NerveCenter 7.1 Linux Installation

Linux

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Document History

1 Overview

This document provides instruction on how to prepare a Linux system for use with **NerveCenter 7.1.00**, how to install NerveCenter on the Linux host and how to manage NerveCenter together with the Linux host following the installation.

This document is only a guide and is not intended to be a definitive set of instructions for all sites to follow. Your site requirements will dictate deviations. In general, these steps may be followed to prepare most Linux systems for use with NerveCenter 7.1.00.

1.1 Terminology

NerveCenter is commonly deployed through two types of installations: NerveCenter *Servers* and NerveCenter *Clients*.

* The **NerveCenter Server** is the software package that is installed on a Linux system and runs as a service on that platform.

* The **NerveCenter Client** is the software package that is installed on Microsoft Windows desktops and is used to access NerveCenter Servers running in your environment.

When NerveCenter Server is installed on a Linux host, the result is the addition of NerveCenter as a runnable *service* much like other network services (ex: DNS, DHCP, LDAP Directory Servers, etc.). Thus, the installed NerveCenter Server software package is referred to as the **NerveCenter Service**.

A running NerveCenter Service consists of a collection of processes, each providing function-specific duties as part of NervCenter's overall network management operation. Core to this is the NerveCenter *Server process*, better referred to as **ncserver** so as to distinguish it apart from references to the overall NerveCenter Server software package. Other key processes of the NerveCenter Service are its *SNMP Pollers*, each referred to as an **ncsnmppoller**, associated SNMP Stacks and various notification listeners.

The NerveCenter Client software package, which runs on Windows desktops, provides the means for monitoring and configuring NerveCenter Servers. It consists of an **Administrator** application, used for configuration review and editing, and a **Client** application, used for monitoring, creating and editing NerveCenter's alarm models, polls and trap masks.

This document focuses on installation and configuration of the NerveCenter Server software package. A separate document covers installation and usage of the NerveCenter Client package; see http://docs.logmatrix.com/NerveCenter/7.1.00/ .

1.2 Applicable Linux Distributions

LogMatrix develops and tests NerveCenter 7.1.00 for use on a set a of commercial Linux distributions. LogMatrix strongly recommends selecting a Linux distribution from this set.

Supported Linux Distributions

* ❊ **Red Hat Enterprise Linux 6** (**RHEL6**) for x86-64

* ❊ **Red Hat Enterprise Linux 7** (**RHEL7**) for x86-64

* ❊ **Community Enterprise Operating System 6** (**CentOS6**) for x86-64

* ❊ **Community Enterprise Operating System 7** (**CentOS7**) for x86-64

* ❊ **Oracle Linux 6** for x86-64

* ❊ **Oracle Linux 7** for x86-64

If your site has a need for a Linux distribution outside of this set, contact LogMatrix for assistance.

Note: **NerveCenter 7.1.00** is incompatible with RedHat Enterprise Linux 5 (**RHEL5**) or earlier and thus also Community Enterprise Operating System 5 (**CentOS5**) and earlier plus **Oracle Linux 5** and earlier. Use **NerveCenter 6.1.00** if your site is running RHEL5, CentOS5 or Oracle Linux 5; contact LogMatrix for assistance.

LogMatrix highly recommends obtaining support access for whichever Linux distribution you select and keeping your host system(s) updated with the latest patches.

2   Linux Host Preparation

2.1 Linux Installation

2.2 Network Configuration

While not required, LogMatrix recommends as a best practice that the Linux host's network connections are configured to use static IPv4, and optionally IPv6, addresses. If DHCP is required for your environment, LogMatrix recommends that the DHCP Service is configured to provide a permanent reservation for the Linux host system.

2.3 Groups and Users Accounts

NerveCenter 7.1 requires two entries, 'ncadmins' and 'ncusers', be defined in the Linux host's group database (typically the file /etc/group). These groups are required to exist at the point of installation and will be used thereafter by NerveCenter during its operation.

Create the 'ncadmins' and 'ncuser's groups through the toolset provided with the Linux distribution. Ex: *system-config-users* on RHEL6, CentOS6 and Oracle Linux 6, or *groupadd(8)*, *adduser(8)*, and *usermod(8)* on RHEL7, CentOS7 and Oracle Linux 7.

NerveCenter Server runs in the context of a designated user account. This account must be a member of the 'ncadmins' group. There is no required name for this account.

Note: NerveCenter installation can occur before the 'ncadmins' group is populated. However in order for the NerveCenter installation to be completed, one or more user accounts need to be added to the 'ncadmins' group. Instruction in section 4.1.1 User Account Selection revisits this step.

Note: RHEL7, CentOS7 and Oracle Linux 7 have a default policy of assigning user IDs (UIDs) and group IDs (GIDs) less than 1,000 for system entities and over 1,000 for user-space identities. This differs from RHEL6, CentOS6 and Oracle Linux 6 where the policy was to have system UIDs and GIDs be numbered less than 500.

2.4 Host Software Package Provisioning

NerveCenter 7.1 consists of only 64-bit applications. As a result, no 32-bit software packages need to be present.

2.4.1 RHEL6 and 7, CentOS6 and 7, and Oracle Linux 6 and 7

Ensure the following 64-bit packages and their dependencies are installed before installing NerveCenter. The typical method for package management is through the user of 'yum'

Table 1 Required Software Packages

Package	Command
glibc	**# yum install glibc**
libgcc	**# yum install libgcc**
libxml2	**# yum install libxml2**
libstdc++	**# yum install libstdc++**

Additionally, the following 64-bit packages will be needed if your usage of NerveCenter evolves to include usage of the Perl modules listed in the right-hand column of Table 2 . NerveCenter

itself does not require these Perl modules so these packages are needed only if your usage of NerveCenter or its Perl 5.24.0 environment comes to require them.

Table 2 Optional 32-bit Software Packages

Package	Command	Used by Perl module(s)
Openssl	**# yum install openssl**	**Net::SSLeay**
Libcurl	**# yum install libcurl**	**WWW::Curl**
db4	**# yum install db4**	**DB_File** **NDBM_File**
Gdbm	**# yum install gdbm**	**GDBM_File:w**

2.5 Host Firewall Configuration

The NerveCenter Service – the NerveCenter Server and its related components – running on the Linux host are accessed over your network from client applications running on Windows desktops. The NerveCenter 7.1 Windows Desktop is the typical means for accessing NerveCenter Servers running in your environment. For this access to work, the firewall where the NerveCenter Server is running needs to be configured per the instructions below.

2.5.1 TCP/UDP Ports

To permit network access to the NerveCenter Service, the following ports need to be examined on the Linux host firewall. To review and change the firewall configuration use the management tool provided with your Linux distribution. Ex: *system-config-firewall* on RHEL6, CentOS6 and Oracle Linux 6, */usr/bin/firewall-config* on RHEL7 and CentOS7 and Oracle Linux 7.

Table 3 NerveCenter TCP Ports

32504/tcp	Allows the NerveCenter Service to receive connections from NerveCenter Administrator (ncadmin.exe) and NerveCenter Client (ncclient.exe) applications running on Windows desktops. This port assignment is configurable via the 'Connections' tab of the NerveCenter Administrator application. The NerveCenter Service retains this value in its configuration file at /opt/OSInc/conf/nervecenter.xml .
32505/tcp	Allows the NerveCenter Service to receive notifications sent by other NerveCenter Servers and for NerveCenter Servers to access each other's Node Lists. Should your site have only one NerveCenter Server installation or not require

	NerveCenter-to-NerveCenter Informs or Node List acquisition, this port does not need to be open. This port assignment is configurable via the 'Connections' of the NerveCenter Administrator application. The NerveCenter Service retains this value in its configuration file at /opt/OSInc/conf/nervecenter.xml .
32506/tcp	Allows the NerveCenter Service to receive connections from NerveCenter Command (nccmd.exe), a command-line utility, running on Windows systems. Should your site not plan to use the NerveCenter Command utility from remote desktop hosts, this port does not need to be open. This port assignment is configurable via the 'Connections' tab of the NerveCenter Administrator application. The NerveCenter Service retains this value in its configuration file at /opt/OSInc/conf/nervecenter.xml .
32508/tcp	Allows the NerveCenter Service to receive connections to its API interface from scripts running on remote systems. Should your site not plan to use the NerveCenter API from remote systems or desktops, this port does not need to be open. This port assignment is configurable via the 'Connections' tab of the NerveCenter Administrator application. The NerveCenter Service retains this value in its configuration file at /opt/OSInc/conf/nervecenter.xml .

In order to receive SNMP Notifications or to allow NerveCenter to respond to SNMP queries, two UDP ports need to be enabled in the firewall.

Table 4 NerveCenter UDP Ports

161/udp	Allows the optional SNMP Management Interface component of the NerveCenter Service to receive incoming SNMP requests (Get, GetNext, GetBulk) from other network management platforms. Should you not have a need to poll the NerveCenter Service via SNMP, this port does not need to be open. This port assignment is configurable via the 'SNMP' tab of the NerveCenter Administrator application. The NerveCenter Service retains this value in its configuration file at /opt/OSInc/conf/nervecenter.xml . The NerveCenter SNMP Management Interface is not enabled by default. Setup is provided via the 'SNMP Agent' tab of the NerveCenter Administrator

	application.
	Note: If you are running the SNMP service provided by your Linux distribution (most likely *snmpd* from the *net-snmp* packages), this will also be using 161/udp by default. If you want to run both the NerveCenter SNMP Management Interface and the net-snmp service, one or the other needs to be set to use a different port. Refer to the documentation at http://net-snmp.org/ on how to configure net-snmp.
162/udp	Allows NerveCenter Server to receive incoming SNMP notification messages (Trap and Inform PDUs) sent from SNMP Agents and other SNMP Management Applications.
	Should you not need to receive SNMP notifications, this port does not need to be open.
	This port assignment is configurable via the 'SNMP' tab of the *NerveCenter* Administrator application. The NerveCenter Service retains this value in its configuration file at /opt/OSInc/conf/nervecenter.xml .
	Note: If you are running the SNMP Trap Receiver provided by your Linux distribution (most likely *snmptrapd* from *net-snmp*), this will also be using 162/udp by default. If you want to run both allow NerveCenter to receive SNMP notifications and run the net-snmp *snmptrapd* service, one or the other needs to set to use a different port. Refer to the documentation at http://net-snmp.org/ on how to configure net-snmp.

2.5.2 ICMP Filtering

Review the firewall configuration's filtering of incoming ICMP traffic.

NerveCenter relies on ICMP and ICMPv6 messages for *Echo Request* and *Echo Reply* (the 'ping' command) as well as being able to receive *Destination Unreachable* notifications. These three ICMP message types need to be permitted through the firewall.

Additionally, NerveCenter can be used to monitor all incoming ICMP and ICMPv6, but only to the extent permitted by the firewall ICMP Filtering rules.

2.6 Linux Services Configuration

2.6.1 SNMP Services

If your host is running the SNMP services provided with your Linux distribution (likely *net-snmp*), they and the NerveCenter installation might conflict. Review the host service configuration and

the service configuration of the net-snmp Master Agent (*snmpd*) and Trap Receiver (*snmptrapd*) to find whether these services are enabled and which ports they are accessing.

The net-snmp Master Agent and Trap Receiver will open 161/udp and 162/udp respectively by default.

If the NerveCenter Service is to be receiving incoming SNMP notification traffic, either NerveCenter or net-snmp must be configured to use a port other than 162/udp.

If the NerveCenter SNMP Management Interface is to be enabled, either NerveCenter or the net-snmp service must be configured to use a port other than 161/udp.

Refer to http://net-snmp.org/ for documentation on how to configure and operate net-snmp.

2.6.2 RPC Services

Prior NerveCenter releases required a configured and running RPC service on the Linux host. This requirement is entirely removed for NerveCenter 7.1. NC7.1 does not rely upon or use RPC.

3 NerveCenter Installation

NerveCenter installs to **/opt/*OSInc*** . The NerveCenter installation process will add **/var/opt/*NerveCenter*** beneath **/var/opt** . It will also create the file **/etc/pam.d/*nervecenter*** if none exists. Likewise, it will create file **/etc/ld.conf.so.d/*nervecenter.conf*** if none exists.

Complete the following steps in order to install NerveCenter 7.1 on the Linux host.

1. Receive and expand the installation kit.

    # *gunzip   NC7100-BLDnn-Linux.tar.gz*

    > Note: Replace the 'nn' with a number (ex: '09') so as to match the name of the received file.

    # *tar -xf   NC7100-BLDxx-Linux.tar*

    This creates a folder **NC7100/** in the file system beneath where the command is executed.

2. Install the NerveCenter product.

    # *cd   NC7100/BIN*
    # *./install*

    The installer will check that the groups 'ncadmins' and 'ncusers' are defined for this system. If they are not, it will complain and exit. If this occurs, add the missing group(s) and then restart the installation with " ***./install*** "

During the installation, request the following components: **m s**

m – MIB Compiler
s – Server

4   NerveCenter Post-Installation

Following the installation, several setup steps need to be taken. Once these are performed, the service is ready for usage.

4.1 Permissions

The following sections present the permission setup required for configuring NerveCenter into the Linux host environment.

4.1.1 User Account Selection

The NerveCenter Service is associated with a user account at runtime. Operations that NerveCenter performs are granted and limited based on the privileges granted to the selected account.

To setup the runtime account association, perform the following steps:

1. Select or create an account that will be used as the NerveCenter runtime account.

2. Add the selected account to the 'ncadmins' group in Linux group database (typically /etc/group).

    Note: The 'ncadmins' group needs to always contain this selected account but may contain additional accounts. All accounts that are a member of 'ncadmins' are granted NerveCenter Administrator access when logging in to the NerveCenter Service through the NerveCenter Client, Administrator or Command applications.

3. Optionally, setup the NerveCenter Startup Authorization File (ncstart-authorized).

    This file is used as a protection over which accounts are allowed to run the NerveCenter Service. If the file is present, then only accounts listed in the file may start the NerveCenter Service. If the file is not present, then any member of the 'ncadmins' group may start the NerveCenter Service.

    Create or edit */opt/OSInc/conf/ncstart-authorized* so that it contains each permitted account name between colons on separate lines.

    Ex: if the permitted accounts are 'nervecenter' and 'admin', then the file should contain two lines

[01]   :nervecenter:
[02]   :admin:

4. Optionally, setup the NerveCenter Startup User File (ncstart-user).

   This file is used to identify the account to be used when NerveCenter is started at system boot or is started from a command prompt. If this file is present, its content names the account that is to be used. If this file is not present, then NerveCenter will run as the super-user account.

   Create or edit the file */opt/OSInc/conf/ncstart-user* so that it contains the name of this account as its sole content on the first line. If NerveCenter is setup to be started at system boot time, this file is accessed to determine the account that is to be used for NerveCenter's operation.

   Ex: if NerveCenter is to run as account 'nervecenter', then the file should contain 'nervecenter' is its sole content.

   [01] nervecenter

   Note: Unlike the *ncstart-authorized* file, the name in *ncstart-user* is <u>not</u> delimited with :'s.
   Note: Unlike the *ncstart-authorized* file, there can only be one entry in *ncstart-user*.

   Note: If you setup NerveCenter with both a *ncstart-authorized* and a *ncstart-user* file, ensure that the two files agree. The account named in *ncstart-user* must also be named in *ncstart-authorized*.

4.1.2 File Permission Setup

To ensure permissions are correct, run the script **/opt/OSInc/nc/bin/ncpermissions** . This script sets the owner, group, and access values for NerveCenter's directories and files under /opt/OSInc and /var/opt/NerveCenter .

 # /opt/OSInc/nc/bin/ncpermissions

Note: *ncpermissions* is meant for execution by the super-user account. Other accounts will not have privileges needed to set directory and file ownerships and permissions.

The command **/opt/OSInc/nc/bin/nccheckdirs** can be subsequently used to verify some of these directory settings.

 # /opt/OSInc/nc/bin/checkdirs

Note: *nccheckdirs*, if run by the super-user account, will correct errors found in directory ownership and permission settings. When run by regular accounts, *nccheckdirs* will perform the checks but not attempt repairs.

4.2 License

The NerveCenter Service requires a license. A license is needed for each host where the NerveCenter Service will run. (A license is *not* needed to run the NerveCenter Desktop applications.) To obtain a license, whether for product evaluation, for permanent development or for production usage, contact Customer Support at LogMatrix.

The license for each host is supplied as a file. It needs to be placed at **/opt/OSInc/conf** such that it is named using the output from hostname(1) [/bin/hostname]. The file needs to end with a *".dat"* suffix.

For example, if the output from /bin/hostname is "nms01", then the license for the host needs to be added to /opt/OSInc/conf/ and named "nms01.dat".

If the output from /bin/hostname contains domain designations, then this needs to be included in the file's naming.

For example, if the output from /bin/hostname is "nms01.acme-services.co.uk", then the file needs to be named "nms01.acme-services.co.uk.dat".

4.3 Service Registration

This section provides instruction on how to change whether NerveCenter should be registered to start at system boot.

4.3.1 RHEL6, CentOS6, Oracle Linux 6

Note: The NerveCenter installation script asks whether the NerveCenter Service should be registered to start a boot time. If this was agreed to, the following step has already been performed.

RHEL6/CentOS6/OracleLinux6 use the SysV 'init' mechanism for managing the services to be started at system boot time. NerveCenter integrates with this through with the script 'ncservice' located in /opt/OSInc/nc/install/. Using the script, you can 'install' it as a member of the services to be managed by the SysV 'init' mechanism and thereby cause the NerveCenter Service to be started at system boot.

> ✳ To check whether NerveCenter Service is configured as a boot-time service:

>   Perform the following:

>   **# /opt/OSInc/nc/install/ncservice   isinstalled**

> ✳ To register NerveCenter Service to be started at system boot:

Perform the following:

 # /opt/OSInc/nc/install/ncservice install

This will place add the ncservice file to /etc/init.d/ and run the registration command appropriate for your Linux host.

❋ To unregister NerveCenter Service from being started at system boot:

Perform the following:

 # /opt/OSInc/nc/install/ncservice uninstall

This will unregister the NerveCenter Service using the command appropriate for your Linux host. It will remove the file /etc/init.d/ncservice upon completion.

4.3.2 RHEL7, CentOS7, Oracle Linux 7

Note: The NerveCenter installation script asks whether the NerveCenter Service should be registered to start a boot time. If this was agreed to, the following step has already been performed.

RHEL7/CentOS7/OracleLinux7 use the systemd mechanism for managing the service units to be started at system boot time. NerveCenter integrates with this through with the script 'ncservice' located in /opt/OSInc/nc/install/. Using the script, you can 'install' it as a member of the service units to be managed by the systemd mechanism and thereby cause the NerveCenter Service to be started at system boot.

❋ To check whether NerveCenter Service is configured as a boot-time service:

Perform the following:

 # /opt/OSInc/nc/install/ncservice isinstalled

or

 # systemctl is-enabled nervecenter

❋ To register NerveCenter Service to be started at system boot:

Perform the following:

 # /opt/OSInc/nc/install/ncservice install

or

 # cd /usr/lib/system/system
 # cp /opt/OSInc/nc/install/nervecenter.service   ./nervecenter.service
 # chown root:root nervecenter.service

 # chmod 644 nervecenter.service

 # systemctl enable nervecenter.service

Either command set will add the NerveCenter service unit file to the set of service units registered with systemd(1) and enable ncservice as a boot-time service.

✳ To unregister NerveCenter Service from being started at system boot:

Perform the following:

 # /opt/OSInc/nc/install/ncservice uninstall

or

#systemctl disable nervecenter.service

This will unregister the NerveCenter service unit file from the set of services to be considered a boot-time service.

4.4 Linux Link Editor/Loader Cache

The NerveCenter Installer adds sets of shared libraries to a collection of directories under /opt/OSInc/lib. Before the NerveCenter Server can be started, this directory needs to be added to the Linux host's link loader database.

4.4.1 Shared Library Registration Setup

Note: The NerveCenter installation script asks whether it should register its shared libraries. If this was agreed to, the following steps have already been performed.

The register NerveCenter's shared libraries with the host's link editor/loader, perform the following steps:

 # cp /opt/OSInc/nc/install/ldconfig-nervecenter.conf   /etc/ld.so.conf.d/

 # /sbin/ldconfig

4.4.2 Shared Library Registration Verification

To verify the registration, execute the following command. The output should be a listing of 3 shared libraries.

 # /sbin/ldconfig -p | grep OSInc

Table 5 Verifying Link Loader/Editor Cache Setup

```
# /sbin/ldconfig  -p | grep  OSInc

        libxerces-c-3.1.so (libc6) => /opt/OSInc/lib/libxerces-c-3.1.so
        libvdes56.so (libc6) => /opt/OSInc/lib/libvdes56.so
        libvdes40.so (libc6) => /opt/OSInc/lib/libvdes40.so
```

4.4.3 Shared Library Binding Verification

The link loader/editor cache can be further checked by running ldd(1) [/usr/bin/ldd] on several of the NerveCenter binaries. The output from ldd shows the resolution that the Linux link editor/loader will perform when these binaries are started. If any of the entries are marked with "not found," then the link loader cache needs further preparation. Should this occur, contact LogMatrix Support for assistance.

Table 6 Verifying Link Loader Bindings

Check 1: Verify ldd resolves run-time library bindings for NerveCenter Server (ncserver)

 # /usr/bin/ldd /opt/OSInc/nc/bin/ncserver

```
        linux-gate.so.1 =>  (0x00ebc000)
        libpthread.so.0 => /lib/libpthread.so.0 (0x003dd000)
        librt.so.1 => /lib/librt.so.1 (0x00402000)
        libstdc++.so.6 => /usr/lib/libstdc++.so.6 (0x00b7f000)
        libm.so.6 => /lib/libm.so.6 (0x007ef000)
        libgcc_s.so.1 => /lib/libgcc_s.so.1 (0x007d0000)
        libc.so.6 => /lib/libc.so.6 (0x00196000)
```

Check 2: Verify ldd resolves run-time library bindings for NerveCenter SNMP Poller (ncsnmppoller)

 # /usr/bin/ldd /opt/OSInc/nc/bin/ncsnmppoller

```
        linux-gate.so.1 =>  (0x00ebc000)
        libpthread.so.0 => /lib/libpthread.so.0 (0x003dd000)
        librt.so.1 => /lib/librt.so.1 (0x00402000)
        libstdc++.so.6 => /usr/lib/libstdc++.so.6 (0x00b7f000)
        libm.so.6 => /lib/libm.so.6 (0x007ef000)
        libgcc_s.so.1 => /lib/libgcc_s.so.1 (0x007d0000)
        libc.so.6 => /lib/libc.so.6 (0x00196000)
        /lib/ld-linux.so.2 (0x00634000)
```

Check 3: Verify ldd resolves run-time library bindings for NerveCenter Security (ncsecurity)

 # /usr/bin/ldd /opt/OSInc/nc/bin/ncsecurity

```
        linux-vdso.so.1 =>  (0x00007fff235b5000)
        libpam.so.0 => /lib64/libpam.so.0 (0x0000003ba1c00000)
        libxml2.so.2 => /usr/lib64/libxml2.so.2 (0x0000003b9a400000)
        libz.so.1 => /lib64/libz.so.1 (0x0000003b93c00000)
        libstdc++.so.6 => /usr/lib64/libstdc++.so.6 (0x0000003b9e000000)
        libm.so.6 => /lib64/libm.so.6 (0x0000003b93800000)
        libgcc_s.so.1 => /lib64/libgcc_s.so.1 (0x0000003b9dc00000)
        libc.so.6 => /lib64/libc.so.6 (0x0000003b92800000)
        libaudit.so.1 => /lib64/libaudit.so.1 (0x00007fb9588d0000)
```

```
        libdl.so.2 => /lib64/libdl.so.2 (0x0000003b93000000)
        libcrypt.so.1 => /lib64/libcrypt.so.1 (0x0000003b9e800000)
        /lib64/ld-linux-x86-64.so.2 (0x0000003b92400000)
        libfreebl3.so => /lib64/libfreebl3.so (0x0000003b9e400000)
```

5 Starting and Stopping the NerveCenter Service

5.1 Starting NerveCenter

NerveCenter Service can be started from the command-line or by the system at boot.

For either a boot-time startup or a command prompt startup, NerveCenter Server will run using the user account indicated in */opt/OSInc/conf/ncstart-user* or else as the super-user account if this file is not present.

5.1.1 Boot-time Start

If NerveCenter has been registered to start at system boot, the service will be started on RHEL6, CentOS6, and Oracle Linux6 by */etc/init.d/ncservice* for the registered Linux run levels. To check which run levels will start NerveCenter, use the following:

> **# chkconfig --list ncservice**
> ncservice   0:off   1:off   2:off   3:on   4:off   5:on   6:off

On RHEL7, CentOS7 and Oracle Linux 7, NerveCenter is started by *systemd*(1)

5.1.2 Command-line Start

The NerveCenter Service may be started from a command prompt. To do so, execute:

> **# /opt/OSInc/bin/ncstart**

Note: For NerveCenter Service to be started from the command prompt (**/opt/OSInc/bin/ncstart**), the command needs to be run from a session using the super-user account or a user account that is a member of the 'ncadmins' group. If the file */opt/OSInc/conf/ncstart-authorized* is present, then the login must match an entry from that file.

5.2 Stopping NerveCenter

The NerveCenter Service can be stopped by the super-user account or by the account named in *ncstart-user* or else by the user account that ran /opt/OSInc/bin/ncstart.

> **# /opt/OSInc/bin/ncstop**

Note: Attempts to halt the NerveCenter Service via other accounts other than the super-user account or the account that started NerveCenter will fail as they will not have the privileges required to halt the processes.

5.3 Checking Whether NerveCenter Has Been Started

The status of whether the NerveCenter Service is running can be checked.

> **# /opt/OSInc/bin/ncstatus**

5.4 Example of Starting and Stopping NerveCenter

The following shows a sequence of checking, starting, checking, stopping and then again checking the NerveCenter Service. These steps can be performed by a login that is a member of 'ncadmins'.

Table 7 Example NerveCenter Service Start/Stop Sequence

Step 1. Checking whether the NerveCenter Service is current running		
	$ /opt/OSInc/bin/ncstatus nervecenter is stopped	Asks whether NerveCenter Service is current running.
Step 2. Start the NerveCenter Service		
	$ /opt/OSInc/bin/ncstart	Start the NerveCenter Service (starts ncserver and its components)
Step 3: Checking whether the NerveCenter Service is running		
	RHEL7/CentOS7/OracleLinux7**:** **$ /opt/OSInc/bin/ncstatus** nervecenter is running RHEL6/CentOS6/OracleLinux6**:** **$ /opt/OSInc/bin/ncstatus** ncserver (pid 5795) is running…	The 'ncstart' in Step 2 has launched the service.
Step 4: Stop the NerveCenter Service		
	$ /opt/OSInc/bin/ncstop Stopping NC Server … 5795 waiting 3 seconds for ncserver to terminate. waiting 3 seconds for ncserver to terminate. Stopping NC SNMP Poller(s) … 5875 waiting 3 seconds for ncsnmppoller(s) to	Shutdown the NerveCenter Service

	terminate.	
Step 5: Check whether the NerveCenter Service is currently running		
	$ /opt/OSInc/nc/ncstatus nervecenter is stopped	Shows that the 'ncstop' in Step 4 has succeeded.

6 Verifying Login Access

Attempts to log into the NerveCenter Service pass through the same process as logging in to the host as with *scp, ssh* or *login*. NerveCenter registers with the host PAM subsystem and can be administratively configured and monitored just as with scp, ssh or login.

This section explains NerveCenter's login mechanism and provides the steps needed for adding and maintaining account access to the NerveCenter Service.

6.1 Managing the PAM Integration

The NerveCenter Installer creates the file *nervecenter* in */etc/pam.d* if the file did not previously exist. If */etc/pam.d/nervecenter* existed before the execution of the NerveCenter Installer, the file is <u>not</u> overwritten or changed by the installation. (This procedure is a safeguard to prevent updates or upgrades from overwriting changes that may have been made to */etc/pam.d/nervecenter*)

A set of default PAM integration files can be found in */opt/OSInc/nc/install* . The NerveCenter 7.0 Installer creates /etc/pam.d/nervecenter by copying in one of:

❊ *pam_nervecenter_rhel6* for RHEL6 and CentOS6 hosts, or

❊ *pam_nervecenter_oracle6* for Oracle Linux 6 hosts, or

❊ *pam_nervecenter_rhel7* for RHEL7 and CentOS7 hosts, or

❊ *pam_nervecenter_oracle7* for Oracle Linux 7 hosts.

NerveCenter's PAM integration is explained in '*Chapter 11: Managing NerveCenter Security'* of the manual **Managing NerveCenter**. The administrators for the Linux host should review */etc/pam.d/nervecenter* and edit its contents to suite the checks and actions appropriate for the host.

Table 8 PAM Documentation References

NerveCenter 7.1 documentation on managing PAM registration. See Chapter 11: 'Managing NerveCenter Security'

http://docs.logmatrix.com/NerveCenter/7.1.00/documentation/pdf/managing_nervecenter/managing_nervecenter.pdf

RedHat Enterprise Linux 6 documentation on PAM.
See Chapter 2: 'Using Pluggable Authentication Modules (PAM)'

https://access.redhat.com/documentation/en-US/Red_Hat_Enterprise_Linux/6/html/Managing_Smart_Cards/index.html

Oracle Linux 6 documentation on PAM.
See Section 23.7. 'About Pluggable Authentication Modules' of 'Administrator's Guide for Release 6', and
See Section 3.5. 'Configuring and Using Pluggable Authentication Modules' of 'Security Guide for Release 6'

http://docs.oracle.com/cd/E37670_01/E41138/html/ol_pam_sec.html

http://docs.oracle.com/cd/E37670_01/E36387/html/ol_pam_sec.html

6.2 Managing User Access

Only the login accounts that are members of the group 'ncadmins' or else the group 'ncusers' may be used to access the NerveCenter Service.

There are four means of accessing a NerveCenter 7.1 Service.

* The NerveCenter Administrator (ncadmin.exe) application can log on to a NerveCenter Service only if the named user is a member of 'ncadmins'.

* The NerveCenter Client (ncclient.exe) application can log on to a NerveCenter Service if the named user is a member of either 'ncadmins' or 'ncusers', but is given full editing abilities only when logged on with an account named in 'ncadmins'.

* The NerveCenter Command-line Utility (nccmd.exe) can log onto a NerveCenter Server if the named user is a member of either 'ncadmins' or 'ncusers', but is give full editing abilities only when logged on with an account named in 'ncadmins'.

> ※ The NerveCenter Perl API can log onto a NerveCenter Server if the named user is a member of either 'ncadmins' or 'ncusers'. Full editing access is granted if the named account is in either group.

Group membership for either the 'ncadmins' or 'ncusers' groups must be explicitly declared in the host's group database (typically /etc/group). To associate an account with either group through the primary group setting of an account, as held in host password database (typically /etc/passwd), is not sufficient on some hosts; be sure the host's group database names all group members for 'ncadmins' and 'ncusers' . Use the appropriate configuration tool for reviewing and editing the host group database. Ex: *system-config-users* on RHEL6, CentOS6 and Oracle Linux 6.

6.3 Testing User Access

Access to the NerveCenter Service can be tested on the Linux host. This is done through an application that mimics the checking done by the NerveCenter Service when it is access by NerveCenter's Administrator, Client or Command-Line applications. The NerveCenter Service does not need to be running for this test to occur; it operates independently of the service's status.

To test user access, perform the following as the super-user:

> **# /opt/OSInc/nc/bin/nctestlogin**

The application will ask for an account name and a password. The password is not shown as it is being entered. Use "-show" on the command-line if you want to visually check that the password is being correctly entered.

Table 9 Sample nctestlogin Session

```
# /opt/OSInc/nc/bin/nctestlogin  -show

nctestlogin Version 7.1.00 (7100 BLD09), Linux(el6)/x86-64 (64-bit) Copyright
(C) 1989-2017 LogMatrix Inc.

Reading /opt/OSInc/conf/nervecenter.xml
PAM Registration: default, servicename{nervecenter}, authcheck{enabled},
accountcheck{enabled}


Enter user name and password. Or press Enter to quit.
login: ncadmin
password: my-secret-nervecenter-password
[2016-01-04 16:59:43]  Begin authentication check for ncadmin@localhost
1. Check for User account
2. Begin PAM access. Using service name "nervecenter"
3. PAM Authentication Check
4. PAM Account Management Check
5. End PAM access
6. Checking Group Membership
```

```
 - Searching group 'root'.  Members: (no match)
 - Searching group 'ncadmins'.  Members: "ncadmin" (match)
 - Success. Granted 'ncadmins'-level access
[2016-01-04 16:59:43]   "ncadmin" login granted with "ncadmins" access.
[2016-01-04 16:59:43]  End authentication check for ncadmin@localhost


Enter user name and password. Or press Enter to quit.
login:
```

The nctestlogin performs the same set of checks, in the same sequence, as done by a running NerveCenter Service. The output shows the progression of six steps. If any step fails, the process stops.

Step	Success / Failure Criterion
1. Check for User account	Attempts a check, using getpwnam(3), of the known user accounts as defined for the host's password database (ie: /etc/passwd, NIS, LDAP, etc.). Success: The account exists. Failure: Cannot find the account in the password database. Verify how accounts are set up on the host, being aware of possible Samba, NIS or LDAP integrations (ex: RedHat Directory Server, SUSE LDAP Server, Microsoft Active Directory service, etc.).
2. Begin PAM access	Opens connection to PAM using pam_start(3). Success: PAM is accessible. Failure: Unable to access PAM. Check that the super-user account is running nctestlogin. Verify presence, proper syntax and content of */etc/pam.d/nervecenter* .
3. PAM Authentication Check	Verifies the provided account name and password using pam_authenticate(3). See the "auth" entries in */etc/pam.d/nervecenter* Success: The provided account and password are a valid combination. Failure: The combination is not valid. Verify the validity of the password. Verify that account is in good standing

	(ex: the password may have expired).
4. PAM Account Management Check	Verifies account standing and performs other checks using pam_acct_mgmt(3). See the "account" entries in */etc/pam.d/nervecenter* Success: The named account is in good standing. Failure: Some quality of the account fails a check. (ex: the account is expired or administratively locked out)
5. End PAM access	Closes connection to PAM. Uses pam_end(3). Always succeeds.
6. Checking Group Membership	Evaluates whether the named account is named by the groups 'ncadmins' or else 'ncusers'. The check is done through getrnam(3), thereby checking the host's group database (ie: /etc/group, NIS, LDAP, etc.). Success: The account is named by 'ncadmins' or else 'ncusers'. Failure: Either the groups are missing from /etc/group or membership is missing from the groups.

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7 NerveCenter 7.1.00 / Linux Installation Checklist

- ☐ Prepare Host System

    - ☐ Ensure fixed IPv4 addressing

    - ☐ Update Host OS patches

    - ☐ Create groups 'ncadmins' and 'ncusers'

    - ☐ Add required 64-bit software packages

    - ☐ Configure firewall

    - ☐ Check *net-snmp* service configuration

- ☐ Install NerveCenter

    - ☐ Select install location (default: /opt/OSInc): _____

    - ☐ Select 'm s'

    - ☐ Choose whether to register NerveCenter for boot-time startup (y/n): _____

- ☐ Configure NerveCenter

    - ☐ Permissions: run /opt/OSInc/nc/bin/ncpermissions

    - ☐ Add license file as /opt/OSInc/conf/<hostname>.dat

    - ☐ Select NC Service user account(s)

        - ☐ Optional: Create or select primary account: _____

        - ☐ Add account(s) to group 'ncadmins'

        - ☐ Optional: Setup file /opt/OSInc/conf/ncstart-authorized

        - ☐ Optional: Setup file /opt/OSInc/conf/ncstart-user

- ☐ Test NerveCenter Configuration

    - ☐ Check shared library registrations: Run "/sbin/ldconfig –p"

    - ☐ Check boot-time-registration: Check file /etc/init.d/ncservice

    - ☐ Check PAM integration: Review file /etc/pam.d/nervecenter

    - ☐ Check account access. Run /opt/OSInc/nc/bin/nctestlogin

LogMatrix Technical Support

LogMatrix is committed to offering the industry's best technical support to our customers and partners. You can quickly and easily obtain support for our NerveCenter proactive IT management software.

Professional Services

LogMatrix offers professional services, when customization of our software is the best solution for a customer. These services enable us, in collaboration with our partners, to focus on technology, staffing, and business processes as we address a specific need.

Educational Services

LogMatrix is committed to providing ongoing education and training in the use of our products. Through a combined set of resources, we can offer quality classroom style or tailored on-site training.

Contacting the Customer Support Center

Telephone Support

Phone: 1-800-892-3646 or 1-508-597-5300

E-Email support

E-mail: techsupport@logmatrix.com.

Online Access

For additional NerveCenter support information, please go the LogMatrix website www.logmatrix.com for access to the following sections of information.

* Software Alerts – latest software alerts relative to NerveCenter.

* User Community Access

You can seek as well as share advice and tips with other NerveCenter users at

http://community.logmatrix.com/LogMatrix/ .

Contact Support@logmatrix.com for:

* Patches and Updates – latest installation files, patches and updates including documentation for NerveCenter.

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