is used to log in to the admin browser console.

## Verify Provisioning and Browser Login

Upon successful completion of the Create Pulse One Domain step above, you should be able to log in to the system which is up and running. Using the example names above, log in to <https://pulseone.example.com> using the admin user and password credentials created above.

## Manage Services

The Services command allows to start a service and to view its status.

```
Pulse One > help services
Usage: services [OPTIONS] COMMAND [ARGS]...

Manage services

Options:
  --help Show this message and exit.

Commands:
  logs    View logs for SERVICE(s) By default only app...
  restart Restart SERVICE(s) By default all services...
  start   Start all services
  status  Service status
  stop    Stop all services
```

To start the service, type the following command:

```
services start
```

To view the service status, type the following command:

```
services status
```

For additional help about services, type the following command:

```
services --help
```

## View Logs

To view the service logs, type the following command:

```
services logs ALL
```

```
Pulse One > help services logs
Usage: services logs [OPTIONS] [SERVICE]...

View logs for SERVICE(s)

By default only app services are included. To view all services, use "ALL"
for SERVICE.

Options:
  --tail INTEGER Number of log lines to show per service
  --follow / --no-follow Follow logs as they are updated
  --help Show this message and exit.
```

## Backup and Restore

The Backup feature provides the means to back up and export the Pulse One config (example provisioning config values, certs, registered PCS/PPS devices, etc.) and data (example search indices, distributed FS data, etc.).

### Note:

- It is recommended to back up only the master node of a cluster. Backing up and restoring of a Passive appliance in a cluster is not recommended/supported because the provisioning and associated appliance information cannot be retrieved from a Passive appliance as the cluster needs to be reformed.
- The appliance should be offline before backing up. If the appliance is online, run the **services stop** command to switch the appliance to offline.
- The backup requires `external` network interface be configured.
- Incremental backup, selective backup, backup to NFS, and backup encryption are not supported in this release.
- Backup of data stored outside the appliance is not supported.
- The importing is limited to the same system version of source and target, e.g., a backup archive of 1723 can only be used to restore to another 1723 appliance.
- Do not run the **system provision** command before importing. If the **system provision** command is run before importing, all Pulse Connect Secure and Pulse Policy Secure appliances may become unregistered.

```
Pulse One > system backup
Usage: system backup [OPTIONS] COMMAND [ARGS]...

Backup and restore system

Options:
  --help  Show this message and exit.

Commands:
  export  Backup system and export archive
  import  Import backup archive and restore system
```

To back up Pulse One config and data files on the appliance:

1. Type the following command:

```
system backup export
```

Upon successful completion, a URL to download the backup is displayed.

2. Use the URL to download the backup file.
3. Once the download is complete, press **Ctrl+C**. The backup file on the appliance is deleted.

To restore a clustered (master) appliance:

1. Restore master appliance configuration onto an appliance.
2. Demote the Passive node of the cluster.
3. Demote the now restored master node of the cluster.
4. Regenerate the cluster using the How-To guide of forming a cluster.

---

**Note:** After demoting an appliance (Active node or Passive node), reboot the appliance. The Internal port will be automatically disabled. If the appliance needs to be clustered again, configure the internal interface prior to executing rest of the clustering commands.

---

To restore the backup file:

1. Type the following command:

```
system backup import
```

The following message appears: "This will destroy all files and configuration currently on this appliance. Type "DESTROY" to continue?".

2. Type **DESTROY**.

A URL to upload the backup is displayed.

3. Use the URL to upload the backup file.

Once the upload is complete, the message "Restore backup (details about backup size and MD5) now?" is displayed.

4. Type **Y** and press **Enter**.
  - All data and configs are destroyed.
  - Backup is restored.
  - The Backup file is deleted from the appliance.

## Snapshot of Pulse One Config and Appliance Logs

To create a snapshot of Pulse One config and appliance logs, type the following command:

```
system snapshot
```

Upon successful completion, use the received URL and MD5 to download and checksum the snapshot archive.

After successful download, when prompted, press **Ctrl+C**.

```
Pulse One > help system snapshot
Usage: system snapshot [OPTIONS]

Take snapshot of application logs and system info

Options:
--help Show this message and exit.
```

---

**Note:**

- Passwords and other secret or private tokens are not captured in the snapshot.
  - Snapshot requires "external" network interface to be configured.
-

## Additional CLI Admin Accounts

The limitation of single CLI admin account to be used by multiple administrators is overcome by providing additional admin accounts.

```
Pulse One > help account
Usage: account [OPTIONS] COMMAND [ARGS]...

Manage admin accounts

Options:
  --help  Show this message and exit.

Commands:
  create  Creates a CLI admin account
  delete  Deletes the CLI admin account
  list    Lists existing admin accounts
  password Manage passwords
```

To create a new admin account, type the following command:

```
account create <new_account_name>
```

To change the admin password, type the following command:

```
account password change
```

To reset the admin password, type the following command:

```
account password reset
```

After accepting the user name, the password is reset to a temporary one. In the next login, the password needs to be changed.

To delete an admin account, type the following command:

```
account delete <account_name>
```

To list all the admin accounts, type the following command:

```
account list
```

---

### Note:

- Account creation, change, deletion should be done on the active node.
  - Created accounts should be replicated to the passive node.
-

# Upgrade Pulse One Appliance

Before upgrading the Pulse One appliance, ensure that the network, gateway, and DNS are configured on the appliance. If you are upgrading from Pulse One 2.0 1637, ensure that the management port is configured to access the UI.

---

**Note:**

- Upgrade process preserves all the already existing data if the upgrade is from Pulse One 2.0 1649 to Pulse One 2.0 1723.
- Upgrade process **does not** preserve the existing data if the upgrade is from Pulse One 2.0 1637 to Pulse One 2.0 1723.

---

To upgrade an existing version of the Pulse One appliance to a new version, do the following:

1. Download the upgrade package from <https://my.pulsesecure.net>.
2. Host the upgrade package on a web server accessible by the Pulse One appliance.
3. Log in to the Pulse One appliance.
4. From the CLI, run the following command:  
**# system upgrade <url of the hosted upgrade package> <hash of the upgrade package>**

---

**Note:** The required hash is an MD5 hash. If it is not provided, create one from the terminal as follows:

**# md5 <full path to upgrade package>**

- 
5. Once the upgrade is complete, press **Enter** to reboot the system. Wait for the system to reboot successfully before continuing to the next step.
  6. Log back into the system using your preset CLI credentials.
  7. Change any of the preset system settings as needed. For the changed settings to take effect, run the following command:  
**# services restart**
  8. Verify upgrade is successful by logging into the Pulse One UI and confirming current running server version under 'Pulse One Properties' is as expected.

---

**Note:** After a successful upgrade, if the upgrade is from Pulse One 2.0 1637 (factory image) to Pulse One 2.0 1723, ensure to physically move the cable connected to management interface to the external interface for the system to continue to work as normal. Ensure to move the cable only after the successful upgrade.

---

# Set Up Pulse One Appliance as a Syslog Server

To set up Pulse One appliance as a syslog server, follow the below steps:

1. Install, deploy and provision Pulse One appliance.
2. Procure the Pulse Connect Secure or Pulse Policy Secure appliance and log in to the appliance.
3. Navigate to **System > Log/Monitoring > (Events/User Access/Admin Access/Sensors) > Settings**.

**Note:** Syslog servers can be added for each of the following Log settings:

Events, User Access, Admin Access, Sensors

4. Once on the appropriate page, under 'Select Events to Log', select all options that need tracking and click **Save**.

The screenshot shows the Pulse Secure web interface for configuring Syslog Servers. The 'Advanced Settings' tab is selected. The 'Select Events to Log' section is expanded, showing various event categories with checkboxes. The 'Syslog Servers' section is also expanded, showing a table with columns for Server name/IP, Facility, Type, Client Certificate, and Filter. A red box highlights the 'Select Events to Log' section and the 'Syslog Servers' table.

Server name/IP	Facility	Type	Client Certificate	Filter
10.64.111.112	LOCAL1	TCP	Select Client Cert	WELF:WELF

5. On the same page, specify the following under 'Syslog server':

**Server name IP:** 10.64.XX.YY for instance

**Facility:** Local 0 thru 7. To distinguish between different log settings (Events, User Access, Admin Access, Sensors), select different facilities.

**Type:** TCP

**Filter:** WELF: WELF

6. Click the **Add** button to add this external syslog server.
7. Click **Save Changes** to save the configuration.
8. Select the **Advanced Settings** tab and enable **Fault Tolerance** for the Pulse One syslog server.



9. Log in to the on-premise Pulse One appliance.
10. Navigate to **Administration > Appliance Logs**.

All the Logs from the various Log settings added per appliance are forwarded to this page.

**Pulse One** Dashboard Appliances Administration

User Management  
Appliance Activities  
**Appliance Logs**

**Appliance System Logs**

Match ALL

From Oct 17, 2016 19:59:10 to Nov 16, 2016 18:59:10

Search

Priority	Facility	Time	Source	User	ID	Message
Info	local1	2016-11-16 18:54:56 -0800	10.64.45.83	System () []	SYS31282	Finished uploading appliance configuration to Pulse One.
Info	local1	2016-11-16 18:54:54 -0800	10.64.45.83	System () []	SYS31280	Started to upload appliance configuration to Pulse One.
Info	local1	2016-11-16 18:53:49 -0800	10.64.45.83	System () []	SYS31407	Successfully connected with TCP syslog server '10.64.45.179'.
Minor	local0	2016-11-14 17:59:37 -0800	10.64.45.56	System () []	SYS24258	Server rollback
Info	local2	2016-11-14 17:59:27 -0800	10.64.45.56	admindb (Admin Users) [Administrators]	ADM22668	Login succeeded for admindb/Admin Users from 172.20.16.51 via internal port.
Info	local2	2016-11-14 17:59:27 -0800	10.64.45.56	admindb (Admin Users) [Administrators]	ADM23573	admindb/Admin Users logged out from IP (172.20.16.68) because user started new session from IP (172.20.16.61).
Info	local2	2016-11-14 17:59:25 -0800	10.64.45.56	admindb (Admin Users) []	AUT30684	Primary authentication successful for admindb/Administrators from 172.20.16.61
Info	local2	2016-11-14 17:59:19 -0800	10.64.45.56	admindb (Admin Users) [Administrators]	ADM22894	Remote address for user admindb/Admin Users changed from 172.20.16.68 to 172.20.16.61. Access denied.
Minor	local1	2016-11-14 17:59:06 -0800	10.64.45.53	System () []	SYS24258	Server rollback
Info	local0	2016-11-14 17:01:01 -0800	10.64.45.56	System () []	STS20641	Number of concurrent users logged in to the device: 1
Info	local0	2016-11-14 17:01:01 -0800	10.64.45.56	System () []	STS30667	Number of NCP connections: 0
Info	local1	2016-11-14 17:00:52 -0800	10.64.45.53	System () []	STS30667	Number of NCP connections: 0

Rows per page: 50

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Pulse Secure

Pulse One v2.0.0.1631  
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# Mount NFS Share on Pulse One Appliance

Follow the steps to set up Pulse One appliance as an NFS client:

- Mount an NFS Server on Pulse One Appliance
- Configure the NFS 'keep\_days' Field
- Unmount NFS Server from the Pulse One Appliance

Before proceeding with the setup, ensure that:

- NFS server is already set up.
- PSA-7000 running Pulse One is fully set up and provisioned.
- To set up the Pulse One appliance as a cluster, mount the NFS Server first before creating the Active-Passive cluster.
- To cluster both appliances and failover, mount the Pulse One appliances to separate NFS servers.
- For the purposes of clustering, to ensure that the NFS servers on either node continue to work as expected, add the IPs of both the internal and external interface to the '/etc/exports' directory on the NFS server.

## Mount an NFS Server on Pulse One Appliance

To mount an NFS server on Pulse One appliance, do the following:

1. Configure and provision the Pulse One appliance.
2. Ensure that the NFS server is properly set up.
3. Ensure that Pulse One appliance is on a subnet that can reach this NFS server.
4. From the Pulse One CLI, run the following command:

```
log-aggregator show
```

```
Pulse One >
Pulse One > log-aggregator show
keep_days: 30
type: local
```

5. With the above confirmation, proceed to mount the NFS server by running the following command:

```
log-aggregator nfs -v <IP of NFS Server or FQDN>:/<path on remote directory>
```

---

**Note:** To use NFS for log storage, both Active and Passive nodes must be configured to use separate NFS mounts.

---

6. A message "This will delete all existing appliance logs. All services will be stopped if currently running." is displayed. Type **y** to proceed.
- 

**Note:** All current logs will be lost, so perform this step after the initial set up to avoid loss of needed logs.

---

```
[Pulse One > log-aggregator nfs -v 10.64.45.91:/home/qa1/nfs_temp
This will delete all existing appliance logs. All services will be stopped if currently running.
Continue? [y/N]: y
Stopping uno_file-store_1 ... done
keep_days: 30
nfs:
  options: vers=3,nolock,retry=1,rw
  volume: 10.64.45.91:/home/qa1/nfs_temp
type: nfs
```

- To check the status of NFS mount, run the following command:

```
log-aggregator show
```

```
[Pulse One > log-aggregator show
keep_days: 30
nfs:
  options: vers=3,nolock,retry=1,rw
  volume: 10.64.45.91:/home/nfs-temp
type: nfs
```

- NFS server will now be synced with the Pulse One appliance logs. Confirm on the server that Pulse One appliance logs are being synced to it.
- Note that the 'nfs mount' command stops all Pulse One services. To continue accessing the Pulse One UI, run the following command:
 

```
services start
```
- Next, proceed as normal with using Pulse One appliance from the UI.

## Configure the NFS 'keep\_days' Field

The NFS keep\_days is the number of days that the logs will be stored. By default, keep\_days is set to 90 days.

- To change keep\_days, type the following command:
 

```
log-aggregator settings -d <keep_days desired>
```
- A message "This might delete some or all of existing appliance logs. All services will be stopped if currently running." is displayed. Type y to proceed.

```
[Pulse One > log-aggregator settings -d 60
This might delete some or all of existing appliance logs. All services will be stopped if currently running.
Continue? [y/N]: y
Stopping uno_file-store_1 ... done
keep_days: 60
```

- To view the configuration changes, type the following command:

```
log-aggregator show
```

```
[Pulse One > log-aggregator show
keep_days: 60
nfs:
  options: vers=3,nolock,retry=1,rw
  volume: 10.64.45.91:/home/qa1/nfs_temp
type: nfs
```

## Unmount NFS Server from the Pulse One Appliance

To unmount NFS server from the Pulse One appliance, do the following:

1. Run the following command, which deletes all the existing logs:  
`log-aggregator nfs --disable`
2. At the confirmation prompt, type `y`. This will return to local nfs storage for logs again.

```
Pulse One > log-aggregator nfs --disable  
This will delete all existing appliance logs. All services will be stopped if currently  
running.  
Continue? [y/N]: y  
Stopping uno_file-store_1 ... done  
keep_days: 30  
nfs: null  
type: local
```

# Set Up a Two-node Active/Passive Cluster

Pulse One appliances support two-node Active/Passive clustering configuration across a LAN to provide high availability. The two nodes in the cluster must run the same version of Pulse One.

When Pulse One is deployed as an Active/Passive cluster, one Pulse One node actively serves requests while the other node runs passively in the background to synchronize appliance configuration data, system state, and log messages. If the active Pulse One node goes offline, the Passive Pulse One node must be manually promoted to handle active requests.

## Prerequisites for Setting Up Clustering

Pulse One uses internal interface for communication between clustered appliances (appliances in Passive and Active modes). Therefore, each of the two candidate appliances must have their internal interface enabled and a valid and available IPv4 address assigned so as to enable clustering.

To set up clustering, the following prerequisites must be fulfilled:

- Enable Internal Interface - Internal interface may be enabled as follows:  
`network interface internal --ip <IPv4 address> --netmask <subnet mask>`

Example:

```
network interface internal --ip 10.64.45.172 --netmask 255.255.0.0
```

- Test connectivity - To test connectivity between the two appliances, run the following command:  
`network ping <internal IP address of the counterpart>`

IP address used to configure internal or external interface should not be in the range 192.170.0.1 – 192.170.0.254.

## Prerequisites for Configuring an Active/Passive Cluster

To configure an Active/Passive cluster, the following prerequisites must be fulfilled.

- Two Pulse One Appliances – one appliance that will be the Active node and the other will be the Passive node. The Active node must be fully configured and the Passive node must only be set up with Internal and External network interfaces.
- Serial console access – to both the Active and Passive nodes.
- Network connectivity between the Internal interfaces – Pulse One state synchronization occurs only via the internal network interface cards (NICs). Please ensure the internal interface on the Active node can communicate with the internal interface on the Passive node.
- Ports between the Active and Passive nodes – Please refer to the table below for the required ports that MUST be open between the Active and Passive node (in the situation that there is a firewall between them):

Protocol	Port	Purpose
TCP/UDP	500, 4500	Secure channel service
TCP	3306	Data store service
TCP	9200, 9300	Index service
TCP	9210, 9310, 9350	Log indexer
TCP	27017	File store

```
Pulse One > help cluster
Usage: cluster [OPTIONS] COMMAND [ARGS]...

Manage cluster

Options:
  --help  Show this message and exit.

Commands:
  add      Add a Pulse One appliance to this cluster -...
  demote   Demote current node to standalone
  join     Join an existing cluster as a passive node -...
  promote  Promote current node to active and enable...
  status   Report cluster status
```

## Setting Up an Active/Passive Cluster

To set up an Active/Passive cluster, follow the below steps:

1. Start with the node that is intended to use as the Active node. Log in to the CLI. To set the appliance as the current Active node, type the following command:

```
cluster promote
```

```
[Pulse One > cluster promote
Promoting node to active cluster node...
Stopping uno_mongo_1 ... done
Removing uno_mongo_1 ... done
Stopping uno_log_collector_1 ... done
Removing uno_log_collector_1 ... done
node:
  id: af714153564b402b84cae007b183dd24
  ip: 192.168.56.101
  mode: active
```

2. To add the Passive node to the cluster, first, run the following command from the Active node. This will return a command to run on the Passive node.

```
cluster add <Internal IP of intended Passive Node>
```

```
To cluster 192.168.56.102 as a passive Pulse One appliance with this active appliance,
configure networking on the passive appliance and run the following command on it:
```

```
cluster join 192.168.56.101 nv13rvdv
```

---

**Note:** The cluster join token is valid until the token is regenerated by issuing the cluster add command.

---

3. Copy the resultant command from the step above. Log in to the node that is intended to use as Passive, paste it, and press **Enter**. At the Pulse One prompt, type **DESTROY** and press **Enter**.

```
cluster join <Internal IP of the Active Node> <cluster token>
```

```
[Pulse One > cluster join 192.168.56.101 nv13rvdv
WARNING: This will delete all Pulse One data, resetting the appliance to factory defaults.
The data will not be recoverable.
]Type "DESTROY" to continue: DESTROY
]
Resetting data...
Removing directory /data/lost+found
Destroyed.
Joining cluster 192.168.56.101 as a passive node...
```

- Once removal of Pulse One data is completed, type the following command to verify the cluster status on the Passive node:

**cluster status**

```
[Pulse One > cluster status
cluster:
  active_node: 10.64.45.177
  nodes:
    - 10.64.45.177
    - 10.64.45.175
node:
  id: 2dc3c005e9fa4b8d85ad32fffc75f2fc
  ip: 10.64.45.175
  mode: passive
```

---

**Note:** For Pulse One appliance in clustered mode, if its peer is not accessible, **cluster status** command will not return any result. To show current cluster status, press **Ctrl+C**.

---

- Run the same command on the Active node to confirm. This concludes the setup of the Active/Passive cluster.

---

**Note:** For clustered appliances, whenever the active appliance is rebooted, passive appliance needs to be subsequently rebooted for the cluster to fully synchronize again.

---

## Failover Scenarios

When an Active node fails for any reason, there are two methods that can be used to failover to the Passive node:

- Failover via DNS
- Failover via IP address swap

### Failover via DNS

- From the CLI of the Passive node, run the following command.

**cluster demote**

Before performing **cluster demote** on the Passive node, please ensure that the Active and Passive nodes are in sync by running **cluster status**.

---

**Note:**

- Do not change DNS server prior to performing **cluster demote** command. Doing so will cause all managed appliances to de-register from Pulse One and they will need to be deleted, added and registered again. Once a Passive node is in a Standalone mode, it is safe to configure DNS server to have Pulse One FQDNs resolve to the IP address of the Passive node's external interface.
  - After demoting an appliance (Active node or Passive node), reboot the appliance. The Internal port will be automatically disabled. If the appliance needs to be clustered again, configure the internal interface prior to executing rest of the clustering commands.
-

2. Navigate to the DNS server. Make the Pulse One FQDNs resolve to the IP address of the Passive node EXT Interface, i.e, the IP in the DNS entry should now be for the Passive node's EXT interface.
3. Next, set Pulse One DNS record to the IP address (external interface) of the Passive node (which is now demoted to a standalone node).
4. Proceed to log in to the Pulse One admin UI by accessing the Fully Qualified Domain Name on the appliance.

## Failover via interface IP swap

1. From the Passive node, type the following command:

```
cluster demote
```

Before running **cluster demote** on the Passive node, please ensure that the Active and Passive nodes are in sync by running **cluster status**.

2. Run the following command to change the IP of the Passive node (EXT interface) to the IP of the Active node:

```
network interface external --ip <EXT IP of ACTIVE node> --netmask <netmask of ACTIVE node> --gateway <gateway IP address>
```


---

### Note:

- Do not change the external interface of the Passive node prior to performing `cluster demote` command. Doing so will cause all managed appliances to de-register from Pulse One and they will need to be deleted, added and registered again. Once the Passive node is in a Standalone mode, it is safe to configure its external interface to IP of the Active node.
- After demoting an appliance (Active node or Passive node), reboot the appliance. The Internal port will be automatically disabled. If the appliance needs to be clustered again, configure the internal interface prior to executing rest of the clustering commands.

- 
3. Proceed to log in to the Pulse One admin UI by accessing the Fully Qualified Domain Name on the appliance.

---

 **Note:** To use NFS for log storage, both Active and Passive nodes must be configured to use separate NFS mounts.

---




## De-clustering the Active-Passive Cluster

To de-cluster the clustered nodes to standalone nodes, do the following

1. First, demote the Passive node by running the following command:  
`cluster demote`
2. Confirm the following output on the screen that the node is successfully demoted.  
`mode: standalone`
3. After this, successfully demote the Active node by running the following command:  
`cluster demote`
4. Confirm the following output on the screen that the node is successfully demoted.  
`mode: standalone`

The de-clustered appliances will then be running in separate standalone nodes.

---

 **Note:** After demoting an appliance (Active node or Passive node), reboot the appliance. The Internal port will be automatically disabled. If the appliance needs to be clustered again, configure the internal interface prior to executing rest of the clustering commands.

---

# Launch Management Console

To launch the management console, go to the “Address” bar in the browser and type the management console address:

<https://pulseone.example.com>

Where pulseone.example.com is the FQDN as configured in the create domain step above.

To log into the management console, use the username and password created in the “Create Pulse One Domain” step.

# Technical Support

Technical product support is available through the Pulse Secure Global Support Center (PSGSC). If the organization has a support contract, then file a ticket with PSGSC.

- Product warranties—For product warranty information, visit <https://www.pulsesecure.net>
- Find product documentation: <https://www.pulsesecure.net/techpubs/>
- Find solutions and answer questions using our Knowledge Base: <https://www.pulsesecure.net/support>

## Opening a Case with PSGSC

Open a case with PSGSC on the Web or by telephone.

- Use the Case Management tool in the PSGSC at <https://www.pulsesecure.net/support>.
- Call Phone: 1-844-751-7629 (Toll-Free, US).

For international or direct-dial options in countries without toll-free numbers, see <https://www.pulsesecure.net/support>