Installation Documentation for Always Available™ Infrastructure Software

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1   ZeroNines Configuration Overview

This document describes the installation of the ZeroNines® Always Available™ software in a standard or "proof of concept" (POC) configuration. In order to accomplish this you must already have installed the CentOS v6.x Linux operating system as described in the ZeroNines document "Installation Documentation for CentOS 6 Linux Operating System," available from ZeroNines. Always Available is a 100% software solution and installs on your existing hardware and network infrastructure; there is no additional hardware to install. Instructions for installing Always Available software in a multi-tenant configuration as often found in managed services environments are in the ZeroNines document "Installation Documentation for Always Available™ Infrastructure Software: MSP Multi-Tenant Multi / Application Installation."
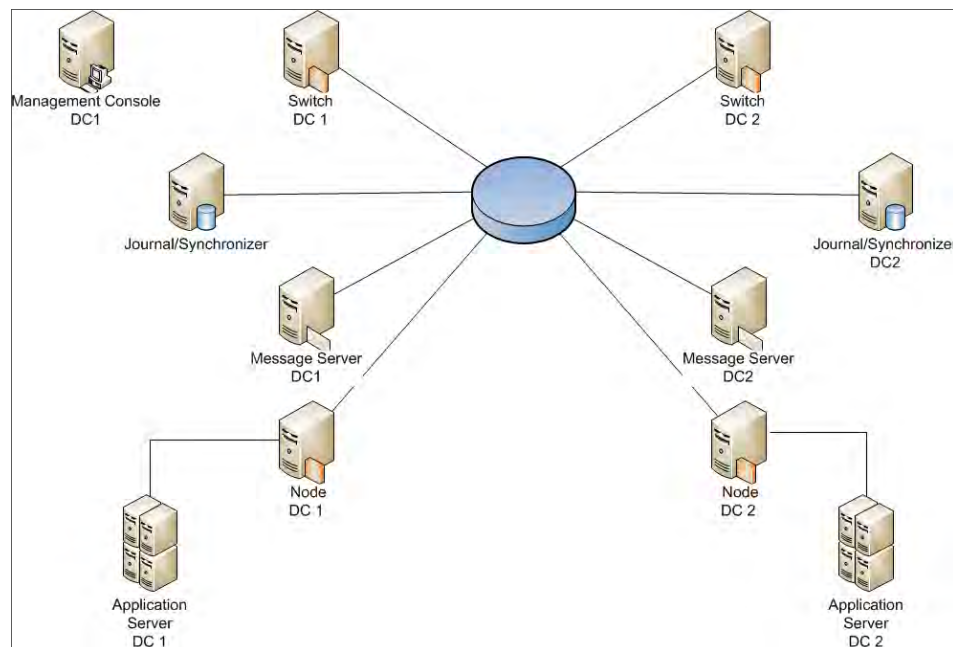
ZeroNines Components

1.1   ZeroNines Basic Components and Function

The architecture consists of switch, node and tracker components. It also requires a network to interconnect the devices, preferably a trusted network. Each switch, node and tracker has configurable identifications that consist of a location ID and device ID. The switches, nodes and tracker(s) communicate via subject addresses in a publish/subscription model. The devices have a built-in guaranteed messaging system to resend those messages that were not received by targeted devices.

1.1.1   The Software Switch

The software switch is the component that external users/systems access. For example, an external DNS server, domain controller, or load balancer would point users to the switch, which would be the gateway to the Always Available configuration. The switch's primary function is to interface with the client, encapsulate the client's message in a ZeroNines formatted message, and transmit that message to the nodes. The encapsulated message contains a location ID, switch ID, time stamp, sequence number, and subject address. Replies are picked off the wire and processed in sequence according to the time

stamp and sequence number. Missing messages are either automatically sent by the node or requested by the switch. Optionally, replies can be requested from the tracker.

The switch also hosts the proxy services. Users connect to the switch via the proxy services. The session is encapsulated and communicated to the ZeroNines message server.

1.1.2   The Management Console

The management console is a user interface for you to monitor the various ZeroNines components. It provides an interface to configure the switches, nodes and protocol proxy. It also has an interface for managing the messaging system.

1.1.3   The Node

The node is the component that interfaces with the application servers. The node receives encapsulated messages or transactions from the switch and relays them to the application server. The node receives and processes these transactions in sequence according to the time stamp and sequence number assigned by the switch. These transactions are buffered in memory as the application server processes them. This mechanism ensures that all sites process all transactions in the same order. On occasion, the memory buffer may become full before transactions are processed at the application server. This will occur if there is a problem at the application server. As memory gets flushed, the node knows what the last successful transaction was, and the node will query the tracker for the missing transactions. Joint action between the tracker and the switch will deliver the missing transactions to the node. These transactions are then processed normally.

1.1.4   Messaging Server

The messaging server is a built-in function of the ZeroNines messaging system for delivering transactions reliably between the switches and nodes. Transactions are buffered to the messaging server's memory, paged memory and/or disk. Typically, the messaging server can hold 30 minutes worth of transactions. Normally, these transactions flush from buffered memory to free up space once all application servers successfully process the transactions. If one or more application servers are down or are experiencing latency, they will need to catch up by processing the delayed transactions, until they reach the same logical state as the other application servers. These delayed transactions are not flushed but remain in memory on the messaging server while the application server works its way through all the transactions in the correct order. If one of the delayed transactions is not processed within 30 minutes it may be flushed, and the node will then query the tracker for it.

We call this our "guaranteed messaging" architecture. It ensures that transactions are delivered to the application servers in the correct order of delivery, based on time stamps and sequence numbers.

Another function of the messaging server is to enable management messages to be transmitted between devices. Management messages can check for active or inactive devices by watching for "heartbeats" that can indicate whether the system should register new or remove old devices. Management messages also inform the guaranteed message system to stop caching or waiting for messages from inaccessible components.

1.1.5   Tracker (Journal/Synchronizer)

The tracker represents the journal and synchronizer in our framework. The tracker's role is mainly to record the transaction messages sent between switches and nodes. With our current deployment, the tracker records the messages to a MySQL database. Hierarchical

storage management systems can be employed to ease storage requirements for the tracker. Tape can be used as an archival method for off-loading data. In addition to the messages, the tracker records location ID, device ID, time stamp, and sequence number.

The tracker has a secondary role as a transaction replay module. Working in conjunction with guaranteed messaging, the tracker can replay missing transactions to a node as part of the process of rebuilding an application server. See Section 1.1.3 "The Node". The tracker works on a primary/secondary configuration, allowing for one active tracker at any time. However, because of the messaging architecture, more than one tracker can be part of the system. If a primary tracker is unavailable, then the device registration will select another tracker as the primary.

1.2 Deployment Options

1.2.1 Always Available Standard Configuration

This is a simple deployment for one application or standard installation.
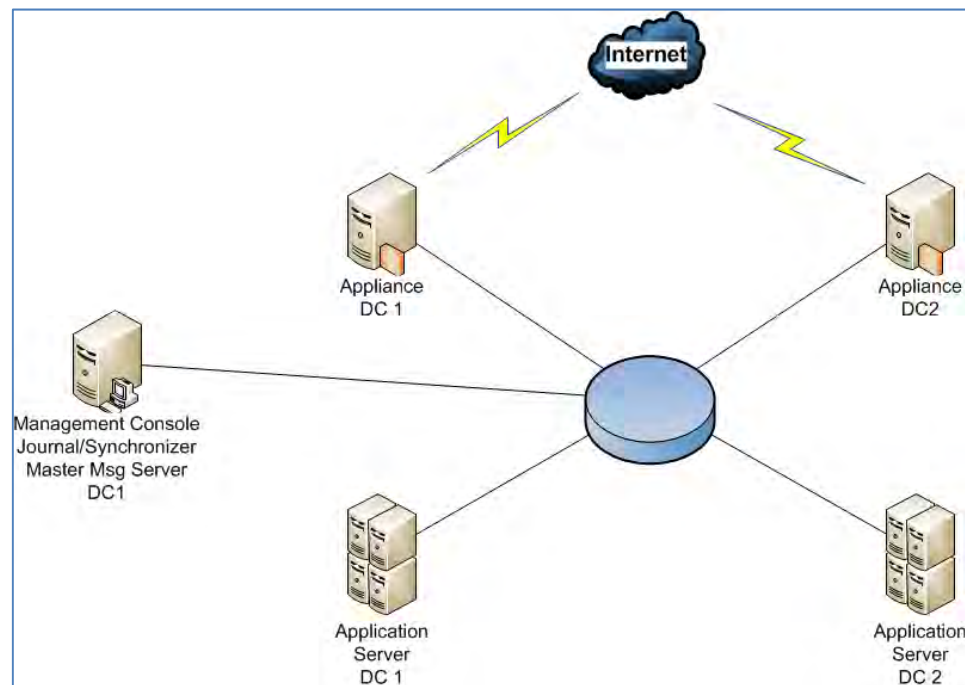
The Always Available standard configuration consists of an application or customer deployed into two (2) data centers. With this configuration, a master message server, console and journaling server will be installed on one server. An appliance server with the switch/switch proxy, node and slave message servers will be installed in each data center for the application servers.

We recommend that you begin with the Always Available standard installation and proceed to a multi-tenant/multi-application configuration after you have some experience with the ZeroNines software.

1.2.2 Always Available - Multi-Tenant/Multi-Application/MSP Configuration

The multi-tenant/multi-application configuration, as often found with managed service providers (MSPs) is not discussed in this document. Contact ZeroNines at support@zeronines.com for the installation documentation for the multi-tenant/multi-application configuration.

1.3   Conventions Used in this Document

• Indicating and Diagramming Command Lines in Linux and other Environments

This document will specify several command level directives for installing software components and running scripts.

In Linux, such commands are structured as follows:

[[user@servername]] # command statement

For example, if your user name is "admin" and the server name is "switch" and the command for installing Apache Tomcat 6 is "yum install tomcat6" then the full command line you will use is:

[admin@switch] # yum install tomcat6

Linux will automatically write out the user name and server name on each command prompt. In this document we will simply denote them with "[user@servername]". The command itself – the part you need to type in – will be in **`bold typewriter font`** and the entire command line will be written on a new line.

Thus, when we instruct you to type the command line "yum install tomcat6" we will illustrate it as follows:

`[[user@servername]] # yum install tomcat6`

Be sure to include any spaces or additional characters such as periods, hyphens, or slashes.

Hit the "Enter" key after typing each command line. In most cases we will not add instructions to hit enter, to avoid cluttering the document. Thus, if we instruct you to enter the command line "su", you would type **`su`** and hit "Enter".

In Linux, the # (pound sign or hash mark) denotes a user logged in with super user status. (The $ dollar sign denotes a user with ordinary non-super user status). All the command lines in this installation process require you to be logged in as a super user.

• Entering Data in On-Screen Forms

When we instruct you to type information into on-screen interactive forms we will format it in `plain typewriter font`. For example, if we want you to type the word "switch" in the hostname box, we will write:

In the Hostname box, type `switch`

• On-Screen Buttons and Other Controls

When you need to click or select an on-screen clickable button, tab, option, checkbox, or other interactive feature, we will write it in ***sans-serif bold italic type***. For example, if we want you to select the "US English" keyboard option and then click "Next" we will write:

Select ***US English*** from the dropdown list and then click ***Next***

• Keystrokes

When you need to hit a key on your keyboard, the name of the key will be in **[bold all-caps, in square brackets]**. For example, when we want you to hit the "Control" and the "C" key simultaneously we will write:

Hit **[ctrl]** + **[c]**

• Names of pages and page sections

If a page, a screen, or a section within a page or screen has a distinct name like "Welcome" or "Hostname" we will use normal type and surround the name with double quotes.

• Punctuation

In order to avoid confusion, we will occasionally dispense with proper English punctuation, most notably dropping the periods at the end of sentences where we instruct you to type a character string as a command. This will eliminate any doubt about whether you should include the period or not.

• Abbreviation of Always Available

In many cases to save space we have abbreviated Always Available as AA.

2   Always Available™ Standard Configuration
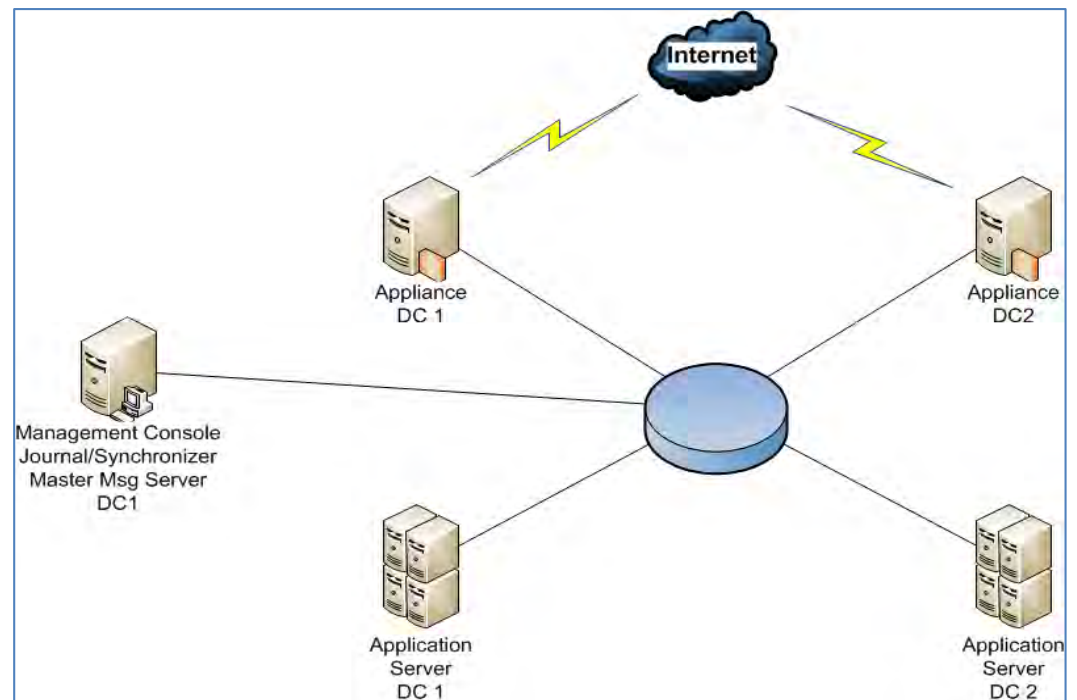
The Standard configuration consists of an application or customer deployed into two (2) data centers. With this configuration, a master message server, console, and journaling server will be installed on one server. In each data center for the application servers, an appliance server with the switch/switch proxy, node, and slave message servers will be installed.

For brevity, we use the word "appliance" in reference to any collection of ZeroNines software components that work together or that are installed together. For example, the ZeroNines console, journal, and messaging server are all installed together as one *appliance*, which in turn is just a part of the overall ZeroNines software installation.

2.1   Hardware Requirements and Configuration

Minimum requirements for all hardware are as follows.

AA Standard Model:

Component	RAM (min - rec)	DASD (min - rec)	Cores (min - rec)	NIC (min - rec)
Console/ Message Server/ Journal	8GB - 16GB	100GB+	2 - 4	1 – 2
Appliance	4GB - 16GB	40GB+	2 – 4	1 – 2

2.2   Network Prerequisites

You will be using one Linux machine to install the 64 bit version of CentOS v6.x Linux operating system, the ZeroNines software, and other necessary platforms onto another physical server or virtual machine. You should work in advance with your network administrator to obtain the IP address and other networking information for the target machine so it is readily available and so you will not need to interrupt the installation process to obtain it.

The information you will need is:

- IP address reserved for the ZeroNines machine you are installing
- The netmask in bit notation (e.g. 24, 20, 16)
- Gateway and DNS Server numbers

2.3   Configuration Worksheets

2.3.1   Pre-Installation Worksheets

Whether you are installing an AA standard deployment or the more complex AA multi-tenant/multi-application or "managed services" deployment, you should collect all the various IP addresses and other required information in advance. Use the following worksheets to record these for easy reference during your installation. You may need to work with your network administrator to obtain this information.

2.3.1.1 AA Standard Configuration Worksheet (Example)

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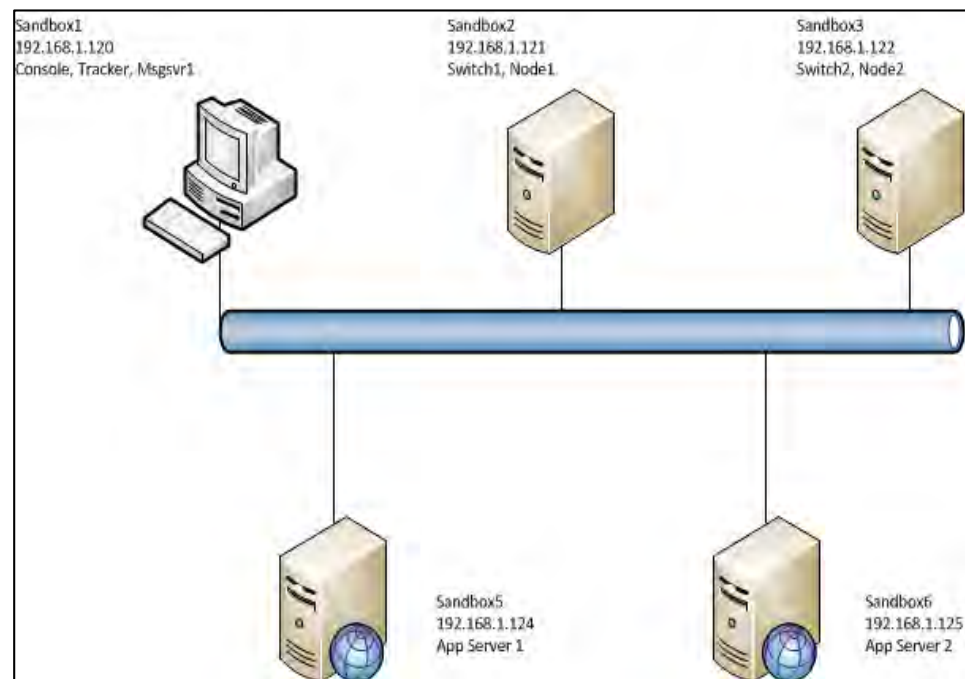
Information to Configure Host File

Host Name	IP Address	Aliases
sandbox1	192.168.1.120	console, tracker, msgsvr1
sandbox2	192.168.1.121	switch1, node1, proxy1
sandbox3	192.168.1.123	switch2, node2, proxy2

Networking Configuration Information

Device	IP Address	Network Mask	Gateway
sandbox1	192.168.1.120	255.255.255.0	192.168.1.251
sandbox2	192.168.1.121	255.255.255.0	192.168.1.251
sandbox3	192.168.1.162	255.255.255.0	192.168.1.251

3   Installation of ZeroNines® Always Available™ Software

To begin the installation of the ZeroNines Always Available software, you will need to log in to the base operating system, CentOS 6. If CentOS 6 is not already installed, proceed no further and refer to the ZeroNines document, "Installation Documentation for CentOS 6 Linux Operating System" available from ZeroNines. With CentOS 6 installed, proceed as follows.
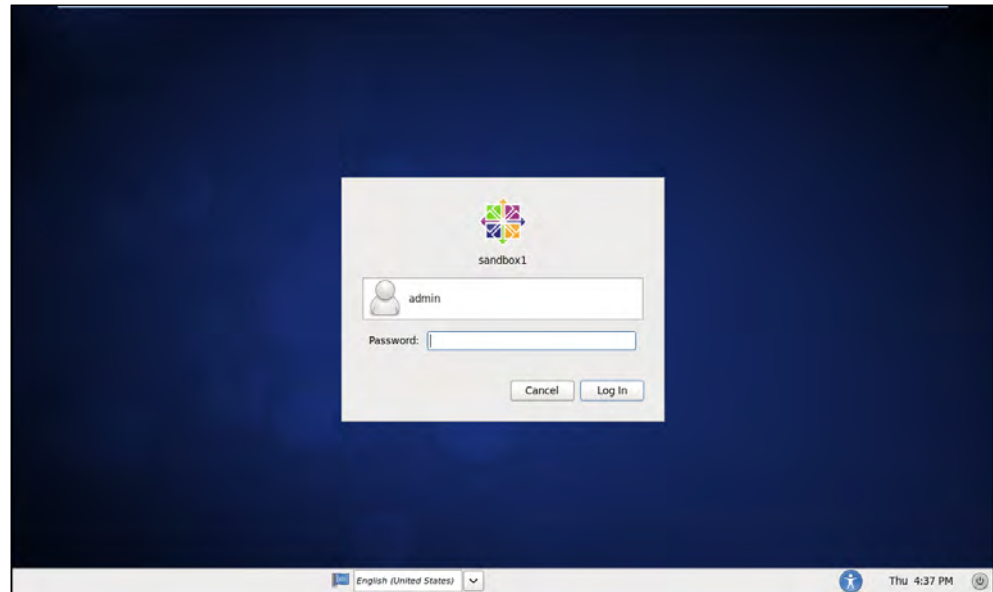
If you are logging in to the system through the graphical user interface (GUI), you will be prompted to log in with the user ID and password. The GUI interface prevents the root user from logging in.
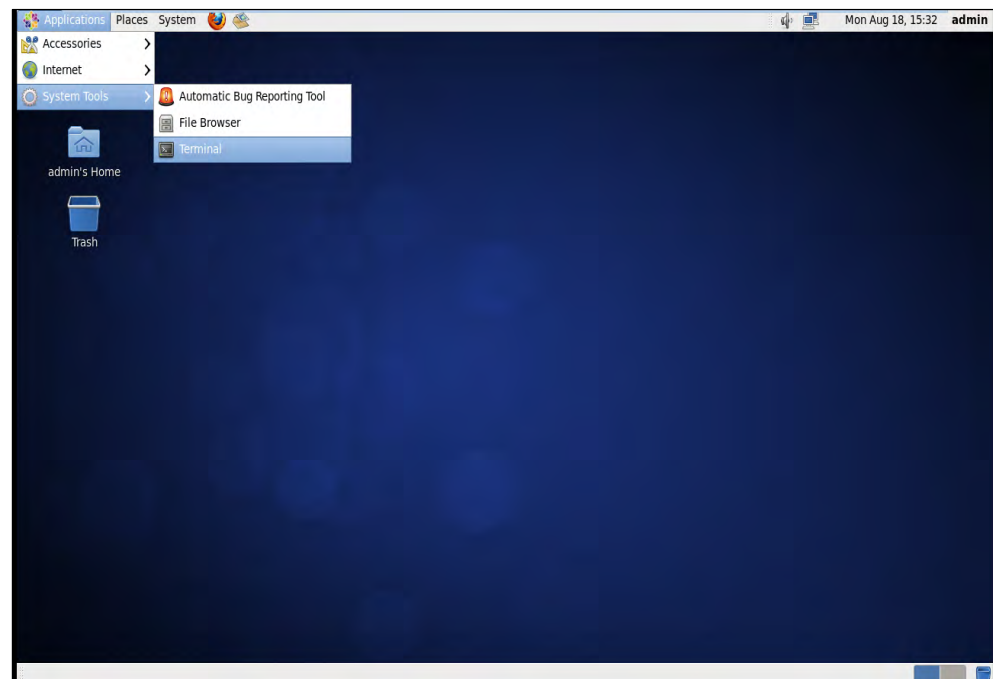
Once in the GUI desktop, you will need to open a terminal window. From the desktop, go to the **Applications** menu pull down tab, click **System Tools**, and then click **Terminal**. This will launch the "Terminal" screen.

3.1.1 Accessing Super User Mode

While working from your Linux machine to install the ZeroNines machine, all commands and scripts will require super user level access, the Linux equivalent of an administrator. In most Linux releases this can be achieved by issuing the **su** command within a terminal window.
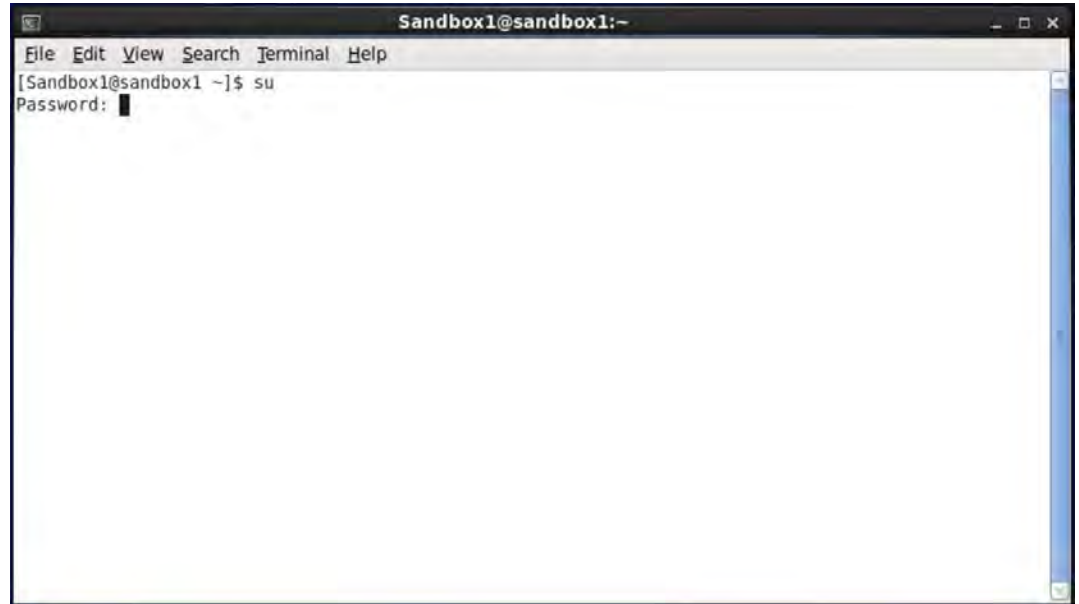
`[user@servername] $ su` and then strike **[Enter]**

You will be prompted for the super user password, which was used upon installation of the operating system on the machine you are using. If you do not have this password, obtain it from your network administrator.

Type the password after the "Password:" prompt and hit **[Enter].**

Once you have achieved super user level, the prompt will change from a "$" to a "#".

Note: after this point in these instructions we will generally not provide instruction to "hit [Enter]" after most commands. When instructed to type a command (often just a number or letter), you can assume you should strike the **[Enter]** key to activate it.

3.1.2   Ping Test

You will now perform a "ping" test to make sure you have an Internet connection, so you will be able to download installation packages for the rest of the installation. In our example we ping the yahoo.com website, but you can use any website you desire.

At the flashing cursor, enter the command:

[admin@switch] # ping www.yahoo.com

The test is successful if the machine starts typing out messages similar to what you see above: "64 bytes from irl.fp.vip.sp2... time=16.5ms". Each line of text like this indicates one successful connection with the website you specified, showing that the ping test is successful. It will continue pinging and writing out these messages until you tell it to stop.

To stop the ping test, hit **[ctrl]** + **[c]**

You should see a subsequent message that reads something like "7 packets transmitted, 7 received, 0% packet loss..." This confirms a successful ping test and you may proceed with the installations. A successful ping test indicates that the base CentOS operating system has been correctly installed. You may now proceed with installing the ZeroNines software.

Note: If the system types out messages similar to: "From 192.168.1.101... Host Unreachable" then the ping test is not reaching the website you specified.

If your ping test fails, try pinging a different website. It is possible the website you have pinged is temporarily offline.

If you continue to receive these error messages, the most likely cause is that the machine is not properly connected to the Internet. Work with your network administrator to resolve the issue and establish Internet connectivity on this target machine.

4 Installing ZeroNines® Always Available™ Components

4.1 Installation Overview

This section will explain how to download and install the ZeroNines Always Available software onto appliance-based servers. ZeroNines software is provided as groups of components, each of which must be installed in turn. These groups of components are referred to as appliances. For example, the ZeroNines console, journal, & messaging server are all installed together as one *appliance*, which in turn is just a part of the overall ZeroNines software installation. An appliance server is a server box that has one or more ZeroNines appliances installed on it.

Some of the software components are configured by ZeroNines to install together in the correct order as a complete appliance. This simplifies and speeds installation on your part.

Before you can install the ZeroNines components, the CentOS base operating system must already be installed as described in the CentOS Installation Guide. You may also "clone" the base operating system from another system or from a software package provided by ZeroNines.

During the following installation process, the installation scripts will automatically unpack and install all ZeroNines components. Once the basic ZeroNines components have been installed, you will control setup through a menu driven process.

4.2 ZeroNines Distribution Software

The ZeroNines software is distributed in a Linux "tar" file. All ZeroNines components are contained within this single tar file. You can obtain the installation package by downloading it from the ZeroNines website. The installation scripts require *root* access to install properly. Within each of the user interface boxes illustrated below, the working path is assumed to be /root.

```
Sandbox1@sandbox1:~
File Edit View Search Terminal Help
[Sandbox1@sandbox1 ~]$ su
Password:
[root@sandbox1 Sandbox1]# cd /root
[root@sandbox1 ~]#
```

To ensure that you are in the working path /root, issue the command:

```
[admin@servername] # cd /root
```

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4.2.1   Download ZeroNines Installation Package

To download the software package from the ZeroNines website, as root user, issue the following command. You should type this out as one line of text as you see in the screenshot above:

```
[user@servername] # wget
http://www.zeronines.com/download02/AAv7_1.tar.gz
```


At the completion of the download you will receive a system message similar to:

2014-09-20 14:19:48 (6.32 MB/s) – "AAv7_1.tar.gz." saved [308233796/308233796] indicating that the download was successful.

4.2.2 Unpack the ZeroNines Installation Package to a Working Directory

Unpack the ZeroNines installation package to the working directory:

```
[user@servername ~]# tar –xzvf AAv7_1.tar.gz
```

At this point the installation package has been distributed into the working directory, "AAv7_1".

NOTE: As a point of reference, "AAv7_1" in the directory name is an abbreviated version of Always Available and the ZeroNines software version number. You do not need to know this for the installation, but it may prove useful in the future for tracking versions of the ZeroNines software you may have installed.

You may now begin the installation.

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4.2.3   Start the Installation Menu
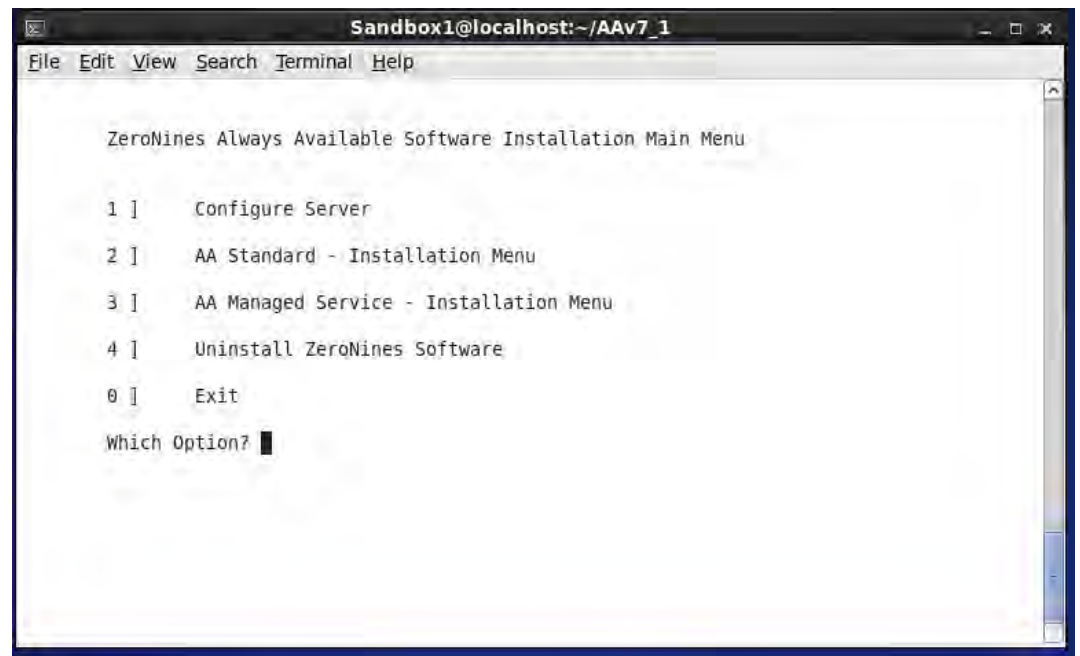
At the command prompt, change to the Installation's working directory:

[user@servername ~] # cd AAv7_1
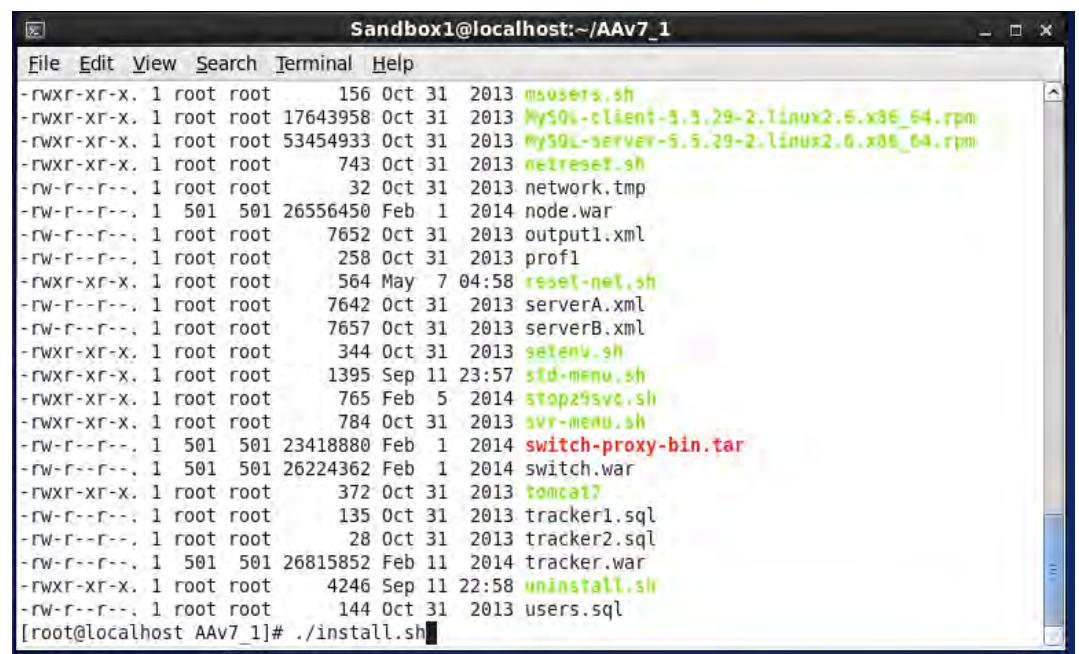
The image above shows a portion of the folder listing for the directory AAv7_1. Launch the installation with this command: **[user@servername AAv7_1]# ./install.sh**

4.3　Welcome to the Menu-Driven Installation Script

Upon executing the `./install.sh` command install script the screen shown above will appear. This is the menu-driven installation script.

This menu-driven system will allow you to install ZeroNines software components and configure various files on the server. The installation menu guides you through the options for the AA Standard or AA Managed Service (multi-tenant/multi-application) installations.

1) Configure Server opens a submenu that gives you options to configure server names, hosts file and network configurations. These options are useful for those administrators using virtual server template files to speed deployment. Rather than installing the base operating system for each virtual server, administrators could import a base image direct from ZeroNines: http://www.zeronines.com/download02/C6Base.ova

2) AA Standard – Installation Menu opens a submenu that gives you options to install the components supporting the AA standard deployment model. This includes installing the console/tracker/ZeroNines message server and appliances.

3) AA Managed Service – Installation Menu opens a submenu that gives you options to install the components supporting a multi-tenant/multi-application deployment model such as is commonly hosted by a managed service provider. This includes installing the console, tracker/message server, and appliances.

4) Uninstall ZeroNines Software uninstalls all ZeroNines components found on the server.

0) Exit will exit the installation system. In sub-menus, the **0) Exit** option will bring you back to the next higher level of the menu.

Note: This guide will cover the "AA Standard" installation procedure. For documentation on installing the multi-tenant/multi-application or "AA Managed Service" configuration, contact ZeroNines at support@zeronines.com.
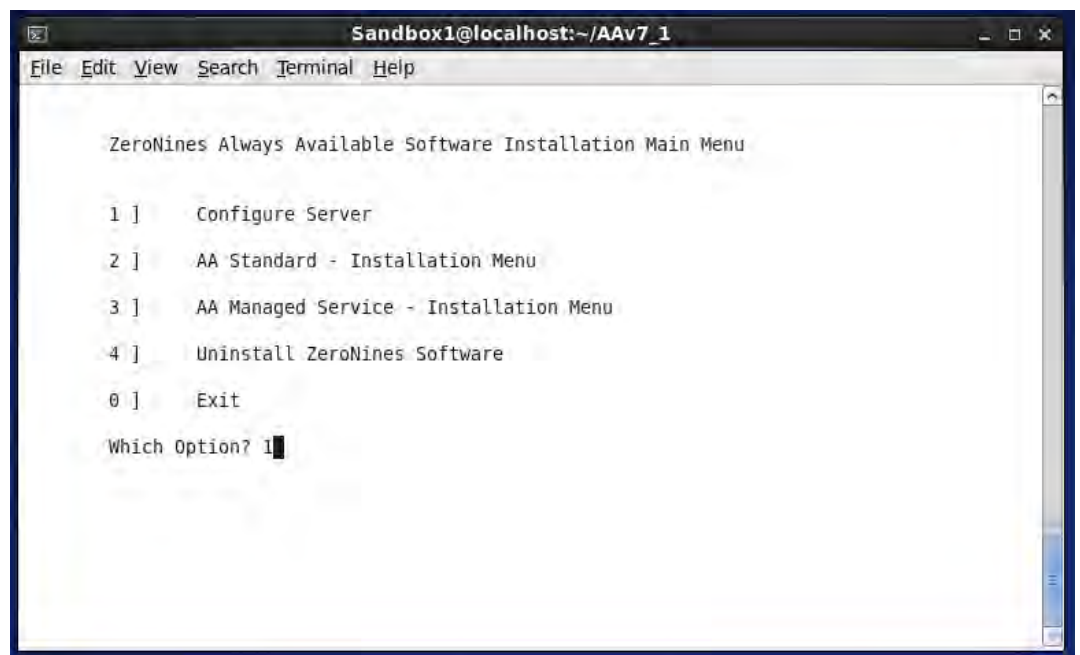
4.4   Configure Host Names

It is important that you configure the host names prior to installing the ZeroNines software components, whether you are installing under the AA standard model or the AA managed services model. The ZeroNines system **does not** require the use of domain servers for address look-ups. Instead, it utilizes the local host files at /etc/hosts for each system. You configure the host files on the local server using a sub-menu accessible through the main menu. As the software is installed, it will refer to the hosts defined in the hosts file.

Note: You should collect the following information in advance of your installation and record it in the worksheet "Information to Configure Host File" in section 2.3.1:

- IP address
- Hostname
- Any aliases

To configure the host files, follow the instructions below.

At the "ZeroNines Software Installation Main Menu", select 1) to Configure Server.

At the "Which Option?" prompt, type **1** and strike enter:

Which Option?   **1   [Enter]**

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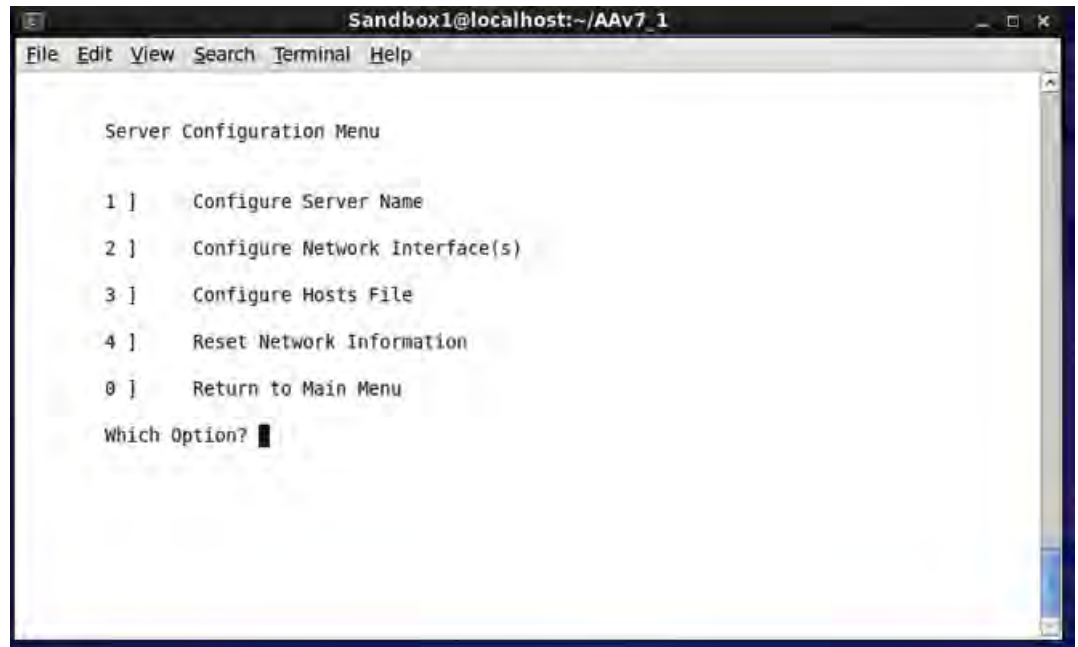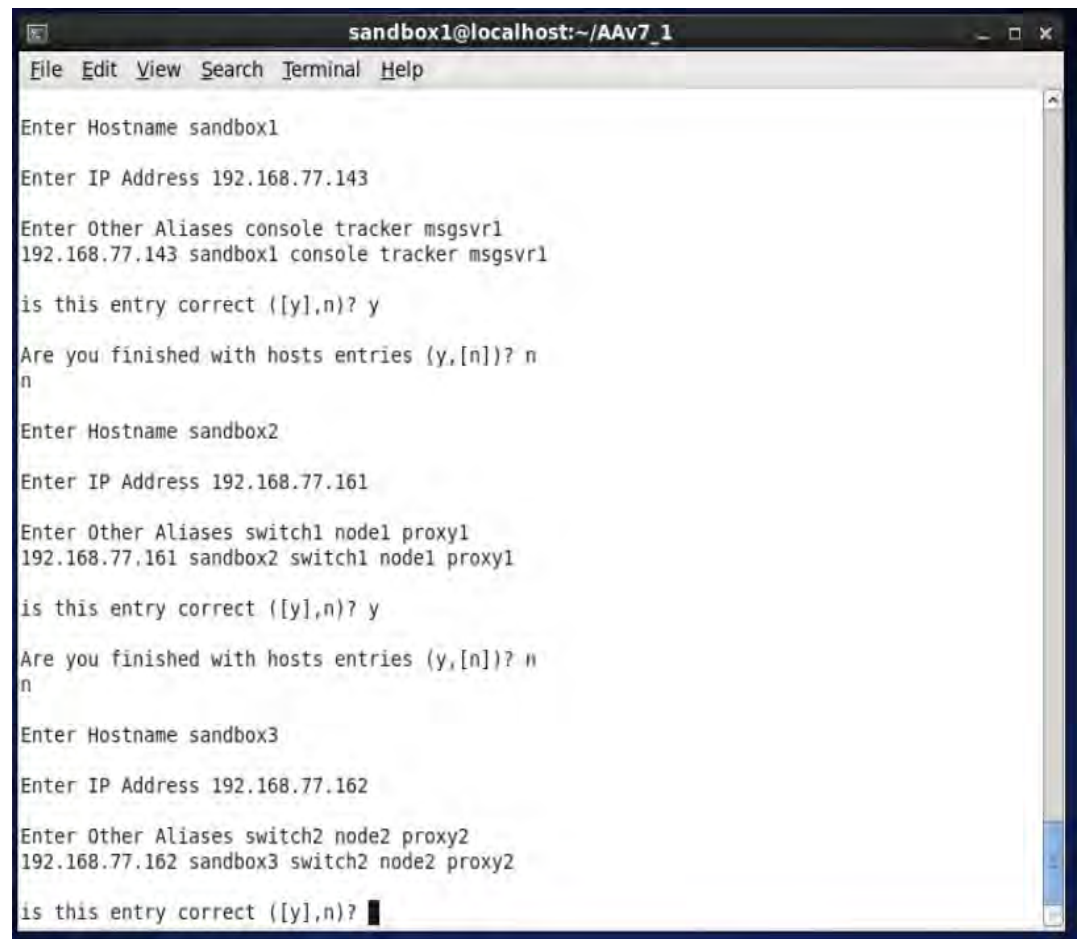
You will then be presented the "Server Configuration Menu" as shown above.

Type **3** to edit the host file name entries.

4.4.1   Host File Entries
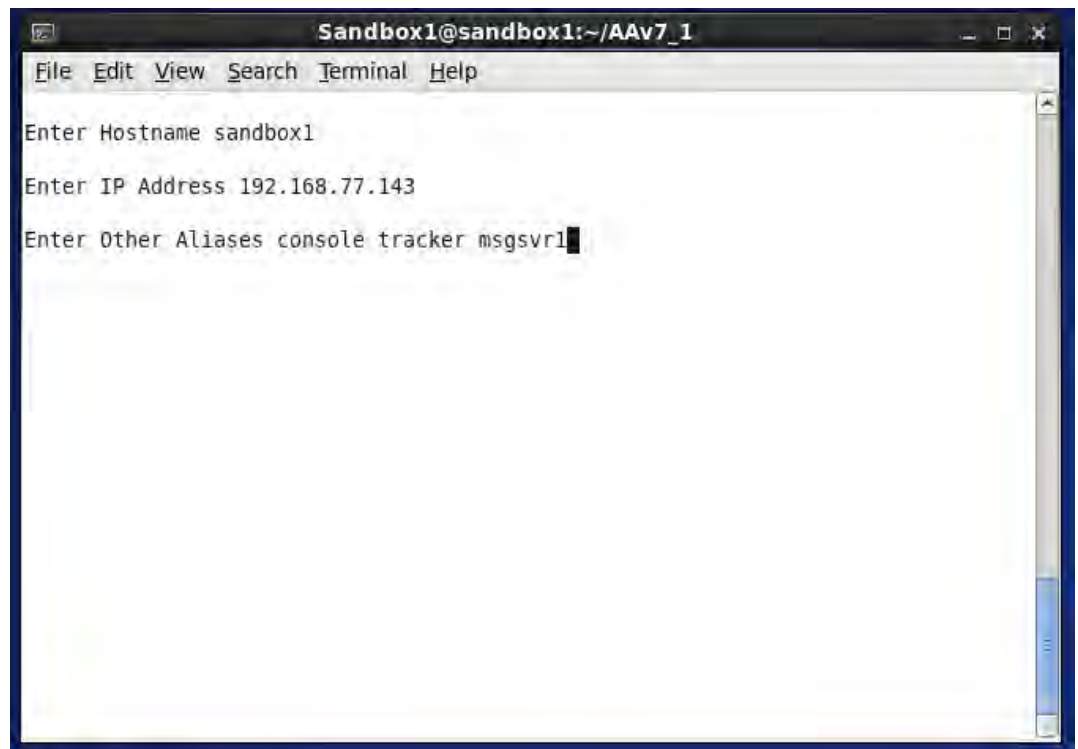
For each host entry, you will be prompted to enter the host name, IP address and any aliases for that host. As in this case with the identification of the management console, each server will be required to identify the journal/synchronizer server. A special alias "tracker" is used to identify the journal server.

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The recommended setup is as follows:

At the "Enter Hostname" prompt, type **sandbox1**

At the "Enter IP Address" prompt, type the IP address you recorded earlier.

At the "Enter Other Aliases" prompt, type **console tracker msgsvr1**

Add the alias **console** for the system that contains the management console. (This is an important alias for the system to communicate with the console and fetch any licensing information related to the server.)

When all the host entries are completed, the system will prompt you to validate the entries. Once validated, the information will be written to the /etc/hosts file. You will be returned to the Server Configuration Menu.

Note: If your environment utilizes Fully Qualified Domain Names (FQDN) in host computer (i.e. sandbox1.zeronines.com), enter the FQDN hostname when prompted for the "Hostname". Internal Messaging components within the ZeroNines software utilize the FQDN hostname.
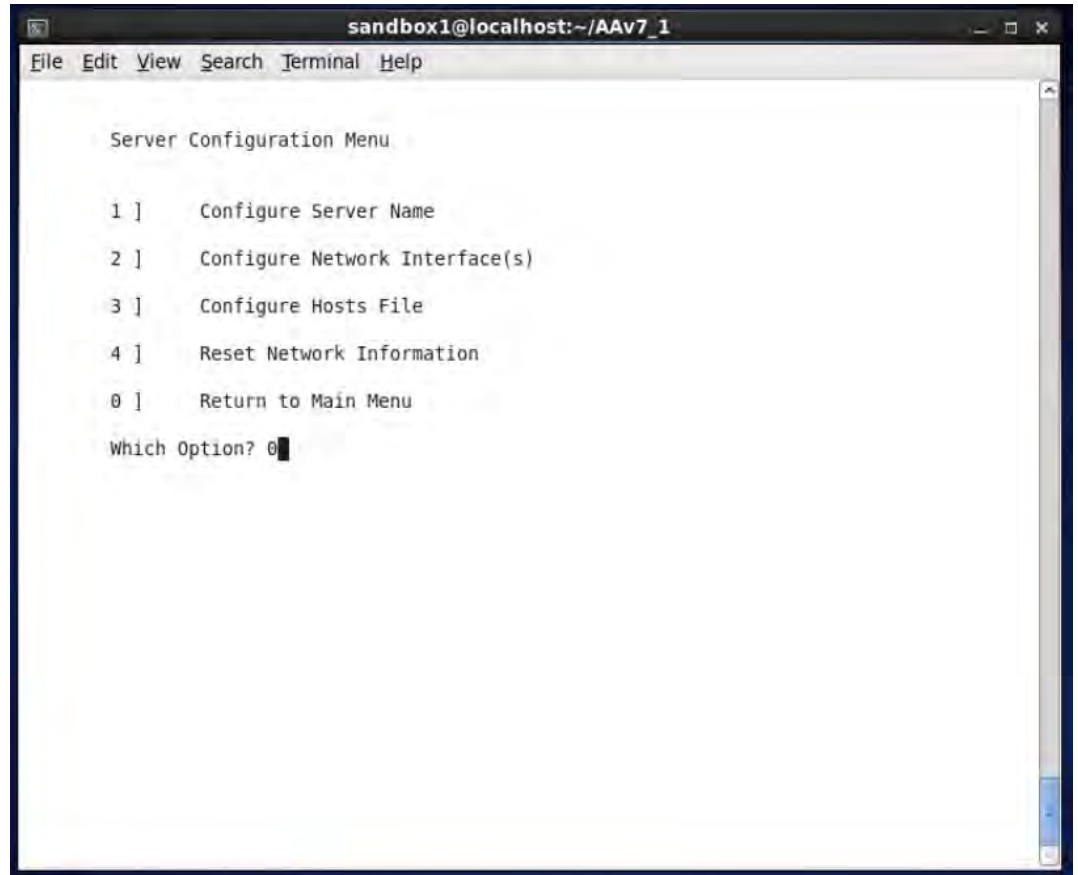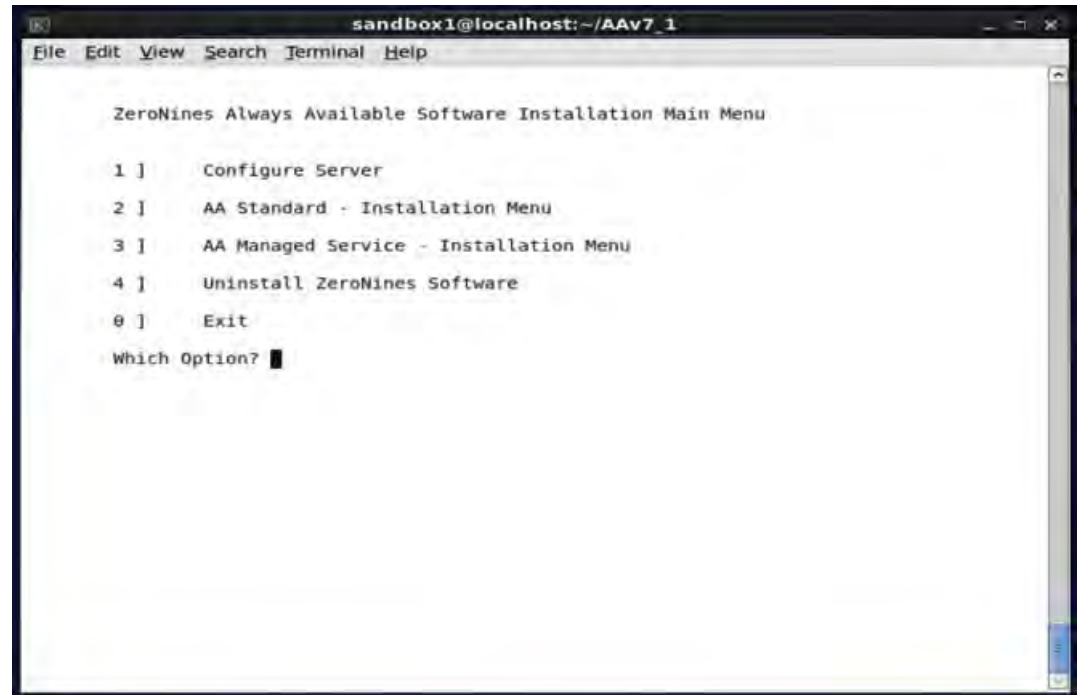
Return to the Main Menu by typing zero: 0

The preceding steps will be required for each server in the AA standard configuration. After the /etc/host file has been loaded to each server you may proceed with the AA standard installation.

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4.5   AA Standard Model Installation Overview

The AA standard model combines the management console, journaling server (tracker) and the messaging server on one server, which should be installed next. The management console, journaling server (tracker) and the messaging server combined constitute the base ZeroNines software. Appliance servers will be installed afterward to interact with the base software, and will contain the switch, switch proxy and node software components.
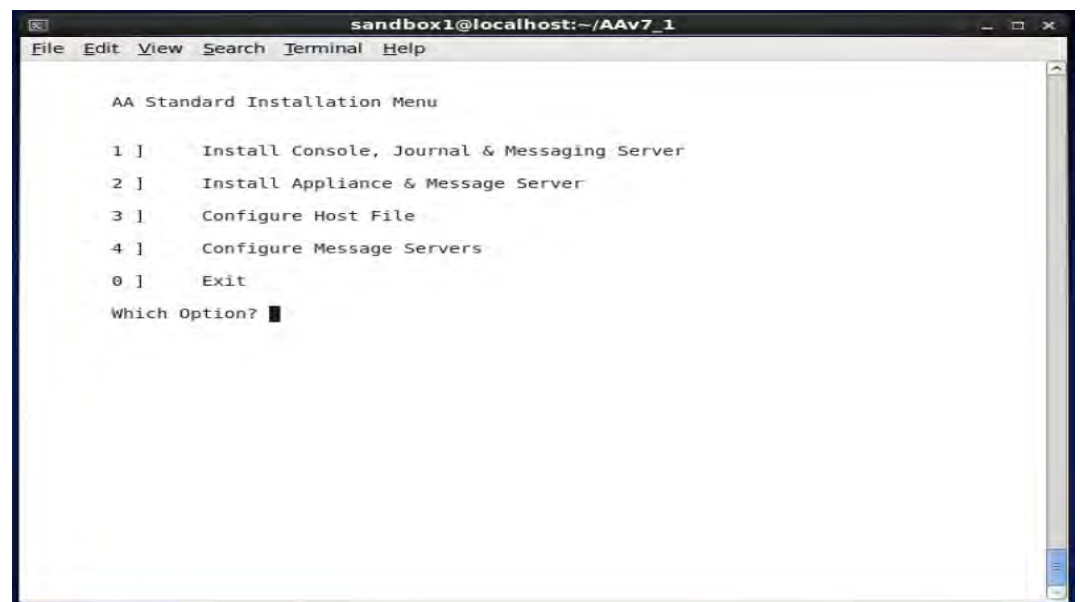
At the "Main Menu", type **2** for the standard model. This action will open the "AA Standard Installation" menu.

At this menu, type **1** to install the console, journal and messaging server on server sandbox1.

4.5.1 Install Console, Journal and Messaging Server

In the "AA Standard Model Installation Menu", type **1**

This will initiate the unpacking and installation process for these basic ZeroNines components and your screen will update in real time to show progress.

As the components are installed, type **y** (for yes) to confirm that you wish to install them.

You will be prompted to install the management console. With the AA standard model, you will install the management console by typing **y** . You are then asked to install the messaging server by typing **y** . When you are asked if this is the master messaging server respond with a **y** .

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You are prompted to indicate whether this is the master messaging server because there are two types of messaging servers: master and slave. By default, the first server installed on the system is the master messaging server. In this case you will respond with a **y** .

Note: ZeroNines allows for clustered messaging servers to reduce single points of failure. The slave messaging servers act as backup messaging servers in case any other messaging servers in the cluster fail. Since this is the first messaging server to be installed, we will allow the system to identify it as the master messaging server.

Once the master messaging server has been installed, the system will configure it. You will be prompted to configure the messaging server for single or clustered mode. Because this is an AA standard installation, you should indicate it is for single mode. Respond with **n** (for no).

Enter the hostname of the messaging server. In this instance it is **msgsvr1,** which was previously defined in the host file.

Once the message server name has been entered, the system will prompt you to confirm the entry. Type **y** . In this case, there will be one message server identified as "msgsvr1", communicating through port 61616.

The next step will be to install the journal (tracker) and by typing **y** . This process will install the Journal database server and supporting software.

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When warned about deleting prior MySQL data and users, type **y** . The installation process will install a MySQL database server and supporting software. You will be prompted to enter a password for the MySQL server. In the example above, the administrator entered **Password**. It is suggested that you assign a password different from the one in the example. Once this process has been completed, you will be returned to the "AA Standard Installation Menu."
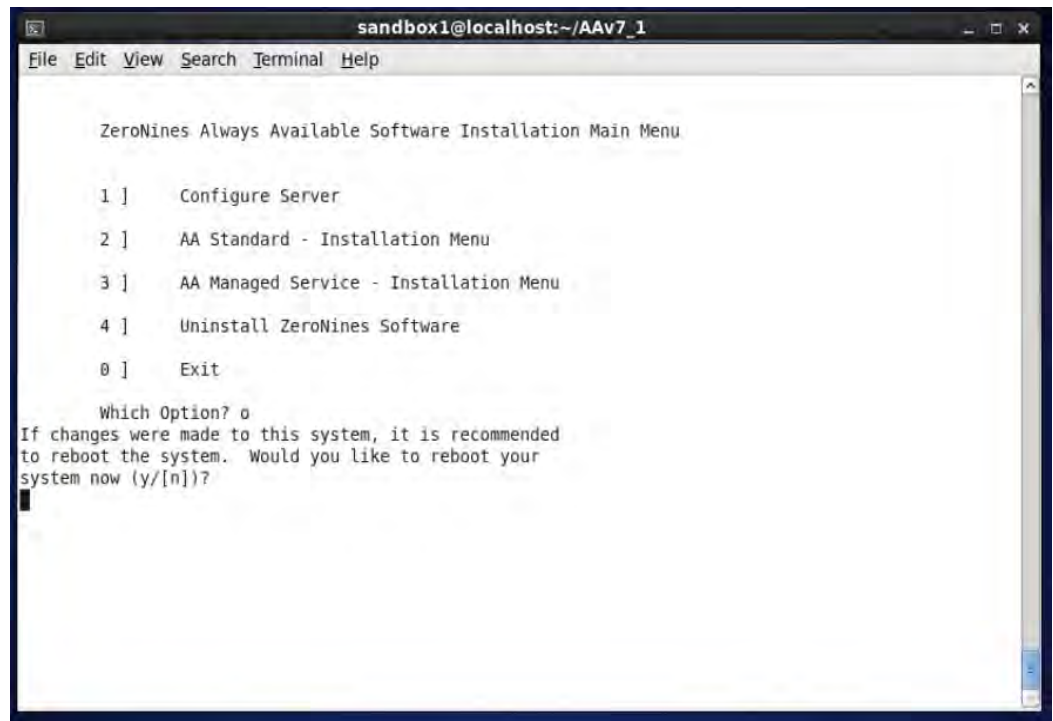
On the "AA Standard Installation Menu" type **0** at the bottom to return to the "Main Menu".

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On the Main Menu, type **0** at the bottom to exit.

You will be prompted to reboot the system, type **y** to reboot the system. It is recommended that the system be rebooted because this will allow all software installations and configurations to initiate. Rebooting completes the installation of the base ZeroNines software on sandbox1.

4.5.2   Confirming Console Installation
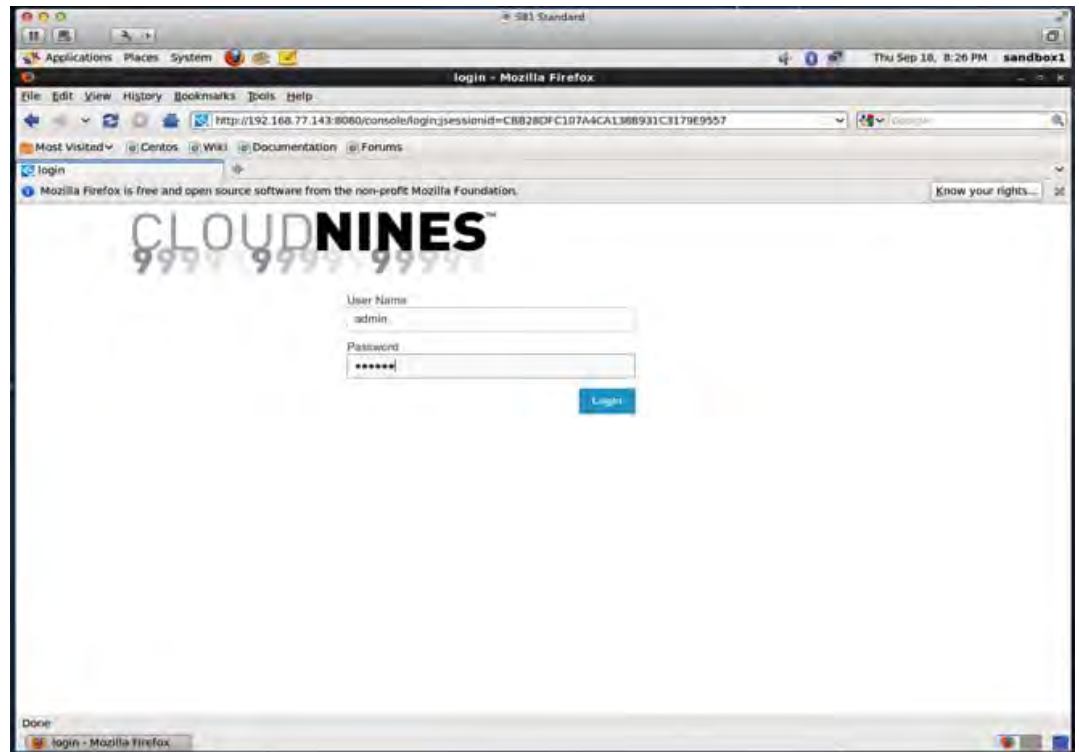
Once the console/journal/messaging server has been installed, you can confirm the installation by accessing the ZeroNines management console. Using a browser, enter the IP Address or URL for the console/journal/messaging server through port 8080.

For example: http://192.168.77.143:8080/console

The console advertises its services on port 8080 and "console" is the web services application. The default user and password are:

User Name: admin

Password: s3cret
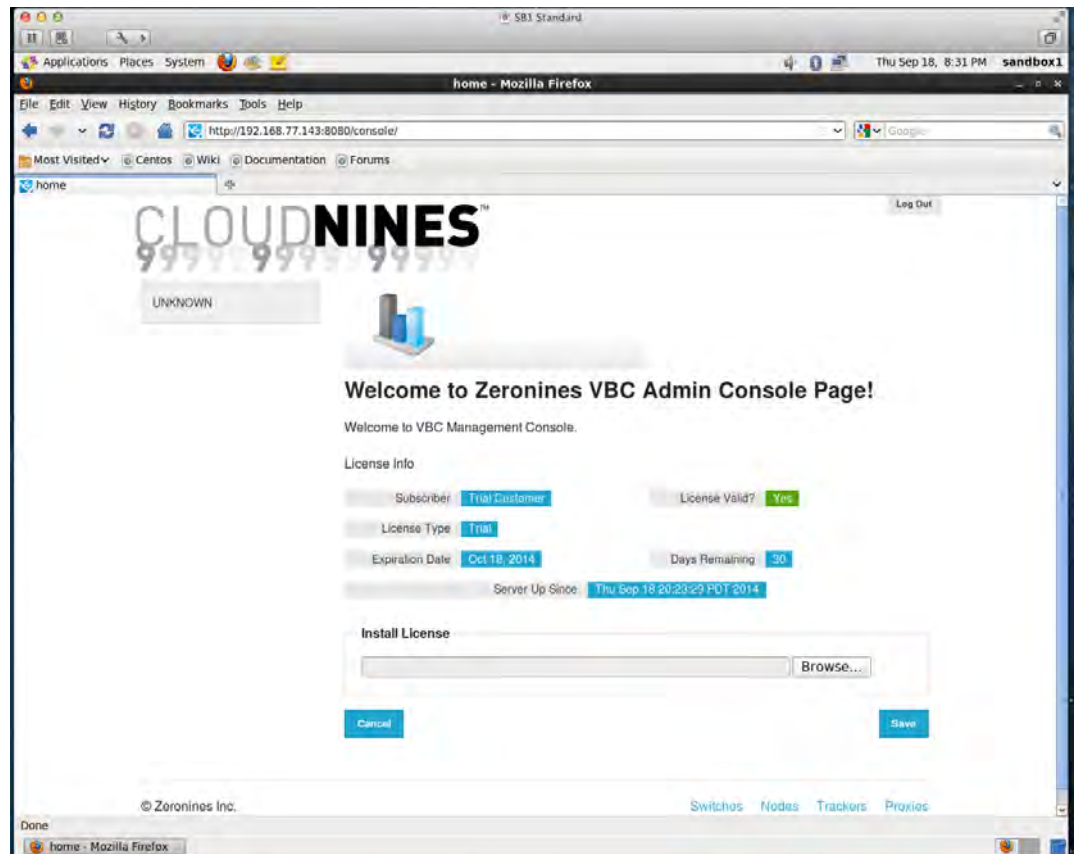
Once successfully logged in to the console, you should have access to the "Welcome to ZeroNines VBC Admin Console Page!" screen and the "Subscriber" screen.

The left navigation pane lists the customers/groups in your installation. In the example below, the group is displayed as "UNKNOWN" because no name has yet been provided for it.
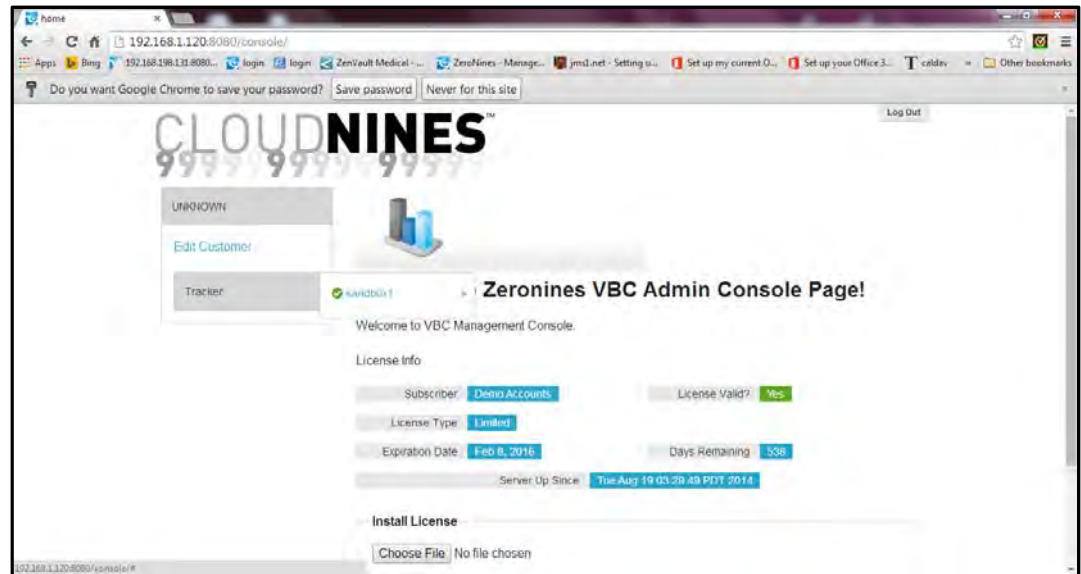
You can expand the groups displayed in the left navigation by double-clicking on them. Once expanded, they will display the components installed for each group, and the server name that runs each component along with a server status icon. In the example above, the administrator has expanded the group "UNKNOWN" and clicked on the Tracker component. The server name that runs this component is "sandbox1". The green checked icon indicates that the system is up and running. If the system were down, a red flag would be displayed.
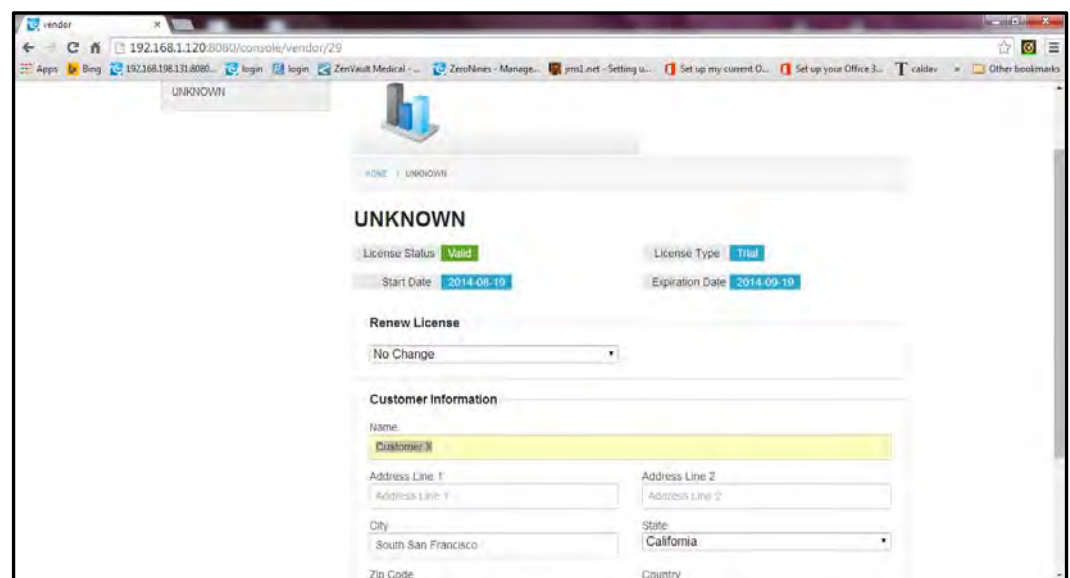
Once the system has been confirmed, select the **Edit Customer** hyperlink. This will allow you to assign a name to the customer/group "UNKNOWN". In this example the administrator has entered `Customer X` and provided minimal information for the address.

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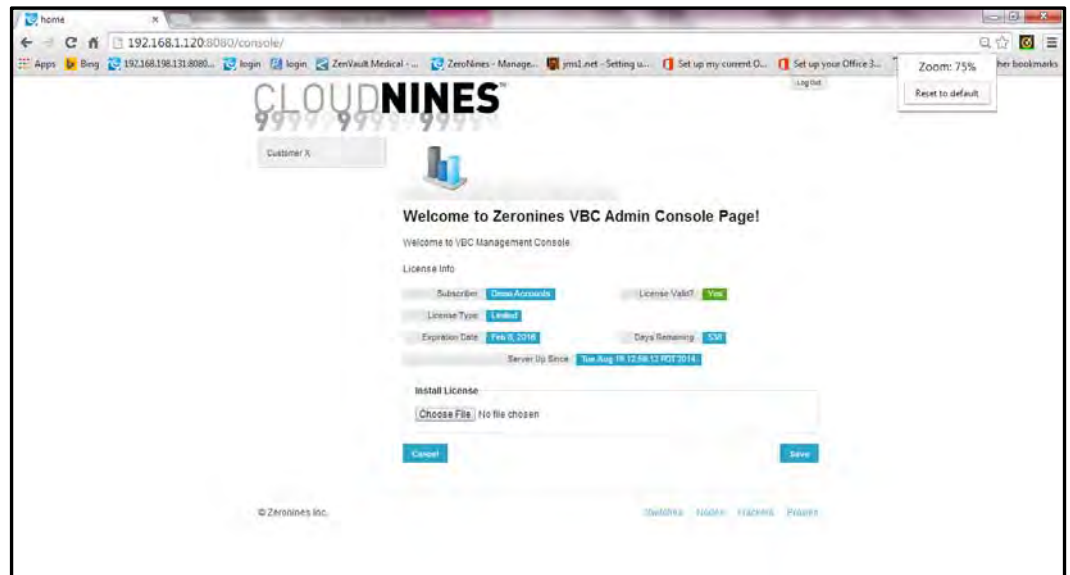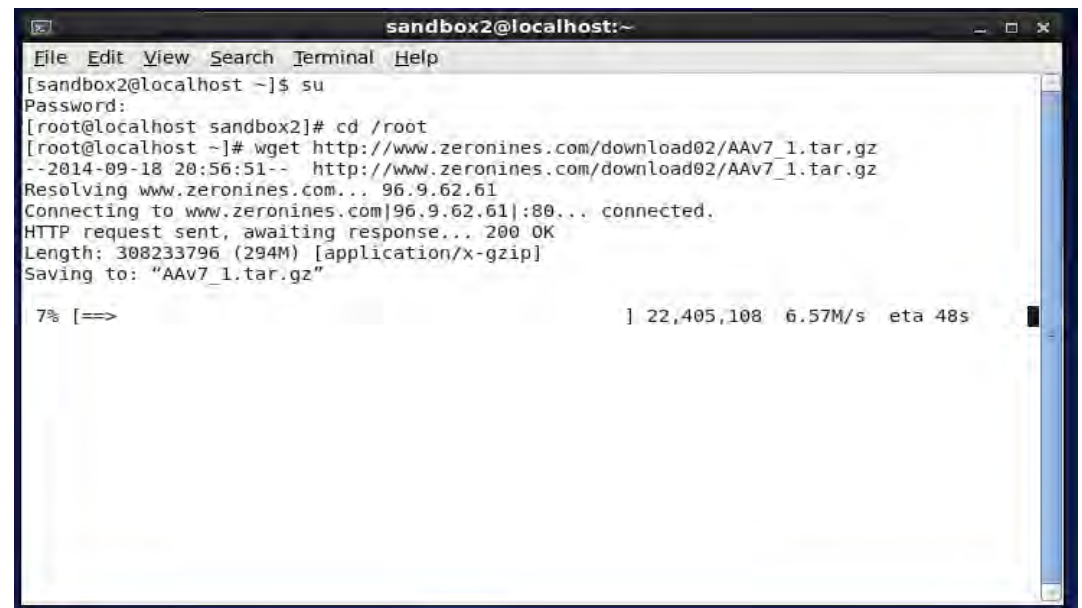
Once the customer information has been entered, all corresponding software components installed will be grouped together. In this example, the software components will be installed within the "Customer X" group.

4.6   Install Appliance & Messaging Server on a Standard Installation

After the console/journal/messaging server has finished rebooting, you will start the installation procedure for your next server. In this case it is sandbox2. You will use the same process used for sandbox1 with a few minor differences.

You will begin by downloading and unpacking the AAv7_1 software to the sandbox2 server just as you did for sandbox1. From /root enter this command:

 # wget http://www.zeronines.com/download02/AAv7_1.tar.gz

Once the software is downloaded you will execute the following steps:

Unpack the software using the following command:

 # tar –xzvf AAv7_1.tar.gz
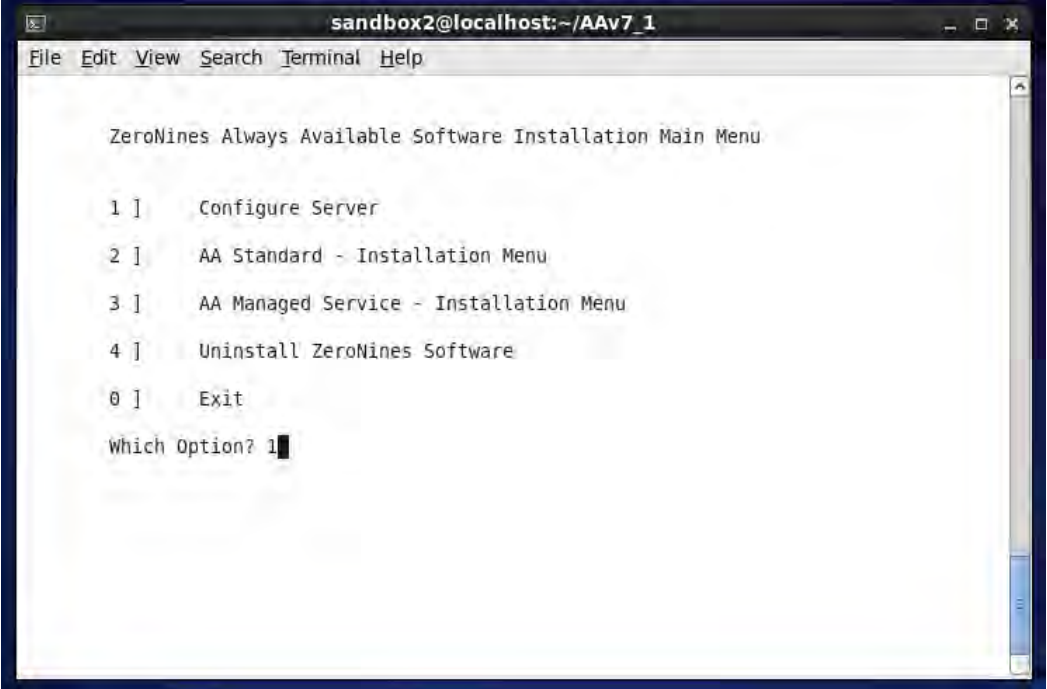
Change to the working directory with the following command:

```
# cd AAv7_1
```


Execute a `# ls` command followed by `# ./install.sh` to start the installation to the sandbox2 server.
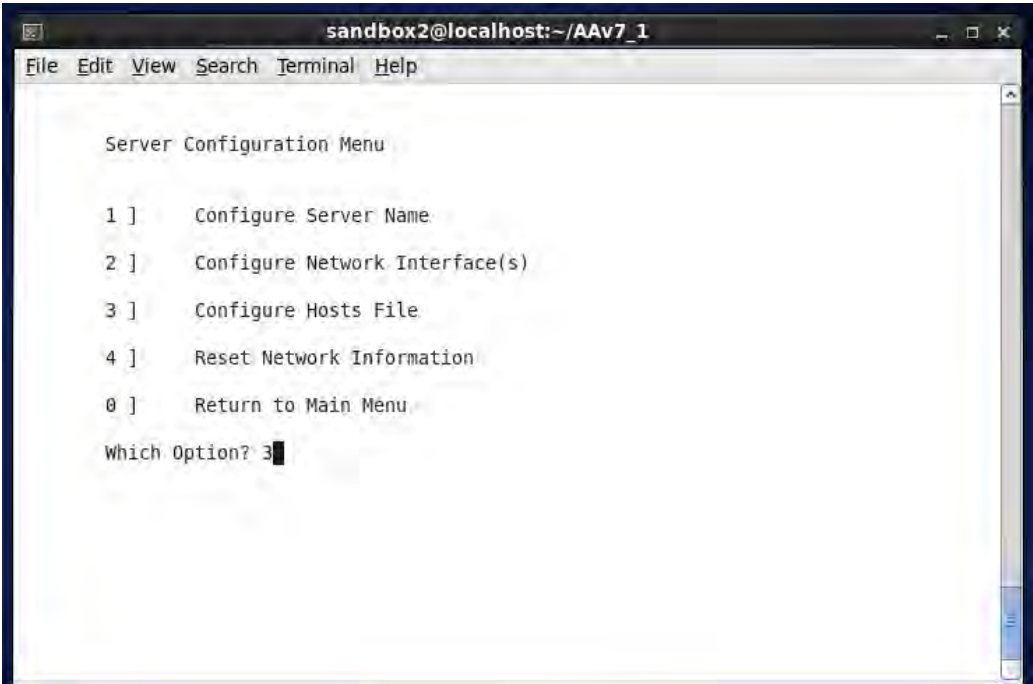
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At the completion of the load, you will be presented the "ZeroNines Always Available Software Installation Main Menu". Here you will select **1)** to configure the server Sandbox2.

Type **1**
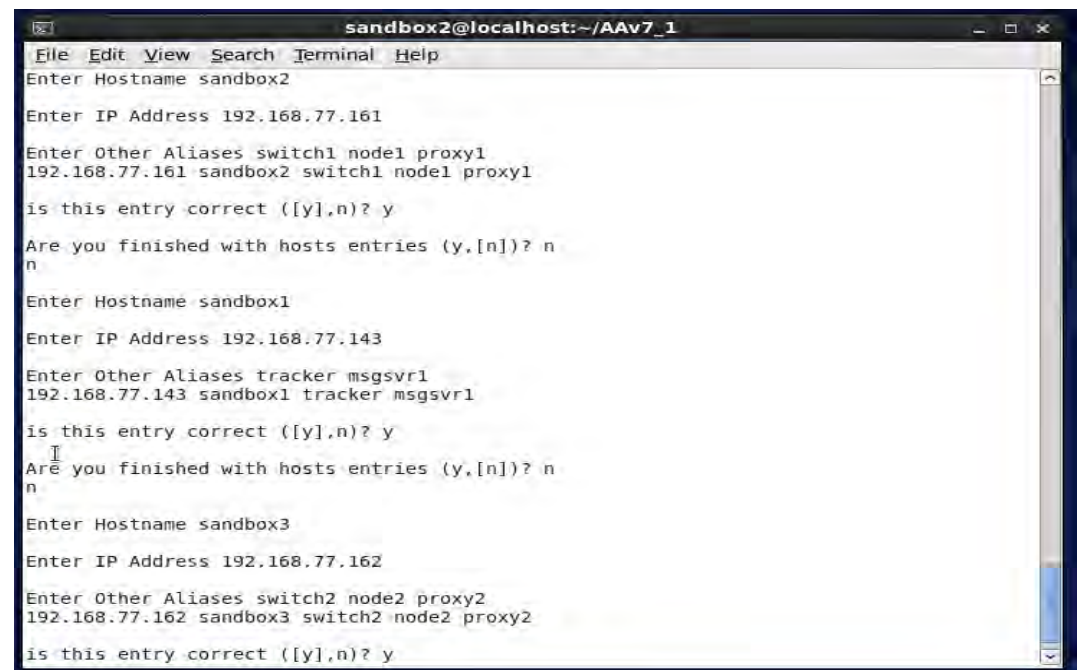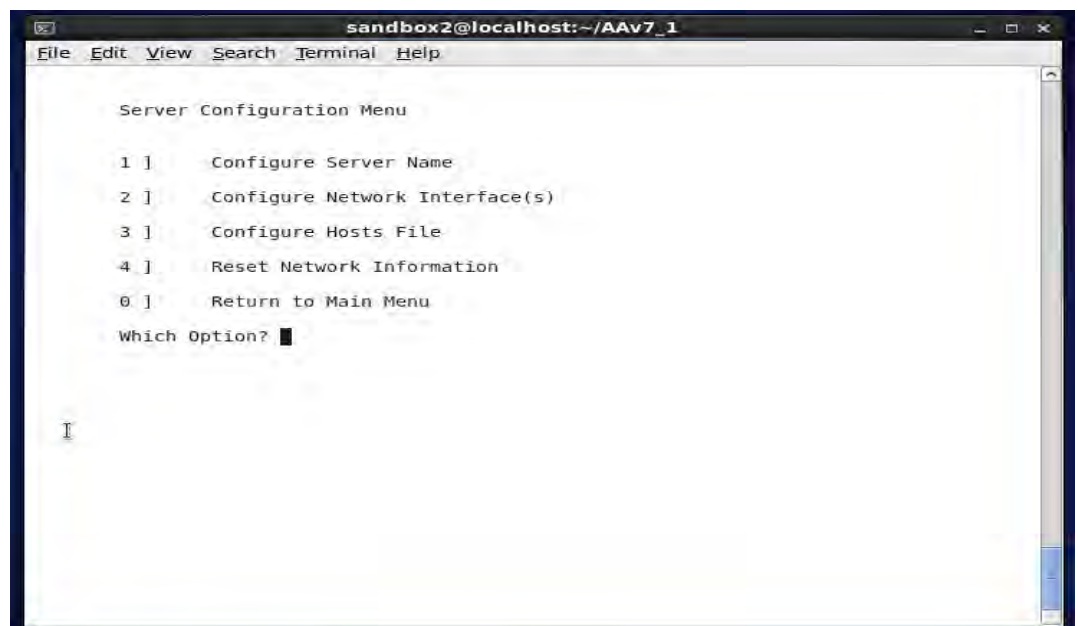
You are then presented the "Server Configuration Menu". Type **3** for "Configure Hosts File".

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You will enter the host name, IP address and aliases for sandbox2. Then you will enter the host name, IP address and aliases for sandbox1 and sandbox3 in sequence as demonstrated below.

At this point, indicate that you are finished with host file entries by typing **y**
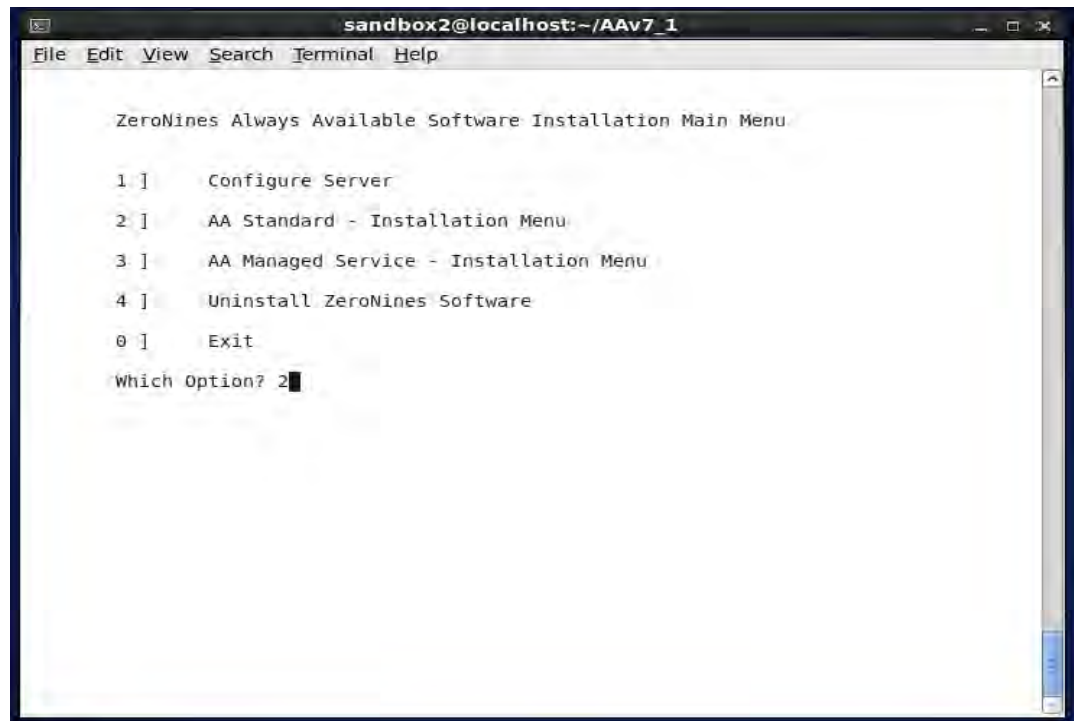
This will return you to the "Server Configuration Menu" and once here type **0** to return to the "Main Menu".
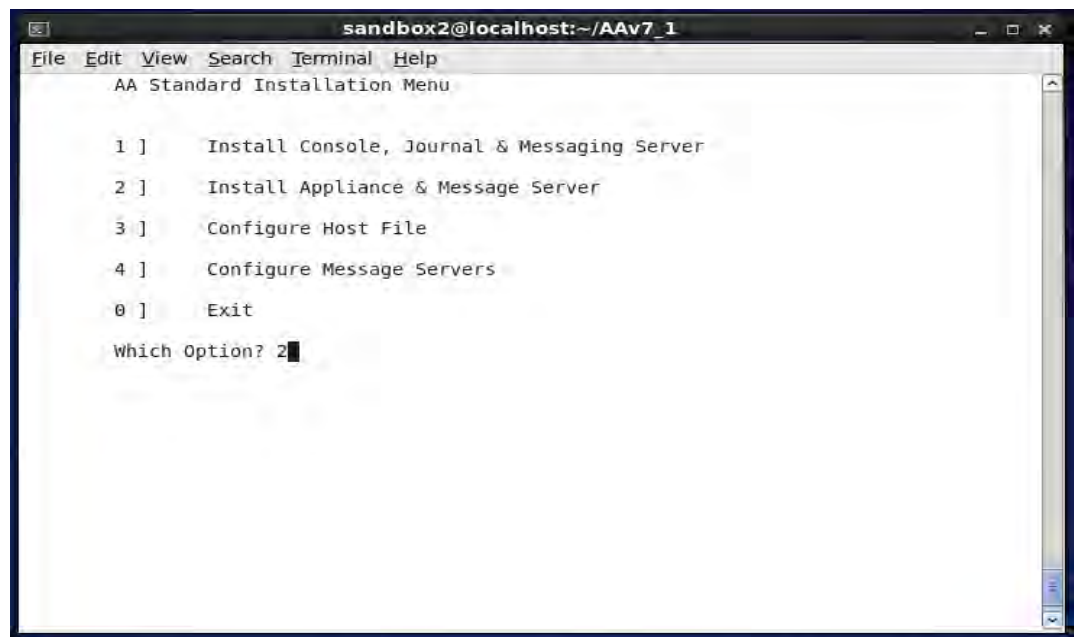
ZeroNines® Always Available™ Software
Installation Documentation for Always Available Infrastructure Software: Standard Installation for Version AAv7_1

At the "Main Menu" select option **2** to enter the "AA Standard Installation Menu".

From this menu you will now type **2** to install the appliance and message server software on the server sandbox2.

The software components are loaded and you are asked if you want to install the messaging server. In this instance our messaging server was defined in sandbox1. Therefore, we do not require the messaging server on sandbox2. Type **n**

You are then asked if there are more than one messaging server and you respond with **n** . You are then asked to enter the name of the primary messaging server. In this instance the messaging server is **msgsvr1**

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You are then asked if the host entries are correct. Type **y** .
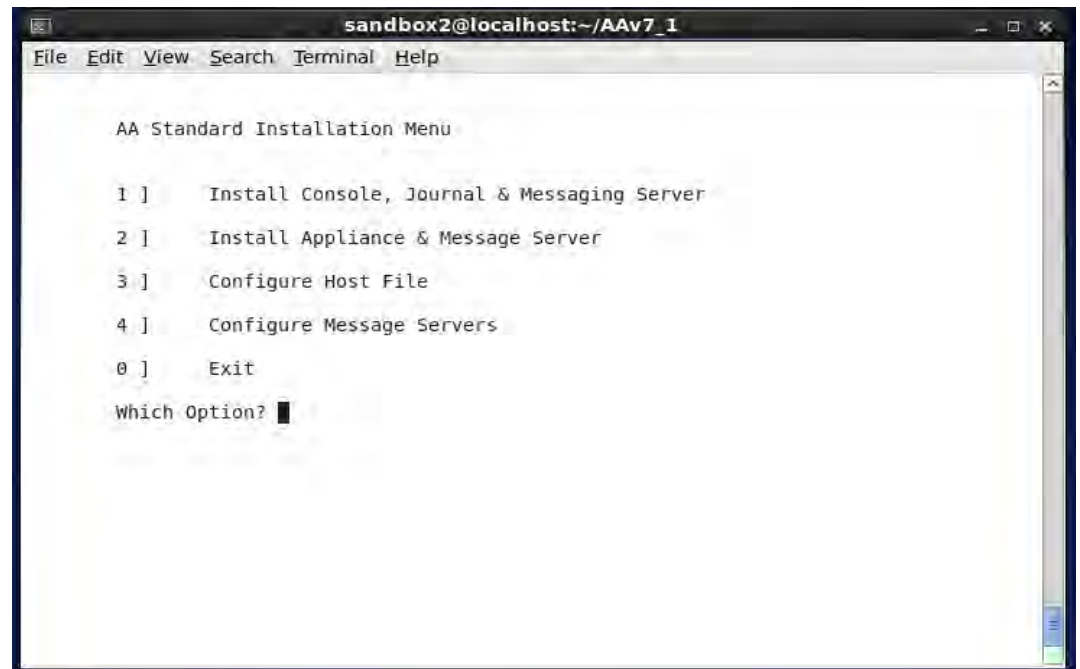
You are then asked if you want to install the switch/proxy. Type **y**

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The switch/proxy module is loaded and you are asked to install the node module. Type **y**
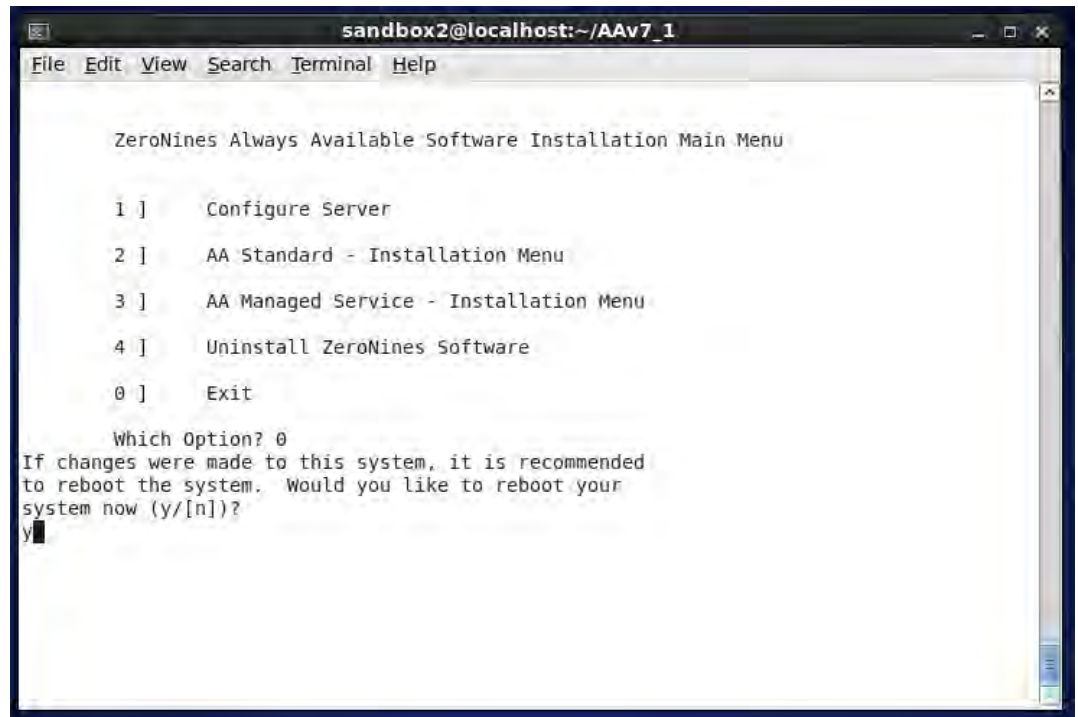
The Node Module is installed and you are returned to "AA Standard Installation Menu". Type **0** to exit this menu.

On the "Main Menu" type **0** to exit and re-boot the server sandbox2. Once the server is rebooted and the appliance is running, you will confirm the installations through the console.

Note: The previous steps will be required to build your second appliance server sandbox3 using the appropriate host name, IP address and aliases. It is recommended that you build server sandbox3 at this time, before moving on to Section 4.6.1

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4.6.1 Confirm Appliance Installation

Launch the management console using the `http:192.168.77.143:8080/console` command and enter the user name and password.
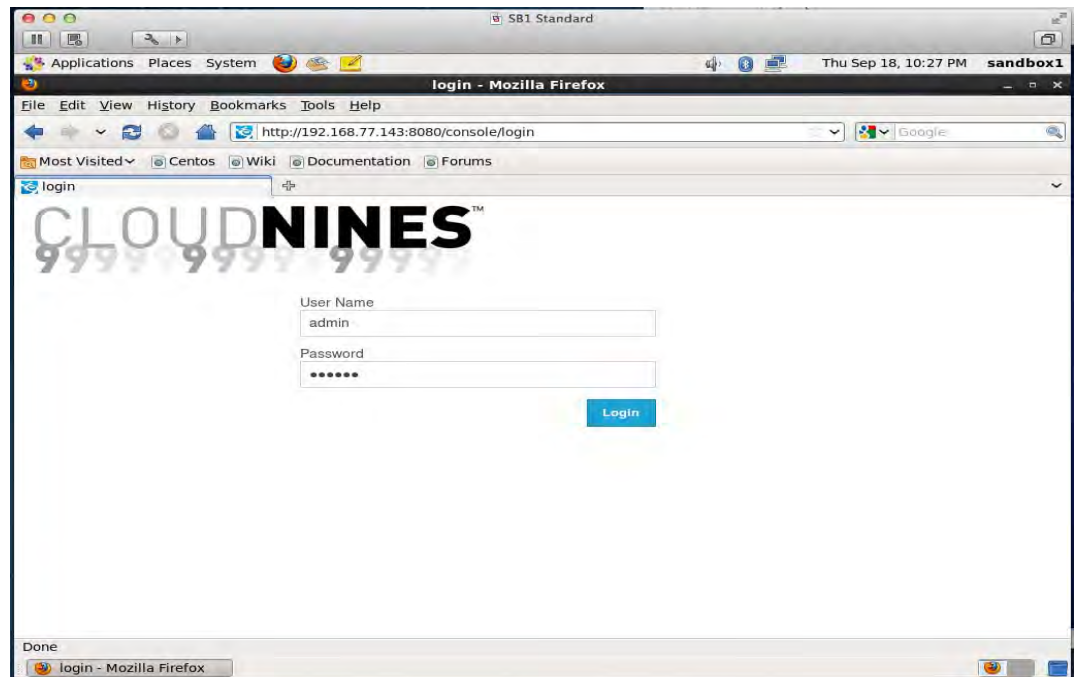
Immediately after the appliance has restarted it will be recognized by the console under the client/application group "UNKNOWN". Each installed component will be displayed on the navigation bar on the left of the console, in this case the tracker, proxy, node and switch.
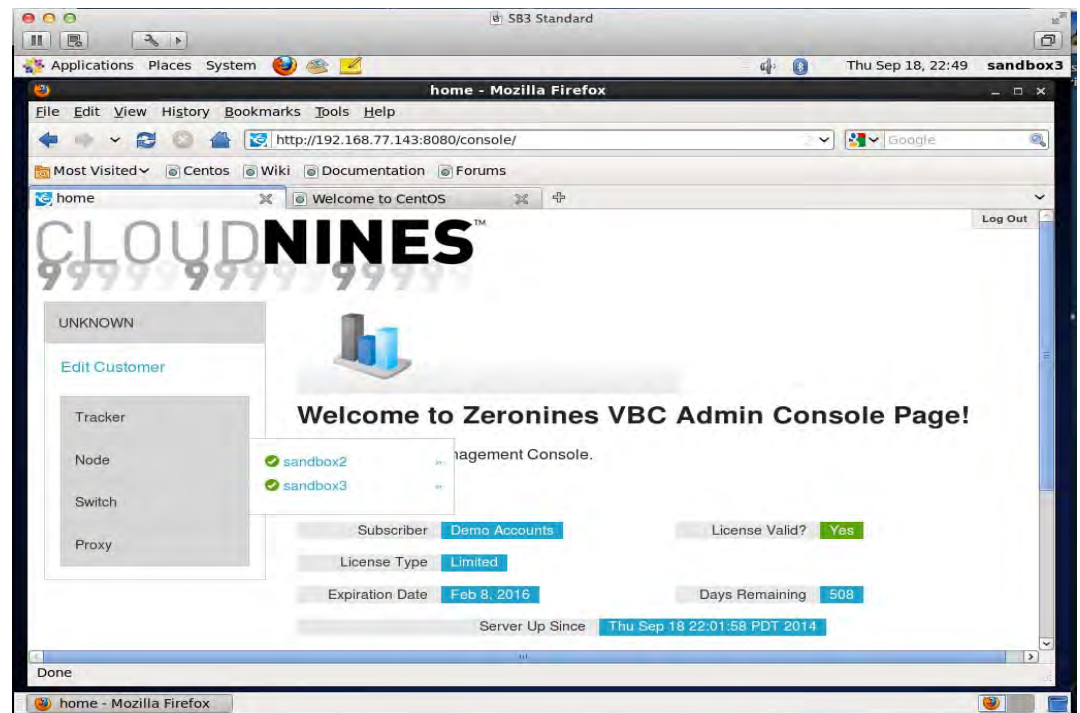
If you click to select any of the components, it will display the server that the module is loaded upon. In the example above, "Node" is highlighted and it indicates that the servers it is loaded upon are called "sandbox2" and "sandbox3". This action concludes the installation of the AA standard configuration. The next section will provide instructions on how to attach application servers to the configuration.

Note: The green checkmark icon to the left of the server name indicates that the server is running. A red flag icon will be displayed if the server is offline.

4.7 Attaching Application Servers
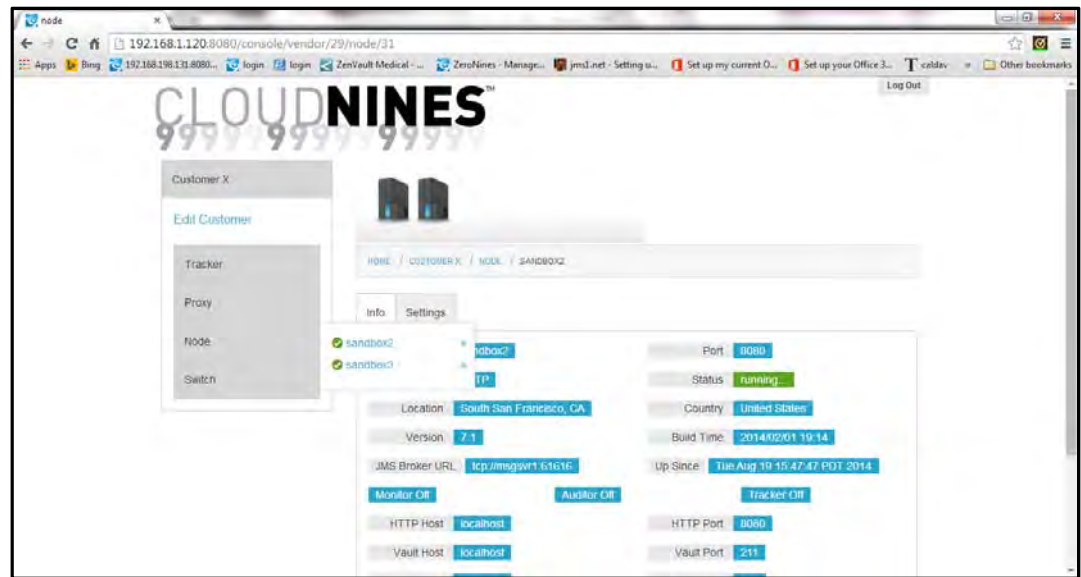
If more than one appliance is configured, each appliance will be displayed when the module is selected. In the example above, two appliances have been configured: sandbox2 and sandbox3.

Configure all the nodes to link to the application servers.

4.7.1 Configuring Appliance to Communicate with Application Server
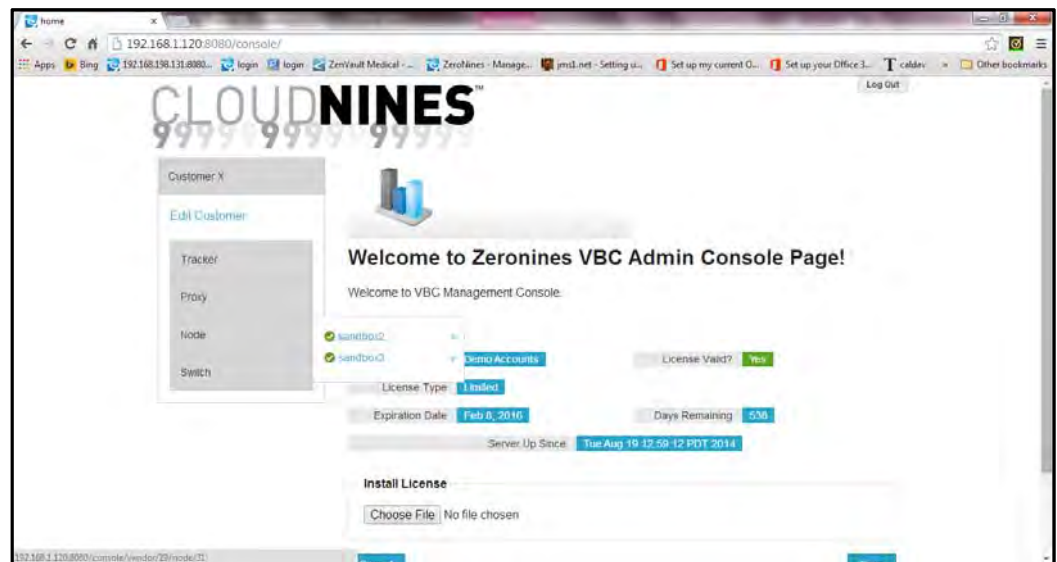
Once the administrator has logged into the management console, highlight and select one of the "Node" servers from the navigation tab on the left. In this example, we've clicked to select the first node **sandbox2**.

Once selected, configuration information for the node will be displayed. By default, the application server settings are set to "localhost". To establish a link from the appliance to the target application server, the administrator will enter the server name or IP address for the application server.
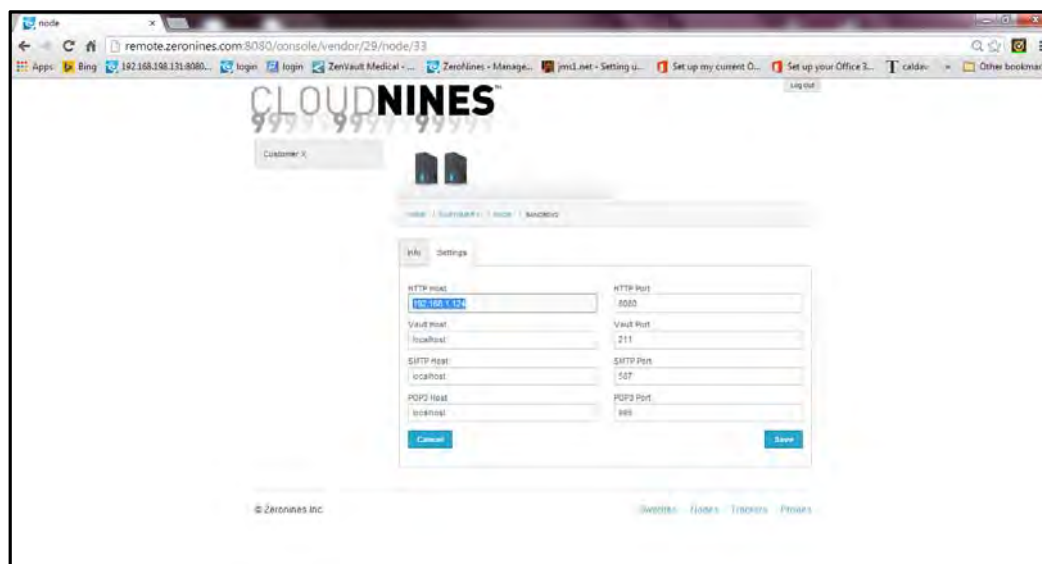
By selecting the "Settings" tab, the Administrator will be able to enter the target application servers. In our example and for security purposes, the application servers will be configured with the IP address 192.168.1.124. Optionally, the administrator can enter a server name that can be resolved by a name server to provide the IP address. The second entry will be the port for the target application, in this example 8080.

Once the application server entries are completed, save your settings by clicking on the *Save* button on the lower right of the page.
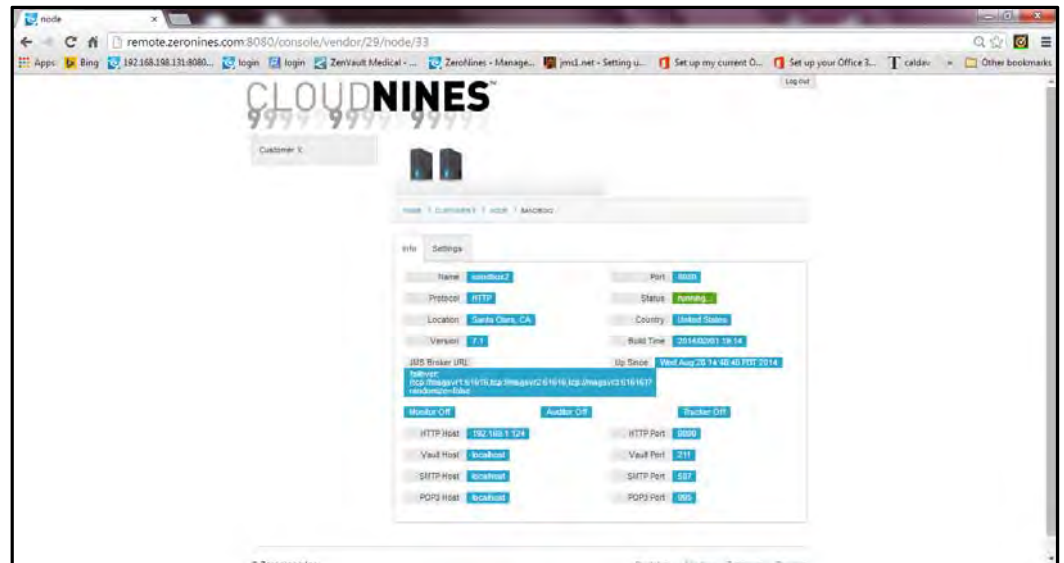
Once the entries are saved, they will be displayed on the "Info" tab for that node, in this case "sandbox2".
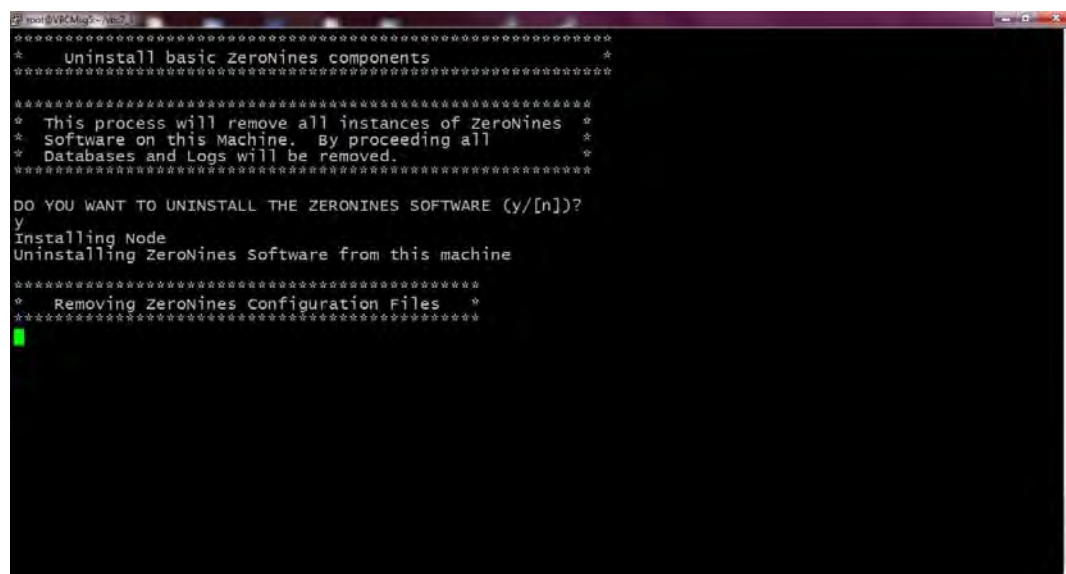
The administrator will then perform the process to configure the second node (sandbox3) to communicate with the second application server. In our example, the second application server is identified by IP address 192.168.1.125 and port 8080

Once the configuration activities are completed and saved, the application servers are part of the ZeroNines ecosystem. Always Available will now sustain your application servers in our active-active configuration.

5 Appendix

5.1 Uninstalling ZeroNines Software

In some instances, you may want to redistribute different modules to either consolidate or expand systems. The best way to make sure there are no residual software components that may cause conflicts is to return to the "ZeroNines Software Installation Main Menu" and type **4 [Enter]** for "Uninstall ZeroNines Software". This will completely remove any ZeroNines software from the server.

Once you type **y** to confirm the removal of the ZeroNines software, components that were found on the system will be removed.

5.1.1 Renaming Servers and Reconfiguring Network Interfaces

ZeroNines has provided administrators with a utility that will rename the server and reset the network configuration files. When administrators import OVA/OVF virtual server templates into a virtual server or when they clone a virtual machine, the original hostname and network information is also imported to the system. ZeroNines has provided this utility to easily change the server name and reset the network hardware settings.
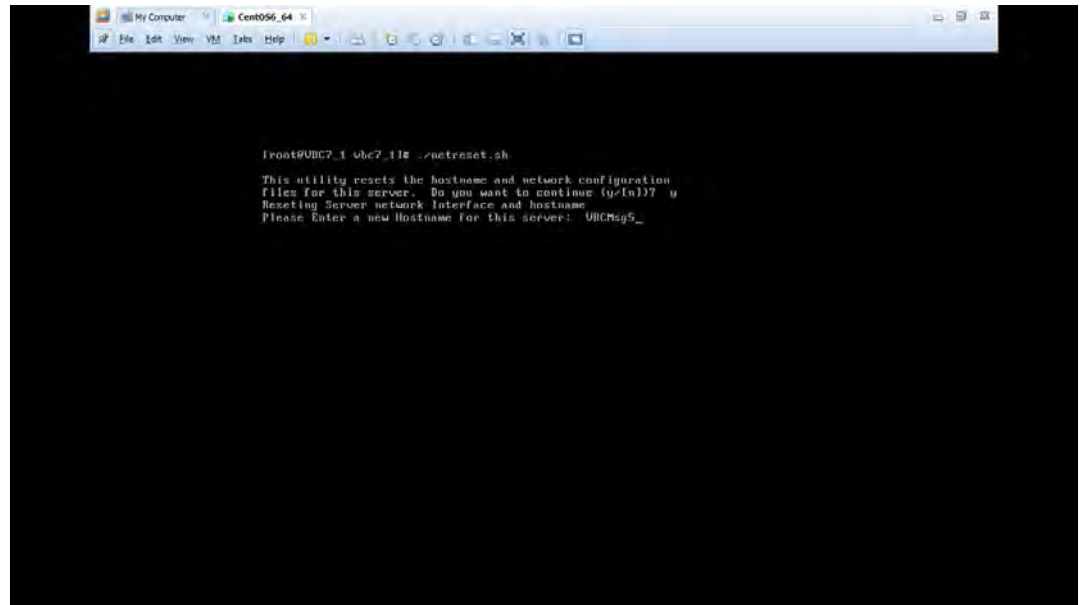
Option "A" is a utility that aids you in renaming the server and resetting the network hardware. The first part of the utility prompts you for a new server name. In this example, **VBCMsg5** is the new server name.

Along with imported or cloned servers, the original network hardware information is stored in the server. The second function of this utility is to reset this information and reboot the server. When the server is rebooted, reload the installation script **install.sh**. Once the main menu is displayed, you should type **9** for "Configure the Network Interface(s)".

5.1.2   Configure Network Interface(s)
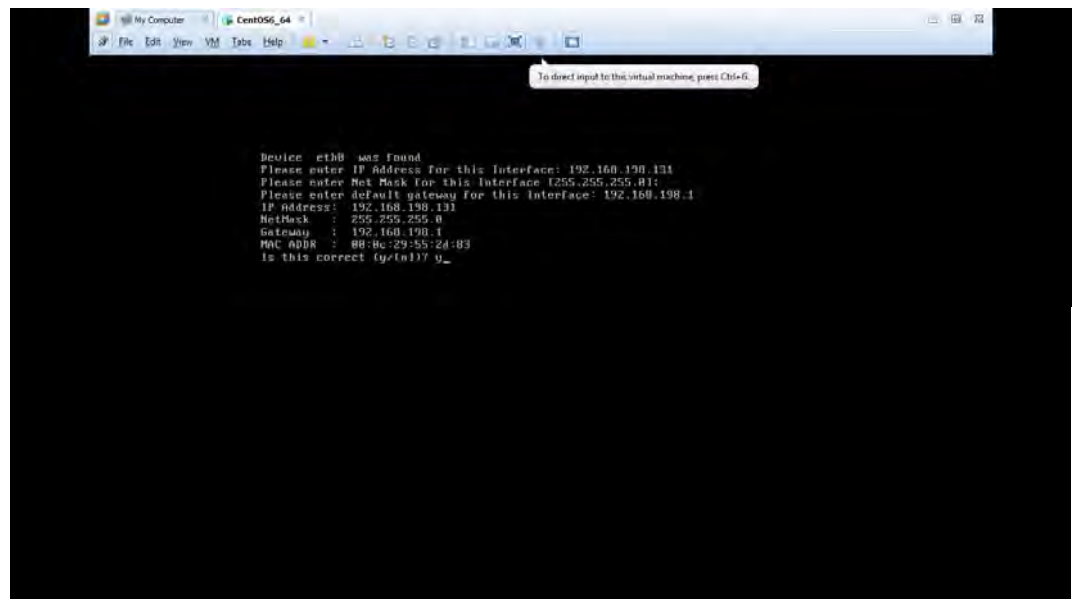
ZeroNines has provided a utility that will allow you to configure the network IP addresses for the server. Once you select menu option **9**, you will be prompted for a static IP address, network mask and gateway address for each interface found. Once these entries are made, you will be prompted for a default gateway address for the server. On occasion,

more than one network interface is found and a default gateway address is configured for the server

5.2   Configuring the Network

The "Configure Network Interface" option configures the network interface(s) on this server. This option is primarily used for virtualized environments such as VMware® when a cloning process is used to copy images of the base operating system. Since the virtualized network hardware changes MAC addresses and potentially other factors, this option will allow you to configure the IP address and other network-specific properties on the server.

The "Rename Server / Reset Network Interface" option allows you to rename the server and reset the network configuration file on the server. This option is primarily used when importing or cloning virtual machines. Since each virtual server environment may have different virtual network devices, the operating system has to identify the new options. This utility clears out past hardware configurations. This utility should be run prior to the "Configure Network Interface" option. This utility will reboot the server.

5.3   Licensing File Installation

As a default, once the management console has been installed, the console is unlocked for a trial period of 30 days. This can be identified by looking at the "License Type" field; Trial, Limited or Perpetual.
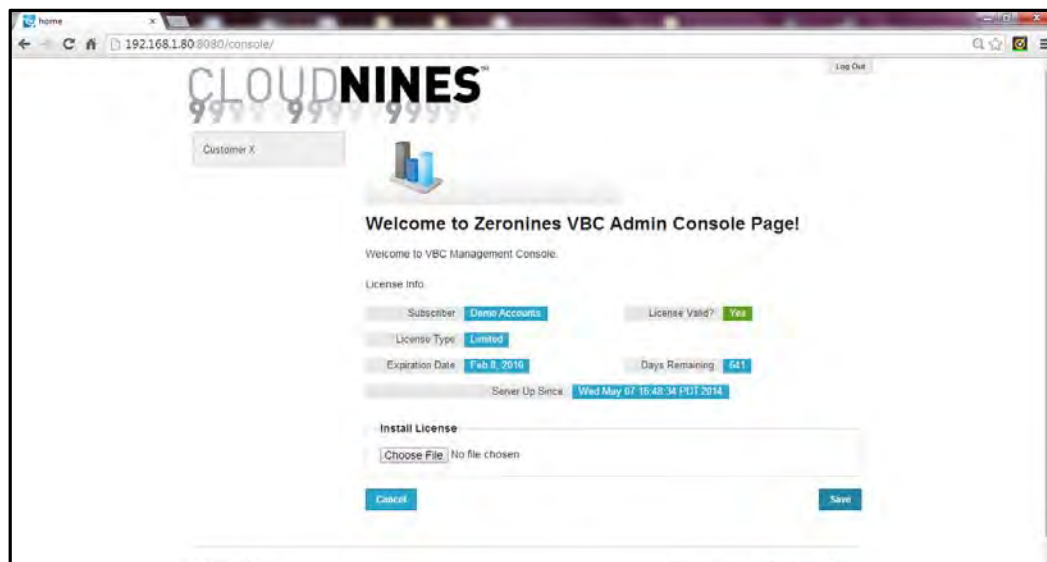
First, you must obtain the license file from ZeroNines. This may be available as a download from a self-help website, or you may receive it via email. If you do not know how to obtain a license file, request it from support@zeronines.com.

Once you have logged in to the console, the ZeroNines license file can be installed. From the main console page, within the "Install License" dialog box, select the "Choose File" button.
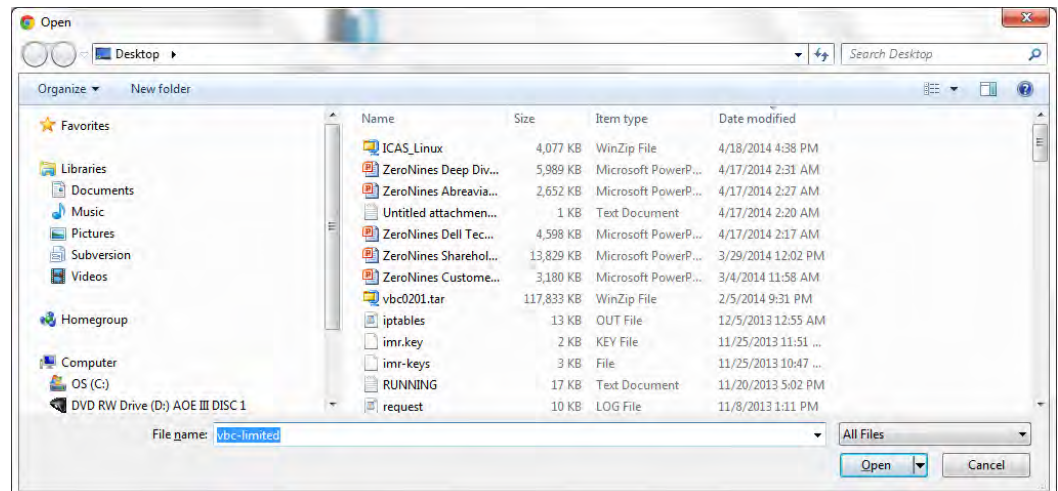
Find and select the ZeroNines license file that was sent to or downloaded by the ZeroNines administrator. Once the file loads, the management console will unlock and the "License Valid?" field will display a green "Yes".
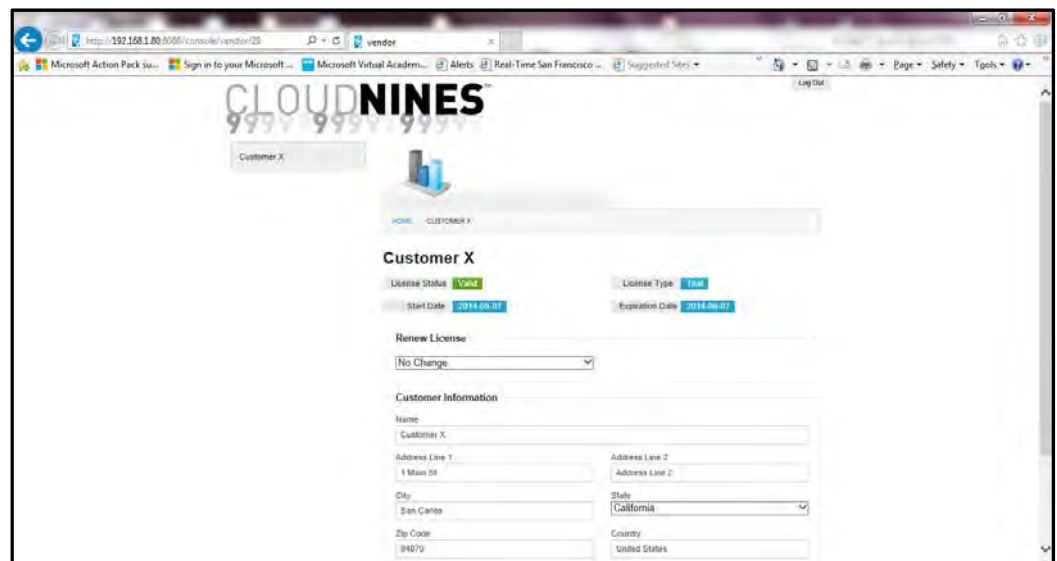
Secondarily, as different application and client groups are installed, each group can be unlocked within the management console.

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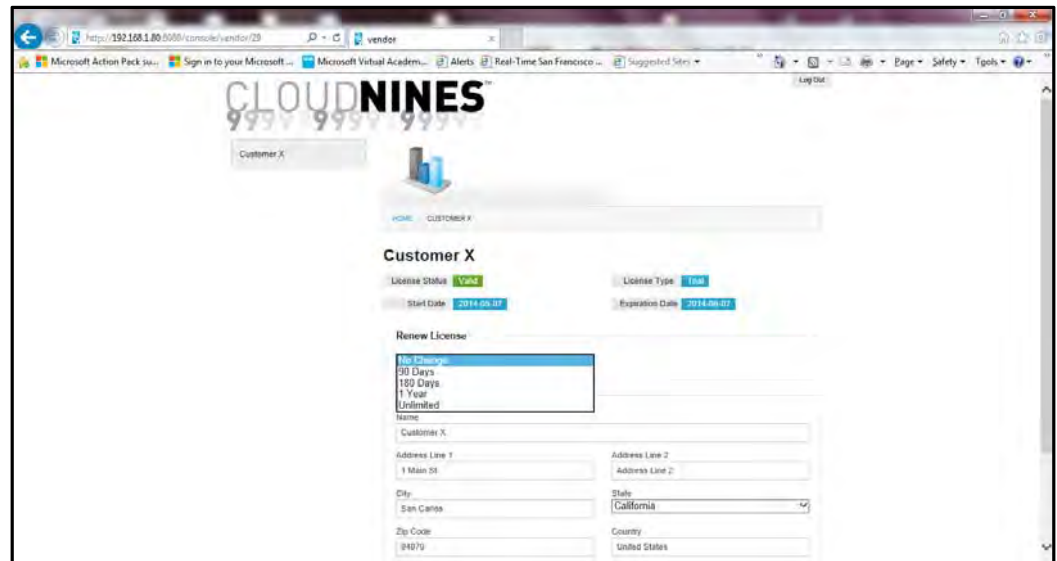
The application and client group can be unlocked by selecting an unlocking period. This information is relayed to the licensing server.

6   Contacting ZeroNines

If you have questions about this installation or you need help, contact ZeroNines Support at support@zeronines.com.

Always Available™ technology from ZeroNines® Technology, Inc. is a software-only business continuity solution. There is no hardware to install, and it operates on your existing hardware and infrastructure.

Always Available™ is true active-active real-time application replication in multiple sites. It processes all network transactions and data exchanges equally and simultaneously on multiple servers anywhere across the globe. If one goes offline, the others keep processing and your customers don't experience downtime. It keeps your applications and data running despite problems that would knock an ordinary system offline.

ZeroNines® Technology, Inc. provides a new standard in network disaster recovery, shifting the paradigm from reactive recovery to proactive business continuity. Our Always Available™ information security and availability technology pushes application uptime beyond five nines (99.999%) to virtually 100% anytime, all the time – zero nines. This enables uninterrupted access to business data, applications, and transactions despite disasters or network disruptions that would otherwise cripple the enterprise. Always Available™ processes all transactions in parallel on geographically dispersed servers that are all hot and all active, eliminating single points of failure. It operates agnostically across multiple platforms, leveraging existing processing and storage infrastructure. We also offer enterprise infrastructure assessment, program management and project implementations. Founded in 2000 and based in Denver, Colorado, ZeroNines' primary target customer base includes Global 2000 companies.

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