manager

NODEGRID

USER GUIDE

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1. OVERVIEW

NodeGrid Manager is a vendor neutral software-defined infrastructure virtual appliance for access and control across of all devices in data centers and test lab environments.

NodeGrid Manager’s core engine utilizes a technology stack that allows for policy based automated discovery and configuration of your asset consoles to minimize configuration and maintenance and utilizes a complete interface abstraction layer that implements the many protocols and methods required to access and control your consoles from multiple vendors.

NodeGrid's flexible console interface provides a complete Web interface and CLI (for scripting) enabling complete customization and integration of your own console portals and applications.

1.1. NodeGrid Manager Features

- Secure access and control of virtual and physical IT devices
- DeviceURL™ bookmarks
- NodeIQ™ elastic asset search
- Cloud Clustering™ with horizontal and vertical scaling
- FireTrail™ secure tunnel-through-firewall access
- Shared Access with Console Data Logging
- Service Processor Logging of Events and Sensors
- Event notification and Alarms
- Power Management
- Auto-discovery of virtual and physical devices
- Policy-based Authentication and Authorization via AD/LDAP
- Web and CLI single interface

1.2. Supported Console Protocols

- Service processors (iLO, DRAC, IPMI, CIMC/UCS, IMM, ILOM)
- VMWare™ (Serial Console, MKS, vMotion™ migration tracking), KVM VMs (Serial Console)
- Legacy consoles (TELNET, SSH)

1.3. Benefits

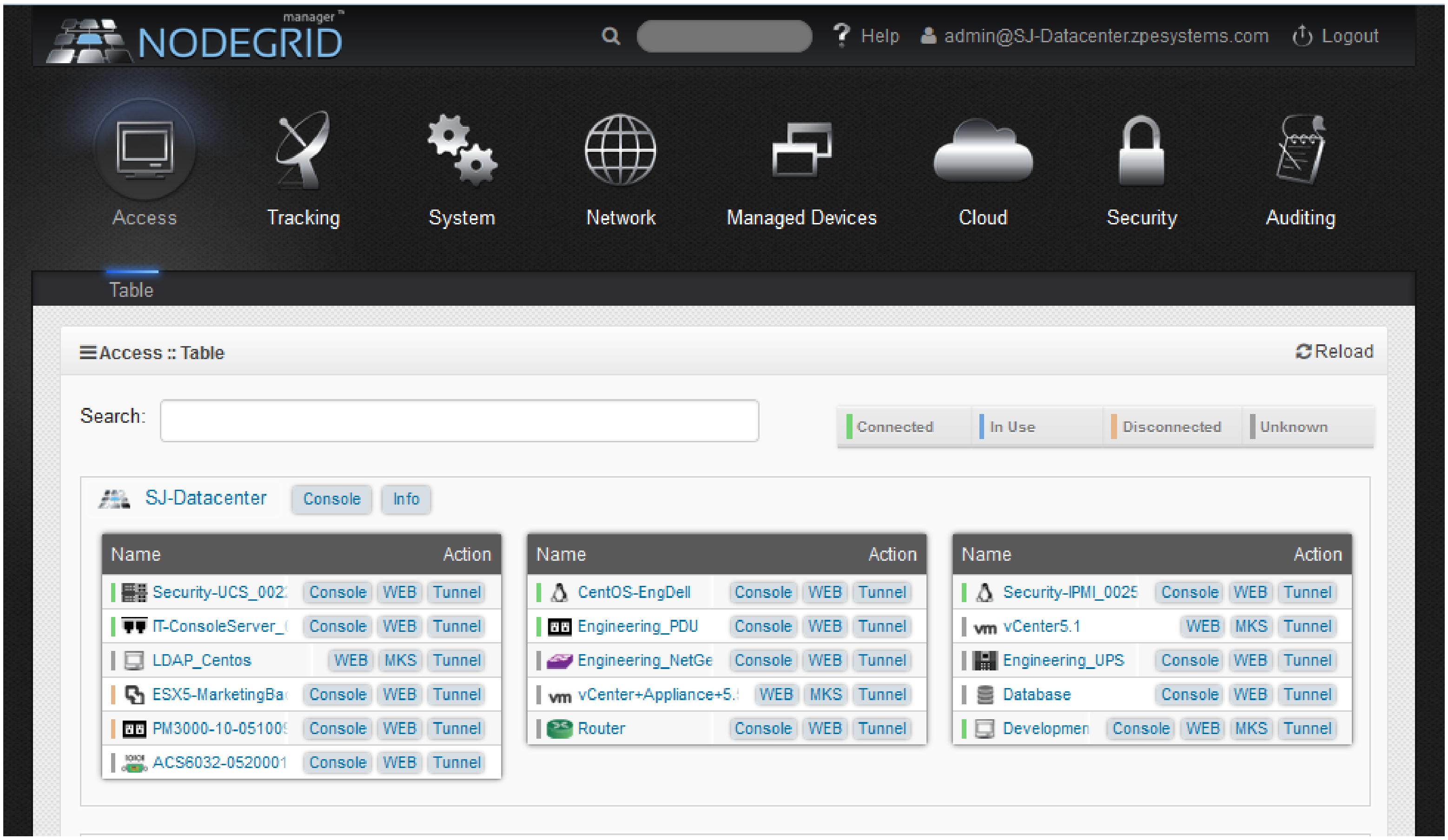
- Single screen access and control experience of physical and virtual assets
- Quick and easy infrastructure deployment
- Vendor neutral support for all console protocols
- No need to maintain multiple vendors' admin tools
- Save time with policy-based discovery and management
- Keep firewalls secure
- All in one. Installs from bootable ISO, no other software required.
- Simplifies day-zero deployments

1.4. NodeGrid Manager System Requirements

NodeGrid Manager runs as a complete system solution on a Linux 32-bit host virtual machine. The software is provided as a bootable ISO file. While NodeGrid Manager can be installed in different virtualization environments, this installation document will describe how to install it on a VMware ESXi™ server (minimum version ESXi 4.1). A client workstation running VMware infrastructure client software (vSphere™) is also required to support the installation. The following are the minimum requirements for the virtual machine in order to host NodeGrid Manager System:

- 2 GB hard drive space;
- 4 GB memory;
- Network adaptor;
- Access to NodeGrid Manager ISO file.

For instructions on how to install NodeGrid Manager, refer to chapter 2.



Name	Action
Security-UCS_002	Console WEB Tunnel
IT-ConsoleServer_	Console WEB Tunnel
LDAP_Centos	WEB MKS Tunnel
ESX5-MarketingBa	Console WEB Tunnel
PM3000-10-05100	Console WEB Tunnel
ACS6032-0520001	Console WEB Tunnel

Name	Action
CentOS-EngDell	Console WEB Tunnel
Engineering_PDU	Console WEB Tunnel
Engineering_NetGe	Console WEB Tunnel
vCenter+Appliance+5.	WEB MKS Tunnel
Router	Console WEB Tunnel

Name	Action
Security-IPMI_0025	Console WEB Tunnel
vCenter5.1	WEB MKS Tunnel
Engineering_UPS	Console WEB Tunnel
Database	Console WEB Tunnel
Developmen	Console WEB MKS Tunnel

Fig1. NodeGrid Manager - Access page.

1.5. Access Options

NodeGrid Manager and Device access options:

- Web browser (HTTPs or HTTP) for management session and device access.
  The Web Manager can be used by the administrator to manage NodeGrid Manager, access the device's Web, launch CLI or Mouse-Keyboard-Screen sessions (for VMware VMs and servers with service processor).
  Supported browsers include: modern versions of Internet Explorer, Firefox and Chrome.
- CLI to NodeGrid Manager and device consoles via SSH v1, SSH v2 and Telnet, including console of virtual appliances (VMware and KVM). CLI is ideal for scripting or integration with other management and automation tools.
- DeviceURL direct bookmark for fast access.

1.6. Authentication

NodeGrid Manager supports local authentication and remote authentication systems including: Kerberos, LDAP, Radius, and Tacacs+. Once a configuration method is selected, it will be used for authentication of any access to the system via Web, CLI and console of the virtual machine running NodeGrid Manager.

1.7. Flexible Groups and Users

User accounts can be created locally on NodeGrid Manager or remotely on authentication servers if remote authentication is selected. The admin user can add new user accounts and create authorization groups in order to provide access rights to managed devices and access profiles per user.

1.8. Managed Devices and Auto-discovery

The admin user can add managed devices following a variety of predefined profile types. Each managed device requires a license from the license pool in order to be accessible. NodeGrid Manager also supports device discovery. This feature allows newly discovered devices to be cloned from existing devices matching their profile to build dynamic access groups.

1.9. Data Logging, Event Logging, Alerts and Notifications

NodeGrid Manager retains archives of data logging and event logging of managed devices in local files or remotely via NFS. Logs can be used for inspection, compliance and auditing purposes. Real-time alerts can be generated from data and event feeds generated by the devices based on configurable regular expression string. Notifications via Syslog, Email or SNMP trap can be used to alert administrators about problems on managed devices or on NodeGrid Manager.

1.10. Security Services and Firewall

The user admin can enable and disable services, configure active ports, define firewall rules, set session timeout per groups, define expiration dates for local user accounts and require password renewal at login time. The admin can also create and configure chains to control packet filtering. NodeGrid Manager ships with pre-defined built-in chains for ease of use.

1.11. MKS, SOL, Virtual Serial, Physical Serial and Power

NodeGrid Manager offers a vendor neutral normalized console interface access for managed devices via:

- virtual serial console (for virtual appliances running on VMware^{TM} or KVM),
- multi-vendor service processor SOL (serial over lan) console,
- physical serial console port via multi-vendor console server appliances,
- power via service processor, virtual machines or network PDUs.

It also supports MKS (Mouse-Keyboard-Screen) for graphical UI of VMware^{TM} virtual machines.

1.12. IPv4 and IPv6 Support

NodeGrid Manager supports single IPv4 stack or dual IPv4 and IPv6 stack (note: NFS supports IPv4 only). The following services are supported for IPv6:

- HTTP / HTTPs access; SSH and Telnet access; Remote Authentication: Kerberos, Tacacs+, Radius and LDAP; SNMP; Linux Kernel; Firewall (IP tables); DHCP and Syslog server.

1.13. SNMP

SNMP v1, v2 and v3 are supported for the Enterprise MIB.

2. INSTALLATION & DEPLOYMENT

NodeGrid Manager installs from an ISO file. The installation procedure is a three stage process:

1. Creating a virtual machine;
2. Booting from the ISO file/CD in order to install the software;
3. Restarting and booting from the newly created virtual machine.

2.1. Creating a Virtual Machine

The following description is for a VMware environment. Similar procedures should be executed for other hypervisors.

1. From the ESXi vSphere screen, click on *Create a new virtual machine* link;
2. For the virtual machine configuration, click on *Typical* and then click *Next*;
3. Choose an appropriate name for your NodeGrid Manager virtual machine and then, click *Next;*
4. Select the data storage volume on which you wish to create for the new virtual machine, then click *Next*;
5. Under Guest Operating System click on *Linux* and from the pull down menu select *Other 2.6x Linux (32bit),* then click *Next;*
6. In the number of NICs field, type *1.* Confirm if the network is a VM network and if the adapter is flexible and then, click *Next;*
7. Confirm that the Disk size is (at least) 2 GB, select *Thin Provision* and then click *Next;*
8. Click *Finish* to complete the configuration of the virtual machine on the ESXi server.

When the installation is complete, the virtual machine should have the following parameters:

- Guest OS: Other 2.6x Linux (32 bit);
- Number of Virtual Processes: 1 (use properties to select at least 2 processors)
- Memory: 4 GB (use properties to set memory after the virtual machine is created);
- NIC: VM Network
- Virtual Desk size: 2 GB

2.2. Installing NodeGrid Manager

To install NodeGrid Manager software follow the steps below:

1. Click on the *Console* tab from the summary screen of the virtual machine;
2. Turn on the power. The virtual machine will fail to boot since there is no operating system installed;
3. Click on the *CD/DVD* icon and select the location of NodeGrid Manager ISO file in your system;
4. Reboot the virtual machine by clicking on *CTL-ALT-INSERT* in the console area;
5. The virtual machine console server software will start with a boot prompt. At the boot prompt, you can hit *ENTER* or wait. The image will be decompressed and then loaded;
6. Once the image has booted, follow the instructions on the console. You must reply *YES* when requested in order to proceed with the installation;
7. The installation process will copy the files into the virtual machine and automatically reboot the system in order to start NodeGrid Manager. Click *ENTER* to boot the image or wait for the image to boot automatically;
8. After booting the image, your new copy of NodeGrid Manager will be available and ready to be configured. Enter the IP address shown on the console in your browser to log in to the Web interface of NodeGrid Manager.

Notes:

1. The default administrator user name is **admin** and the default password is **admin**. The user admin can access NodeGrid Manager via console of the virtual machine, via Web interface (HTTPS) or via CLI (SSH). Other access methods can be enabled via NodeGrid Manager configuration.
2. The super user is **root** and the default password is **root**. The root user has SHELL access to the Linux OS. The root user access is ONLY available via console of the virtual machine. Use *passwd* to change the root default password.

⚠ Attention! The password for the **root** and **admin** must be changed during the installation process.

2.3. Initial NodeGrid Manager Setup

Open a web browser and log in to the web interface of NodeGrid Manager using the IP address shown on the console. Both HTTPS and HTTP redirect are enabled. The default administrator user name is **admin** and the default password **admin**.

Note: DHCP is the default IP configuration. If no DHCP server is available, please login to NodeGrid Manager’s console using **admin** credentials and configure a static IP address using CLI instructions as follows:

```
[admin@nodegrid /]# cd settings/network_interfaces/eth0/
[admin@nodegrid eth0]# set ipv4_mode=static
[+admin@nodegrid eth0]# set ipv4_address=10.0.0.10
ipv4_mask=255.255.255.0 ipv4_gateway=10.0.0.1
[+admin@nodegrid eth0]# show
interface: eth0
mac address: 08:00:27:c4:cf:e5
status = enabled
ipv4_mode = static
ipv4_address = 10.0.0.10
ipv4_mask = 255.255.255.0
```

```
ipv4_gateway = 10.0.0.1
ipv6_mode = no_ipv6_address
[+admin@nodegrid eth0]# commit
[admin@nodegrid eth0]# exit
```

Open a web browser using the static IP address and login as **admin** user.

CLI hints:

At any point in CLI you can press the Tab key and the interface will show the available options.
Type 'show' to display the parameters available for the present path (i.e. folder).
Type 'ls' to display the paths available following the present path.

Once NodeGrid Manager has an IP address, please continue the configuration via web browser.

1. During first time login, the **admin** user will be required to change the default password. Provide the information requested on screen and click on Change Password button;
2. On the main page, select *System :: License*, click the *Add* button, enter the license information and click on *Save* button;

2.3.1. Adding Servers with Service Processor Support

3. Select *Managed Devices :: Devices*, click the *Add* button to add a device in the system. For the purpose of this example, provide the following information:

   On the *Name* field, type the name of the server you want to add. This device should be a server that supports Service Processor. Enter the IP address of the service processor on this server. Make sure the IP address is reachable by NodeGrid Manager. On the *Type* field, select type that matches the service processor profile in use. Type username and password of the administrator account on the service processor and then, click the *Save* button.

The server should now appear under *Access* page and it should be ready for access. For console access via SOL, you must also enable BIOS console redirect and OS console redirect (typically for Linux OS) on the server.

Further configuration on *Managed Devices :: Devices* is available in order to enable tunnel, data logging, event logging, alerting and custom fields for this type of device.

2.3.2. Adding Devices with SSH or Telnet Support

4. Select *Managed Devices :: Devices*, click the *Add* button to add a device in the system. For the purpose of this example, provide the following information:

   On the *Name* field, type the name of the device you want to add (for example a critical Red Hat Linux server, a network PDU or a router). This device must be compatible with the pre-defined prompt configuration under *Managed Devices :: Templates* for type device_console. Otherwise, just create your own version of the device template and use it here. Enter the IP address of the server. Make sure the IP address is reachable by NodeGrid Manager. On the *Type* field, select device_console. Type username and password of the user account you want to use to login to the device. You may leave it blank if you want to provide unique credentials during the login time and then, click the *Save* button.

   The device should now appear under *Access* page and it should be ready for access.

   Further configuration on *Managed Devices :: Devices* is available in order to enable tunnel, data logging, event logging, alerting and custom fields for this type of device.

2.3.3. Adding Virtual Machines

5. Select *Managed Devices :: Devices*, click the *Add* button to add a device in the system. For the purpose of this example, provide the following information:

On the *Name* field, type the name of the virtual machine you want to add. The name must be as it is shown on VMware or KVM hypervisor. Enter the IP address of ESXi or KVM server. Make sure the IP address is reachable by NodeGrid Manager. On the *Type* field, select virtual_console_vmware or virtual_console_kvm according to your hypervisor type.

For KVM VM, you must provide the hypervisor's username and password and then, click the *Save* button.

For VMware VM, you must provide the VM Manager information. Leave it blank for now and click on *Save* button to save the new virtual machine. Go to *Managed Devices :: VM Managers* and click on *Add* button, provide the IP address of the ESXi server, enter an ESXi credential with administrator role and click on *Save* button. If you want to discovery other VMs running on the ESXi server, allow few seconds for NodeGrid Manager to establish communication with ESXi and then double click to edit the configuration. Check the *Discover Virtual Machines* field, configure the polling interval, the scope options and click on *Save* button. In order to complete the configuration on the virtual machine, go back to *Managed Devices :: Devices* and double click on the virtual machine you just created. On the settings page, select the VM Manager name and click on *Save* button.

The virtual machine should now appear under *Access* page and it should be ready for access. For VMware MKS access, first install VMware VMRC plugin on your workstation by browsing ESXi server and downloading vSphere client.

Further configuration on *Managed Devices :: Devices* is available in order to enable data logging, event logging, alerting and custom fields for this type of device.

2.3.4. Adding Console Servers

6. Select *Managed Devices :: Devices*, click the *Add* button to add a device in the system. For the purpose of this example, provide the following information:

   On the *Name* field, type the name of the console server device you want to add. Enter the IP address of the console server. Make sure the IP address is reachable by NodeGrid Manager. On the *Type* field, select one of the console server options. Type username and password of the admin user account of the console server device. Select Appliance on *Edge Device* field. Select *Discover of Serial Ports* if you want to automatically add the console server ports (requires Auto-discovery configuration) and then, click the *Save* button. You can repeat this process and select Serial Port on *Edge Device* field in order to manually add each device connected to the serial ports of the console server.

The console server device should now appear under *Access* page and it should be ready for access. The console server ports will also show on the *Access* page after they are discovered (requires Auto-discovery configuration).

Further configuration on *Managed Devices :: Devices* is available in order to enable tunnel, data logging, event logging, alerting and custom fields for this type of device.

2.3.5. Auto-Discovery Configuration

7. Select *Manage Devices :: Auto-discovery* and click the *Add* button. Select an option below matching what was done in steps 3-6:

    - In order to discover virtual machines (type: virtual_console_vmware) running on ESXi or vCenter, select VM Manager on the *Discovery Method*. In the *Datacenter, Cluster* and *Host Identifier* fields, provide a substring to identify the datacenter, cluster or virtual machine names for this configuration. Otherwise, leave these fields blank and this will allow any virtual machine to match this configuration. For the *Action* field, select action Clone. For the *Clone From* field, select the virtual machine name from step 5 and then, click *Save*.

    - In order to discover managed devices of virtual_console_vmware type running virtual serial port (vSPC on ESXi), select VM Serial on the *Discovery Method*. In the *Host Identifier* field, provide a substring to identify the virtual machine names for this configuration. You can also provide the Port URI information configured under the VM serial port in the ESXi server. This field can be used to provide group names or an identifier for a group of servers. Otherwise, leave both fields blank and this will allow any virtual machine to match this configuration. For the *Action* field, select action Clone. For the *Clone From* field, select the virtual machine “template” name from step 5 and then, click *Save*.

- In order to discover managed devices of service processor type, select DHCP under *Discovery Method*. This enables NodeGrid Manager to evaluate the discovery rules for any server with a service processor that requests DHCP. Please note that this option requires DHCP Server enable under Network :: DHCP Server. For *Mac Address* provide the three first octets or full MAC Address of the devices that you want to discover. In the *Host Identifier* field, provide a substring to identify the server names for this configuration. Fields left blank will not be used during the discovery to match this configuration. In the *Action* field, select action Clone. For the *Clone From* field, select the server name from step 3 and then, click *Save*.

- In order to discover console servers and ports (type: console_server_xxxxx), select Console Server on the *Discovery Method*. In the *Port List* field, provide a list of individual ports separated by commas and/or port range separated by dash to be discovered. In the *Host Identifier* field, provide a substring to identify the console server names or console server port names for this configuration. Otherwise, leave these fields blank and this will allow any console server or port to match this configuration. For the *Action* field, select action Clone. For the *Clone From* field, select the console server name from step 6 and then, click *Save*.

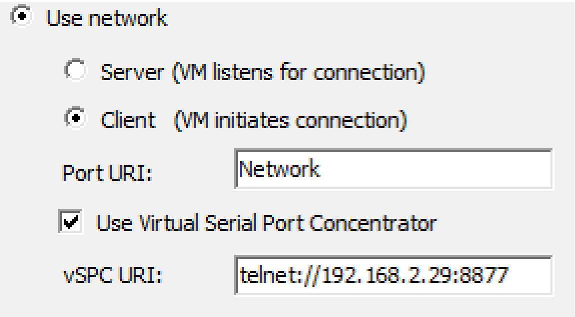
NodeGrid Manager is now configured with basic information and ready to discover servers with service processor and virtual machines and to accept users and connections to managed devices.

2.4. Configuring Virtual Serial Port (vSPC) on VM SERVERS

In order to redirect the VMware virtual machine vSPC data to NodeGrid Manager, the virtual machine serial port needs to be configured as described below:

1. Go to ESXi configuration (vSphere™). Select the virtual machine you want to connect and click the *Edit Virtual Machine Settings* link;
2. Click *Add*. The virtual machine must be turned off;
3. Click *Serial Manager Device*, then click on *Next* in the pop-up window;
4. Click *Connect Via Network*, then click *Next*;

5. Select Client (VM initiates connection) – this is the default
6. For Port URI, type **<group_id>** where group_id is an identifier that can be used during the auto-discovery to relate servers of the same group. This field is optional.
7. On vSPC URI, type **telnet://<IP or NodeGrid Manager hostname>:8877**
8. Click *Finish*.



● Use network

○ Server (VM listens for connection)

● Client (VM initiates connection)

Port URI: Network

☑ Use Virtual Serial Port Concentrator

vSPC URI: telnet://192.168.2.29:8877

3. ACCESS & TRACKING

3.1. Web, SSH or Telnet

You can access NodeGrid Manager through the Web, SSH and Telnet. If you want to log into the Web interface, open a Web browser and enter the NodeGrid Manager IP address in the address field. Both HTTPs and HTTP redirect to HTTPs are enabled by default. If you want to login to the CLI, open an SSH or Telnet session using the NodeGrid IP address. Please note that only SSH protocol is enable by default.
The default administrator user is: ***admin***, password: ***admin***

As the admin user connected to a Web session, you can view all the devices that are enrolled under NodeGrid Manager by clicking on *Access*. If authorization enforcement is enabled, then the user will see only the managed devices configured under the groups he/she belongs to.
In order to view the devices and connect to a managed device via Web session, follow the steps below:

1. Select *Access* on the top navigation. A list of names or aliases for all configured and installed devices which the user is authorized to access, will be displayed on the content area;
2. In the Action Column, select Console and a Java applet viewer will start. On the top of the viewer window you will see the name of the managed device you are connected to.

A Telnet or SSH client can be used by an authorized user to establish a connection straight to the console of a managed device if:

- The Telnet or SSH protocol is enabled in the NodeGrid Manager's security settings;
- A user name and password is provided upon connection. Make sure to create local users or enable remote authentication for enterprise users.

3.1.1. Using Telnet to Connect to a Managed Device

For this procedure, you need the username configured to access the managed device, the managed device name (for example, Development_CentOS), and the hostname or IP address of NodeGrid Manager.

To use a Telnet client, enter the information in the dialog boxes of the client.
-or-

To use Telnet in a shell, enter the following command:

# telnet [*hostname* | *IP_address*]
login: *username:[device_name]*

```
Example:

$ telnet 192.168.2.164
Trying 192.168.2.164...
Connected to 192.168.2.164.
Escape character is '^]'.

NodeGrid 2.0.0 Aug 12 2014 - 06:09:31 NewYork-DC

login: admin:Development_CentOS
Password:
[Enter `^Ec?' for help]
[Enter `^Ec.' to disconnect]

CentOS release 6.4 (Final)
Kernel 2.6.32-358.el6.x86_64 on an x86_64

CentOS-srv.zpesystems.com login:
```

3.1.2. Using SSH to Connect to a Managed Device

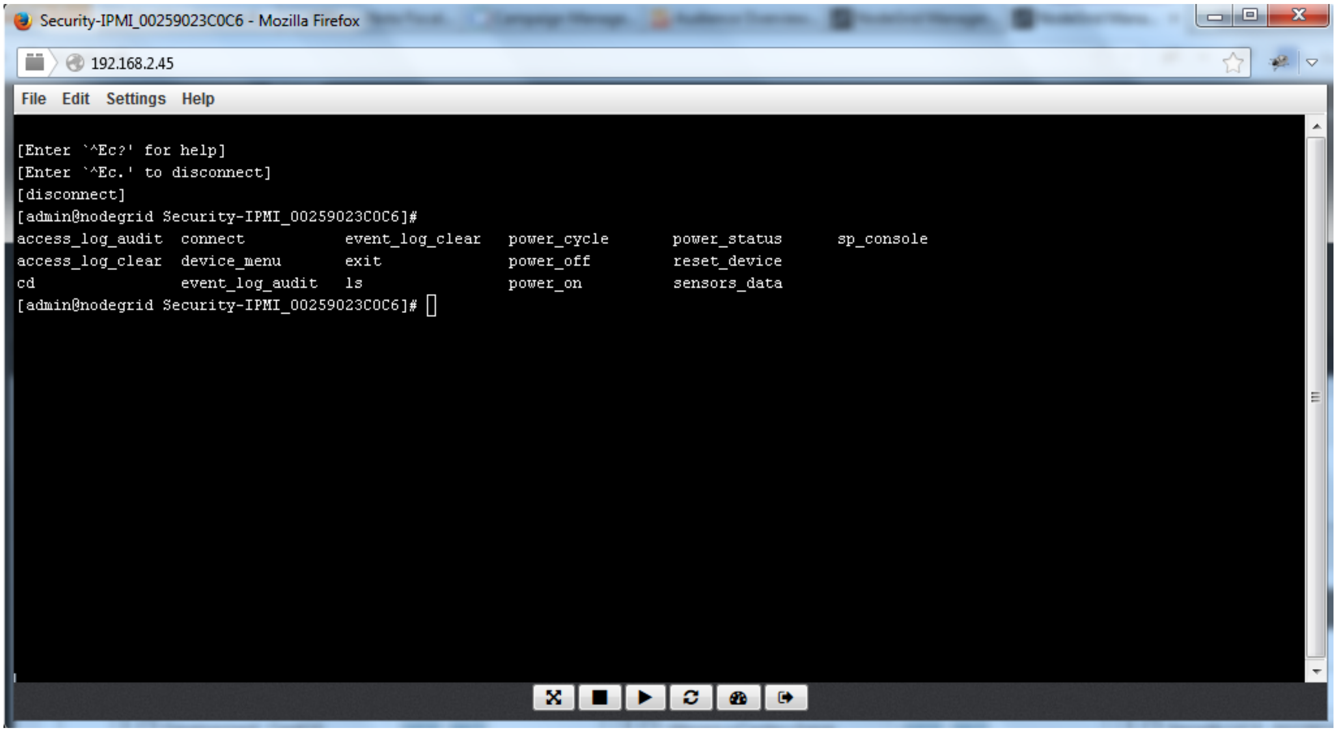
For this procedure, you need the username configured to access the managed device, the managed device name (for example, Server-Eng), and the hostname of the NodeGrid Manager server or its IP address.

To use an SSH client, enter the information in the dialog boxes of the client.
-or-
To use SSH in a shell, enter the following command:
ssh -l username**:device**_name [hostname | IP_address]

```
Example:

$ ssh admin:Development_CentOS@192.168.2.164
Password:
[Enter `^Ec?' for help]
[Enter `^Ec.' to disconnect]

CentOS release 6.4 (Final)
Kernel 2.6.32-358.el6.x86_64 on an x86_64

CentOS-srv.zpesystems.com login:
```

If you have to close an SSH/Telnet session (Java Applet always uses SSH), just type *exit* from the CLI. If you have connected directly to a managed device, use **^EC.** hotkey to go back to CLI mode.

From the CLI, the user can type <Tab><Tab> to see a list of supported commands. The screen shot below shows a CLI example for a server that supports service processors. The commands available to the user are defined by the authorization group the user belongs to.



```
[Enter `^Ec?' for help]
[Enter `^Ec.' to disconnect]
[disconnect]
[admin@nodegrid Security-IPMI_00259023C0C6]#
access_log_audit  connect           event_log_clear   power_cycle       power_status      sp_console
access_log_clear  device_menu       exit              power_off         reset_device
cd                event_log_audit   ls                power_on          sensors_data
[admin@nodegrid Security-IPMI_00259023C0C6]#
```

3.2. Tracking

Select Tracking on the navigation menu in order to see runtime information. Open Session shows all users actively connected to the system. If a user has permission based on an authorization group, he/she can disconnect existing sessions. The other tabs under Tracking will show additional read only runtime information about the system.

4. CONFIGURATION - SYSTEM

The system menu options are as following:

4.1. Preferences

This page allows the user to configure system's parameters. The following fields are relevant for this page:

- *Address Location* is a free format field for the address location of NodeGrid Manager.
- *Online help* allows the user to define an alternate location where the user manual can be posted. When the user clicks on the *Help* button on the top right corner of the Web interface, a new Web page opens up and the file defined on this URL location is shown. The Web server's root directory default location is within NodeGrid Manager. However the administrator can download the file from NodeGrid Manager (or a new update from the ZPE Systems Website) and post the manual in any other location of the network that is reachable by NodeGrid Manager.
- *Login Banner* allows the system to show a common message during the login process. The message will be shown on Telnet, SSH, HTTP, HTTPs and Console. This is typically used to show warning messages before the user logs in on the system. The admin user can edit and customize the default message.
- *Session Timeout* allows the admin user to configure the number of minutes before open sessions are timed out. Configuration changes on this field will be effective for new sessions only. Existing sessions will continue following their session timeout value specified during their login time. A zero in this field allows new sessions to never expire.

4.2. Date and Time

The date and time can be retrieved from a Network Time Protocol (NTP) server or be set manually. NTP is the default configuration for this option and it will try to retrieve the date and time from any server in the NTP pool. In manual configuration mode, NodeGrid Manager will use its own clock to provide date and time information. The user must refresh this page to see current system time.

4.3. License

Select this option to view license information for NodeGrid Manager. Enrolled licenses will show on this table along with detailed information about the number of managed licenses and any other relevant information. Multiple licenses can be added on the system. For licenses of the same type, the total number of allowed managed devices will be the sum of all licenses up to upper limit supported by the system (currently 1,000 nodes). Excess devices beyond this limit will not be supported. The top right corner of this content page shows a summary of the licenses installed, in use and available. Click on *Add* if you want to add a license and then, in the license field, enter the number of the license you are adding. If you want to delete a license, click on its respective box and then click on *Delete*.

4.4. Toolkit

Use this option to reboot, shutdown, save settings (to backup settings), apply settings (to restore settings), apply system certificates and restore to factory default settings (erase and recover original installation settings).

4.5. Logging

Use this option to enable data logging collection of CLI sessions. If this selection is enabled, all data exchange during a CLI session will be logged for auditing and inspection. The admin user can inspect and clear data logs via the CLI command.

4.6. Custom Fields

Use this selection to add searchable custom fields and value.

5. CONFIGURATION - NETWORK

The network menu options are as follows:

5.1. Settings

Use this selection to configure the hostname for NodeGrid Manager, static DNS information and to enable an IPv6 network stack.

5.2. Interfaces

This page will list all the available Ethernet interfaces created for the virtual machine hosting NodeGrid Manager. A total of 4 Ethernet interfaces can be enabled on the system. The Ethernets must be created by the hypervisor management system. Drilldown to the interface to enable it and configure additional IPv4 and IPv6 parameters. In order to support IPv6, IPv6 support needs to be enabled under Network :: Settings.

IPv4 method options below:

- DHCP if you want to have the IPv4 address set by the DHCP server;
- IPv4 address unconfigured to disable IPv4.
- Static, if you want to enter the subnet mask and the IPv4 IP address manually.

IPv6 method options below:

- Static to enter the prefix length and the IPv6 IP address manually;
- DHCPv6 if you want to have the IPv6 IP address set by the DHCP server;
- Stateless if the link is restricted to the local IP address;
- Unconfigured IPv6 address to disable IPv6.

5.3. Static Routes

This page allows the user to create IPv4 and IPv6 static routes. Any existing static routes will be listed in the table. The user can create default, IP or Network routes.

Static Routes (IPv4 and IPv6)

Adding Static Routes, select:

1. Click on *Add;*
2. Default to configure the default route;
3. In the Gateway field, enter the Gateway IP address;
4. In the Metric Field, enter the number of hops to your destination, then click the *Save* button.

Note: Go to *Tracking :: Routing Table* page to see the current running routing table.

5.4. Hosts

This page allows sysadmins to add managed hosts by adding an IP address, host and alias. Any existing hosts will be listed in the table.

5.5. SNMP

This page lists any existing SNMP configuration and it allows the user to create new ones. Use *System* button to enter system's contact and location. Use *Add* button to add v1, v2 community name or v3 user name, along with the OID information and desired permissions. Select the v1, v2 option and provide the source (subnet address) or v3 option and then select the Authentication Type (*MD5* or *SHA*) and enter the authentication passphrase Level (*NoAuthNoPriv*, *AuthNoPriv*, *AuthPriv*).

Note: Only enterprise information is currently available under SNMP.

5.6. DHCP Server

NodeGrid Manager may be configured to serve IP addresses for the managed devices in the management network. This is typically the case of servers running service processors. Since each service processor requires an IP address, it is convenient to have the management network requesting DHCP from NodeGrid Manager. This page will list any existing DHCP configuration. Click on *Add* or drill down to existing entries to configure a DHCP server. In order to add new entries, provide the subnet and netmask of the interface served by DHCP. Optionally you can provide domain, DNS and router IP address. Network ranges and hosts can be added to the configuration as well.

6. CONFIGURATION - MANAGED DEVICES

The Managed Devices menu options are as follows:

6.1. Devices

This page list all managed devices enrolled in the NodeGrid Manager system. The top right corner of the table shows the total licenses in the system, total in use and total available. Each managed device added in the system uses one license from the pool. If licenses expire or are deleted from the system, the devices exceeding the total licenses will have their status changed to “unlicensed”. While their information will be retained in the system, the unlicensed devices will not show up in the access page preventing the user from connecting to them. Only licensed devices are listed on the access page and are available for access and management.

For adding or editing devices, the following fields are relevant:

- *Name* is the unique name of the managed device. It should be the hostname of the server, hostname of the console server or the virtual machine name in the ESXi or KVM hypervisor. The managed device name will be used for connecting via Web or CLI (SSH or Telnet).
- *IP Address* is the managed device’s IP address. For virtual machines, enter the IP address of the hypervisor.
- *Address Location* is a free format field for the address location of the device
- *WEB URL* is the managed device URL, if it is available. %IP is a macro that will be replaced by the actual managed device’s IP address.
- *Type* – select the appropriate type from the pull-down selection.
  The following types *ilo* (HP), *imm* (IBM), *drac* (DELL), *ipmi_1.5* and *ipmi_2.0* (Super Micro), *ilom* (Oracle), *cimc_ucs* (Cisco) are for service processors;
  The *device_console* type is for generic devices that respond to SSH or Telnet protocols
  The *vm_console_vmware* type is for VMware^{TM} virtual machines using MKS-Mouse Keyboard and Screen or vSPC for virtual serial port.

The *vm_console_kvm* type is for KVM virtual machines using virtual serial port. The *console_server_xxx* types are for Serial Consoles from Avocent/Cyclades and OpenGear.

- *Username* and *Password* for the privileged user on the managed device. This account will be used for logging into the device in order to collect data logging and event logging. Typically this is the admin user of the service processor or console server. Note: *vm_console_vmware* type does not require username and password.
- *Mode* settings allow to control the state of the device.

  Enabled – the device is visible on Access page. The Console connection between NodeGrid Manager and the device will remain established to allow collecting data logs sent by the device's console, regardless if the session is in use.

  On-demand – the device is visible on Access page. The Console connection between NodeGrid Manager and the device will be established dynamically when there is a user using the session. The connection will be disconnected when the last user terminates the session with the device.

  Disabled – the device is not visible on Access page. The Console connection between NodeGrid Manager and the device is not established. Use this mode if you want to disallow temporarily access to device (for example when device is maintenance mode).

  Discovered – the device is not visible on Access page. The Console connection between NodeGrid Manager and the device is not established. This device was auto-discovered and it is currently parked on this state for review by admin.
- *End Device* settings for *console_server_xxx* type. This allows NodeGrid Manager to identify if the managed device is for the appliance itself or for one of the serial ports on the console server. *Discovery* allows the system to fetch information about new serial ports on the console server or updates on existing serial ports.
- *Enable Send Break* allows admins to customize the *Break Sequence* to be used by this managed device.
- *Multisession* allows multiple users to log to the same managed device simultaneously. For auditing and tracking purposes, only one user will have control of the session at a time. The others will be in read-only mode.
- *Data Log* and *Event Log* selection will configure the system to collect data log (not available for MKS sessions) and event log from the device (for service processor device type only). *Event Log Frequency* and *Event Log Unit* will set the frequency

to collect the event log from the service processor. Both alerts and events support *Alert Strings* and *Event Strings*, which are regular expression pattern string that are evaluated against the data source stream as the data is collected. Events are generated for each match.

6.2. Templates

Templates hold specific information about the CLI prompt characteristics from different targets. NodeGrid Manager provides several pre-configured templates that can be cloned and modify in order to grow your portfolio of templates. Select a single template and use the *Clone* button to make a copy of it. You can edit the template in order to make further changes. Pre-defined templates can be modified, but cannot be deleted.

6.3. Target Types

Target Types hold specific information about the family type (required for the device driver identification), protocol to be used for communication, and the template associated to different targets. NodeGrid Manager provides several pre-configured target types that can be cloned and modify in order to grow even more your portfolio. Select a single target type and use the *Clone* button to make a copy of it. You can edit the target type in order to make further changes. Pre-defined target types can be modified, but cannot be deleted.

6.4. Auto-discovery

This feature allows newly discovered devices to be cloned from existing devices matching their profile and build dynamic access groups. For best results with this feature, make sure the device to be used as reference in the cloning process is correctly configured. Verify that username, password and IP address are correct by accessing the device. Verify that the data logging and event logging settings are correct by auditing the log files. Verify that events are being detected based on data logging and event logging by simulating events and checking if any notification was created. Verify that the device is in the desirable authorization group with correct access rights.
Select *Auto-discovery* and click on the *Add* button. Select an option below matching the

device type to be discovered:

- In order to discover managed devices of one of the service processor types, select *DHCP* as the *Discovery Method*. This will direct NodeGrid Manager to evaluate any server with service processor that requests DHCP against the discovery rules. Please note that this option requires *DHCP server* to be enabled under Network. For *Mac Address* provide the three first octets or full MAC Address of the devices that you want to discover. In the *Host Identifier* field, provide a substring to identify the server names to this configuration. Fields left in blank will not be used during the discovery to match this configuration. In the *Action* field, select action "Clone." In the *Clone From* field, select a server name from pull-down list (from the same type) and then, click the *Save* button.
- In order to discover managed devices of vm_console_vmware type running virtual serial port (vSPC on ESXi), select *VM Serial* as the *Discovery Method*. In the *Host Identifier* field, provide a substring to identify the virtual machine names to this configuration. You can also provide the Port URI information configured under the VM serial port in the ESXi server. This field can be used to provide group names or string identifier for a group of servers. Otherwise, leave both fields blank and this will make any virtual machine match this configuration. In the *Action* field, select action "Clone." In the *Clone From* field, select a server name from pull-down list (from the same type) and then, click Save.
- In order to discover managed devices for MKS Mouse-Keyboard-Screen sessions, select VM Manager as the Discovery Method. On *Datacenter* and *Cluster*, provide a substring to identify the data center and/or cluster of interest. In the *Host Identifier* field, provide a substring to identify the server names for this configuration. Fields left in black will not be used during the discovery to match this configuration. In the *Action* field, select action *Clone*. For the *Clone From* field, select a server name from the pull-down list (from the same type) and click *Save*.

  Note: Requires *Discover Virtual Machines* to be enable under *VM Manager*.
- In order to discover managed devices from console server appliances, select Console Server as the Discovery Method. Under *Port List*, provide a comma separated list of ports of interest. In the *Host Identifier* field, provide a substring to identify the serial port names to this configuration. Fields left blank will not be used during the discovery to match this configuration. On *Action* field, select action *Clone*. For the *Clone From* field, select a server name from

the pull-down list (of the same type) and then, click *Save*.

The auto-discovery *Up* and *Down* buttons allow you to change the order of the discovery rule within a given *Discovery Method*. This is important if the administrator wants to set discovery rules with different priorities or even rules to drop the discovery match (by selecting action *Discard*).

6.5. VM Manager

This feature allows NodeGrid Manager to communicate to VMware vCenter™ in order to generate session tickets for MKS sessions and also to execute power commands for managed devices of *VM_Console* type.

- *VM Server* – provide the IP address of the vCenter™ server.
- *Username* and *Password* for the user with admin privileges in vCenter™

Click *Save*.

In order to discover virtual machines from vCenter™, *Discover Virtual Machines* needs to be enabled. Provide the polling interval (in minutes) for how often the list of VMs will be retrieved from vCenter™. On the *Discovery Scope Options* select the data centers and/or clusters from where NodeGrid Manager will search for virtual machine names. Setting the correct scope will help to improve performance especially in large data centers. The list of names will be used by the auto-discovery process following your discovery rules.

7. CONFIGURATION - SECURITY

The security menu options are as follows:

7.1. Local Accounts

The NodeGrid Manager system installs with a built-in admin user account with full access over the environment in order to configure network, security, authentication, authorization, add devices and other users. The user ***admin*** account cannot be deleted and it has the default password ***admin***. It is strongly recommended that admins change the default password during the first login by using the *Change Password* option on the pull-down menu under your username in the top right corner. New users can be added by the administrator. The admin can force passwords to be changed upon next login and set expiration dates for the user accounts. Regardless of activation options, users can change their own passwords at any time. All users have access to all enabled managed devices by default. Based on the groups they are assigned to, these users have limited access to NodeGrid Manager Web portal management attributes. The users' privileges can be modified (elevated or reduced) by setting profile and access rights in an authorization group. A user who belongs to group *Admin* will have the same administration privileges as the admin user. Each user must have a specific user account on NodeGrid Manager or on the enterprise authentication server. A user can be assigned to one or more authorization groups.

Adding new users:

1. Click on *Local Accounts*
2. A list of all users will be displayed on the User Names screen;
3. Click on *Add* and the Local User Information screen will be displayed;
4. Type a new user name and password and then confirm it;
5. Enter Account Expiration Date (optional);
6. Select or Deselect the option *Require password change at login time* by the "next login" checkbox;

7. To add the user to an available user group, just choose the group name from the box on the left and then click *Add.* To remove a user group from the box, just select it and click *Remove*;
8. Click *Save.*

7.2. Authorization

There are two default authorization groups: *admin* and *users*. An administrator can add new groups and change authorization/permission settings of the groups. Groups can restrict or expand user access rights to managed devices and to the system.

Admin group members have the same access and configuration authorizations that the default admin user has and full administrative control that cannot be changed. For example: users of the *admin* group can manager other users, add/delete managed devices, add new groups, set up authorization and authentication, enable services and perform all types of configuration and maintenance on the system. It is the highest privilege level.

User group members have regular access to managed devices and limited access to the system. This is the default group for new users added in the system. Authorization permissions of the group can be changed by an admin user.

Adding new groups:

1. Click on *Authorization* and the Groups screen will be shown with a list of the default authorization groups available and additional authorization groups created;
2. Click *Add;*
3. Type the name of the new group you want to create and then click on *Save;*

Configuring members of the authorization group:

1. Click the *Members* button
2. Click on *Add* and select the members to add to this group by moving them to the box on the right. You can also make a comma-separated list of remote users that should belong to this group. Click on *Save* to accept your changes.
3. If you want to remove members, select the member you want to remove from the

list and click *Delete*. This will delete the selected members;

Configuring profiles of the authorization group:

1. Click on the *Profile* button
2. Select the System Permissions which should be enabled for this group; Selecting all permissions will allow this user full management access to the system.
3. Select the Profile Settings which should be enabled for this group. The menu-driven option will show an indexed list of all managed devices every time a CLI session is opened. The user just needs to select the index number to go directly to the desired managed device. Custom timeout allows the members of this group to have their own timeout session.
4. Click on *Save*.

Configuring devices of the authorization group:

1. Click on the *Devices* button
2. Click on *Add;*
3. To move managed devices from the available device list on the left to the list of authorized devices on the right, double click on the name or select the device and then click *Add.* Devices can be removed from the box on the right by double clicking on the device or by clicking on the delete button after selecting to device to be removed;
4. Select device permissions and click *Save*.
5. To edit access rights, select the checkbox next to the name(s) available and then, click on *Edit*. The Device Permissions will be displayed on the screen. Choose the desired access rights and click the *Save* button.
6. If you want to remove devices, select the device's box you want to remove from the list and click on *Delete*. This will delete the selected devices.

7.3. Authentication

NodeGrid Manager supports local authentication and the following remote authentication types: Kerberos, LDAP, Radius, and Tacacs+. The default configuration is Local. Once a configuration method is selected, it will be used for authentication of any access to the system via Web, CLI and console of the virtual machine running NodeGrid Manager. In order to use an authentication server, its IP address must be configured as well as other parameters that it might have. The remote servers must be configured before being used.

7.3.1. Setting authentication type

1. Click the *Authentication* button;
2. Select an Authentication Type from the pull-down menu. A list of additional configuration options will be shown for the specific selection.

Kerberos

a. Enter the server's IP address (Realm) and then, the Realm Domain Name;
b. Enter the Domain Name and then click on *Save*;

RADIUS

a. Enter the First Authentication and Accounting Servers' IP addresses;
b. Enter the Second Authentication and Accounting Servers' IP addresses if necessary;
c. Type a Pass sentence or word in the secret field and then re-enter both in the Confirm field confirm them;
d. In the Timeout field, type the number of seconds for server timeout and in the Retries field, type the desired number of retries;
e. In case you choose the Enabling Service Type feature to specify the authorization group checkbox, type the authorization group name for all of the following Service Types: Callback Framed, Login, Callback Login, Framed, Administrative and Outbound. Then, click on *Save*.

LDAP(S)

a. Enter the Server IP address and the Base;
b. Select Start_TLS, On or OFF from the Secure drop-down menu;
c. Enter the User Name of the Database, the Database password and then, re-type the password in the Password field to confirm it;
d. Enter the features needed and then click *Save*.

TACACS+

a. Enter the First Authentication and Accounting Server IP addresses;
b. Enter the Second Authentication and Accounting Server IP address if it's going to be used;
c. From the Service drop-down menu, choose the requested service (raccess or PPP);
d. In the Secret field, type your pass sentence or secret word and then, re-type them in the Secret field confirmation;
e. In the Timeout field, enter the number of seconds for server timeout and then, the number of allowed retries in the Retry field;
f. In case the option Enable User-Level is chosen to specify the authorization group, enter up to 15 User levels, authorization group name, and then click *Save*.

Remote authentication options also allow you to enable a fallback authentication to local. This will allow the authentication to be performed against the local database, in case the connection to the remote authentication request times out or the authentication was rejected by the remote authentication server.

7.4. Firewall

NodeGrid Manager acts as a Firewall when configured to do so by an administrator. There are three built-in default chains. These accept Output, Input and Forward packets. If you want to add a user chain, change the built-in chains policy or delete user added chains, select the buttons Add, Delete or Change Policy. You cannot delete default chains, only change their policy to accept or drop. You can configure rules for chains by clicking on their names. At the time you add a chain only a named entry for is created for it. If you need to configure rules for the chain you may do so after its addition.

If you want to configure a Firewall you must select an action (*Examples: Accept, Return, Log, Drop or Reject*) from the Target pull-down menu for each rule. The action you select will be performed on an IP packet that matches all the specified criteria in the rule.

Adding a chain:

1. Click on *Add*;
2. Select the type of chain: IPv4 or IPv6
3. Enter the chain name you want to add (Note: Do not use spaces in the chain name);
4. Click on *Save;*
5. Add rules to complete the configuration of the chain. You can add one or more rules.

Adding a rule:

1. Choose the name of the chain from the chain list, to which you want to add a rule;
2. Click on *Add*;
3. Configure the rule;
4. Save the configuration.

Changing the policy for a default chain:

1. Choose the name of the chain you wish to change (Input, Output and Forward) and select its respective checkbox;
2. From the drop-down menu, click on Change Policy and select *Accept* or *Drop.* Then, click *Save.*

It is not possible to edit a user defined chain.

7.5. Services

Use these settings to control which services should be enabled in the system and which network ports they should be using. This allows you to configure the security level of the system. For instance, you can disable unsecured protocols like Telnet or HTTP on this page, or set the SSH version you want to allow in the system.

Settings:

- Enable RPC if you have set NFS (Network File System) to store data or event logging. Otherwise, leave it disabled.
- Disable Telnet if you do not want to use an unsecured protocol. This will help to increase security.
- Enable FTP if you want to transfer files to NodeGrid Manager
- Disable SNMP if you do not want to allow SNMP access to NodeGrid Manager. This will help to increase security. Otherwise, you can select version 1, 2 or 3 under SNMP configuration.
- Disable ICMP if you do not want to respond to Ping
- Select SSH version: 1 or 2. Select SSH TCP port. Default port: 22
- Disable VM Serial session if you do not want to accept VMware ESXi vSPC (virtual serial port) connections to NodeGrid Manager
- Select the VM Serial TCP Port: Default port 8877. This should be the same port number used by vSPC under the virtual serial configuration in the ESXi server.
- Select vMotion timeout to be used in association with VM serial port connection, when VM Serial is enabled.
- Select Device access enforcement if access rights enforcement based on authorization groups is required. When this selection is enabled, only devices listed under the authorization groups that the user belongs to will be shown the user. If this option is not selected, all enrolled devices in the NodeGrid Manager will be shown to the user and the user will be able to access them without restriction.
- Select DHCP lease controlled by auto-discovery rules, if DCHP should lease IP Addresses only to devices whose discovery rules are a match on this NodeGrid Manager.
- Disable HTTP if you do not want to use an unsecured protocol. This will help to increase security. Otherwise select the HTTP port. Default port: 80
- Select HTTPs version (default 2,3), cipher (default Low) and port (default 443).
- Enable HTTP to HTTPs redirect if desirable.

8. CONFIGURATION - AUDITING

The auditing feature allows events to be generated to two different destinations: Syslog and Email. It also allows data logging and events logging to be stored locally, remotely via NFS or sent to a syslog server.

8.1. Event Destination

The event notification will use this configuration to identify the destination of the event group selection. Event Destination can be configured with the following steps.

Syslog

1. Select the Facility;
2. To enable syslog messages to be sent to one or many remote IPv4 or IPv6 syslog servers, select *Remote Server* for *IPv4* or *IPv6.* Then, enter the Hostname or IPv4/IPv6 Address. If you enter more than one server address, separate them by using commas;
3. Select Root Session to send syslog messages to every session you log into as a root or admin user.
4. Select System Console to send messages to the console of NodeGrid Manager;

Email

1. Configure the SMTP server. Example: smtp.gmail.com
2. Configure the SMTP port. Example: 587
3. Configure *Username* and *Password* for the server.
4. Select the *Destination Email*. Use commas to provide multiple emails
5. Check *Start TLS* according to your server requirements.

8.2. Logging Destination

Use this configuration to define the logging destination. Options are Local, NFS or Syslog.

Local:

1. Enter the segment size in kilobytes and spare segments.
2. Define the time for the daily log rotation.

NFS:

1. Enter NFS Server,
2. Enter NFS Path,
3. Enter Segment Size (Kbytes) and
4. Enter Spare Segments.
   NOTE: RPC service must be enabled under Security :: Services before configuring NFS Settings. NFS does not support IPv6.

Syslog:

1. Select a facility number from the drop-down menu: Log Local 0, Log Local 1, Log Local 2, Log Local 3, Log Local 4 or Log Local 5.
2. Click Save.

9. TECHNICAL SUPPORT

Our Technical Support staff are standing by to provide assistance in case you have any operational or installation issues regarding to your licensed NodeGrid Manager product. In order to be assisted in the fastest way possible, follow the steps below:

1. Verify the relevant section of this manual to see if the problem can be solved by following the recommended procedures shown;

2. Visit our Support Website www.zpesystems.com/support to submit an online service request or to find the Technical Support location closest to you.

For Online help documentation, go to www.zpesystems.com

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