



Installation Documentation for Always Available™ Infrastructure Software

MSP Multi-Tenant / Multi Application Installation
For Software Version AAv7_1

ZeroNines Technology, Inc.

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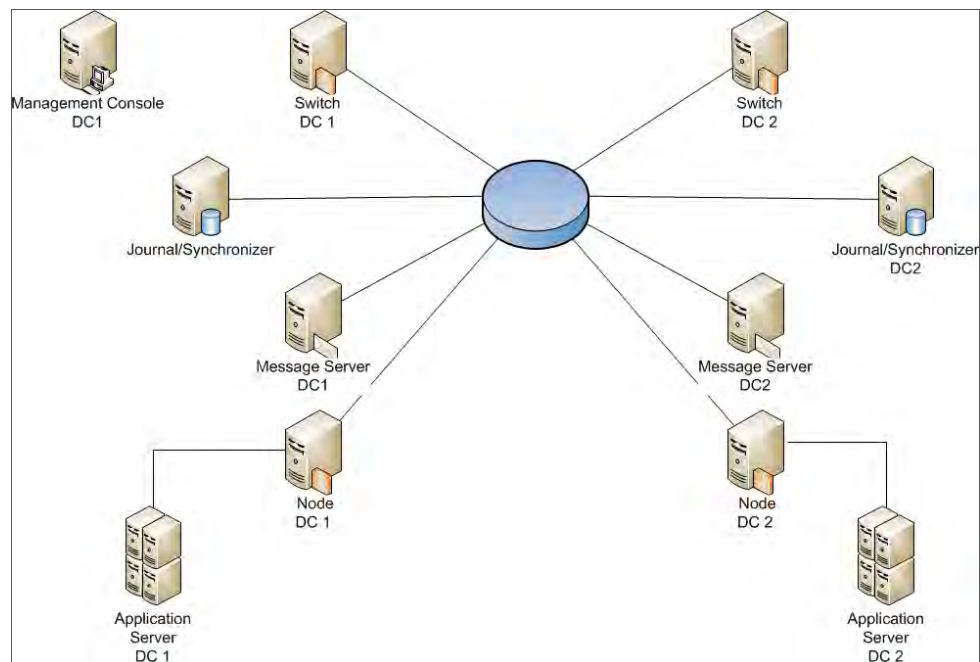
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1 ZeroNines Configuration Overview

This document describes the installation of the ZeroNines® Always Available™ software in a multi-tenant/multi-application or “MSP” (managed service provider) 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 standard or “proof of concept” (POC) configuration are in the ZeroNines document “Installation Documentation for Always Available™ Infrastructure Software: Standard Installation for Software Version AAv7_1.”



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

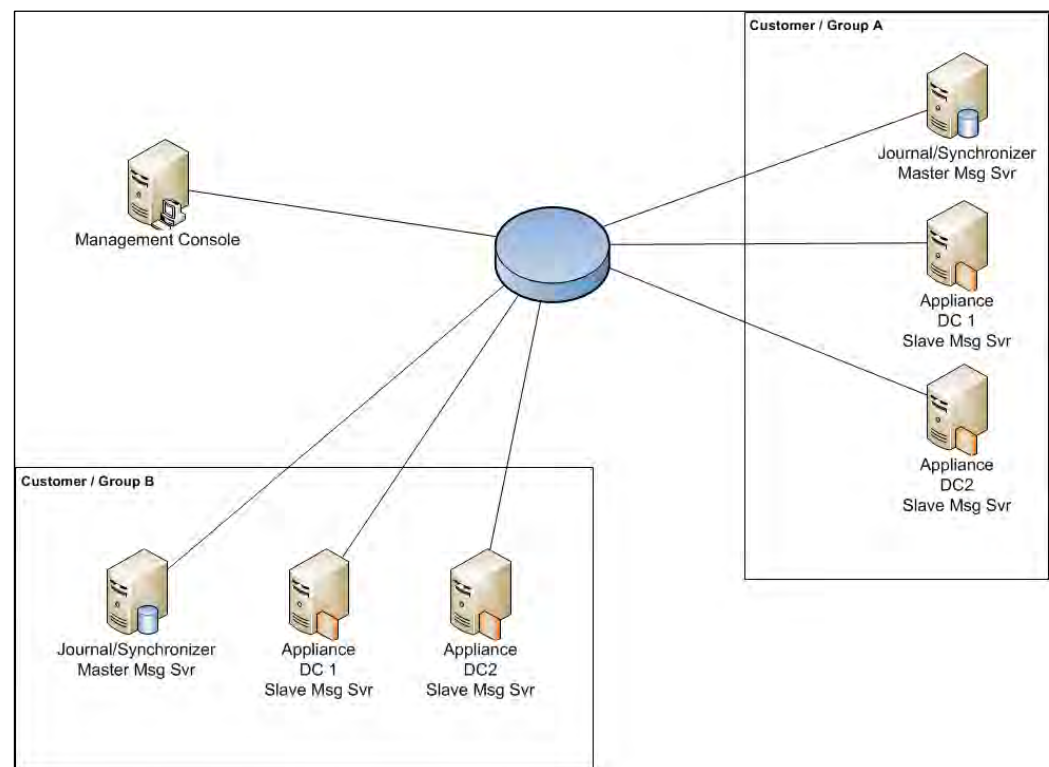
storage management systems can be employed to ease storage requirements for the tracker. Tape can be used as an archival method for off-loading data. In addition to the messages, the tracker records location ID, device ID, time stamp, and sequence number.

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 Multi-Tenant/Multi-Application/MSP Configuration

This is a deployment or usage model typically used by a managed service provider.



With an Always Available managed service multi-tenant or multi-application installation the groups are contained and segmented by the ZeroNines messaging servers. For each group, a ZeroNines message server or cluster of message servers is established. In this configuration, the message server and journal server **are not** installed on the console. The journal server will monitor transactions for the group for which it is configured.

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.

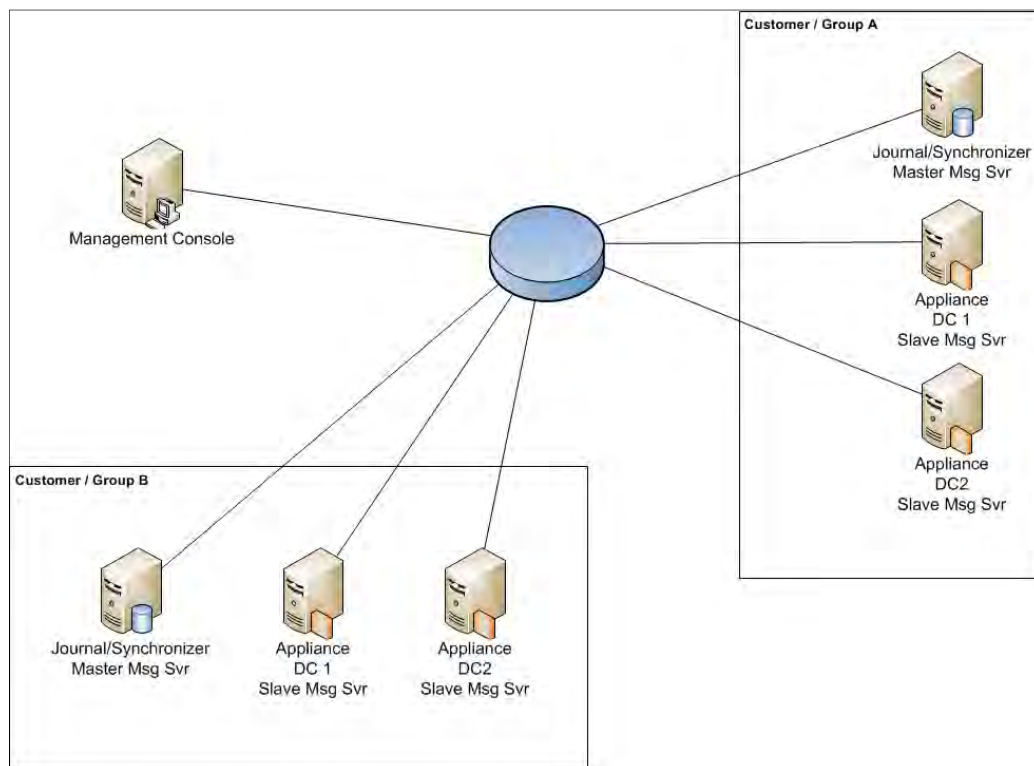
- **Punctuation**

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™ MSP Multi-Tenant/Multi-Application Configuration



With an AA managed service multi-tenant or multi-application installation the groups are contained and segmented by the ZeroNines messaging servers. For each group, a ZeroNines message server or cluster of message servers is established. In this configuration, the message server and journal server **are not** installed on the console. The journal server will monitor transactions for the group for which it is configured.

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 Multi- Tenant / Multi-Application / MSP Model:

Component	RAM (min - rec)	DASD (min - rec)	Cores (min - rec)	NIC (min - rec)
Console	4GB – 8GB	60GB+	1 - 2	1
Journal / Message Server	8GB - 16GB	100GB+	2 – 4	1 – 2
Appliance / Message Server	8GB – 16GB	60GB+	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:

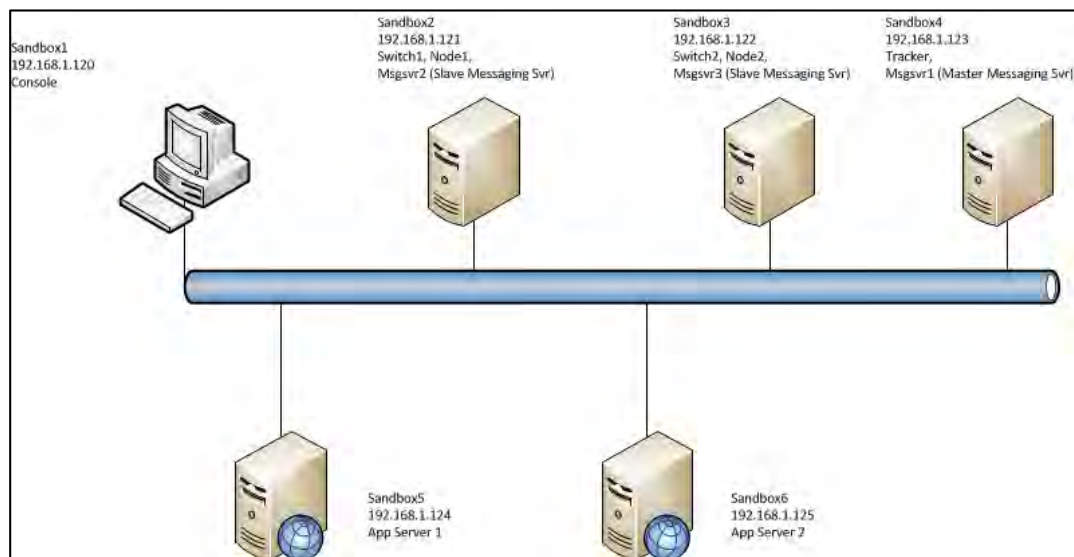
- IP address reserved for the ZeroNines machine you are installing
- The netmask in bit notation (e.g. 24, 20, 16)
- Gateway and DNS Server numbers

2.3 Configuration Worksheets

2.3.1 Pre-Installation Worksheets

Whether you are installing an AA standard deployment or the more complex AA 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 Managed Service - Multi- Tenant Configuration Worksheet (Example)



Information to Configure Host File

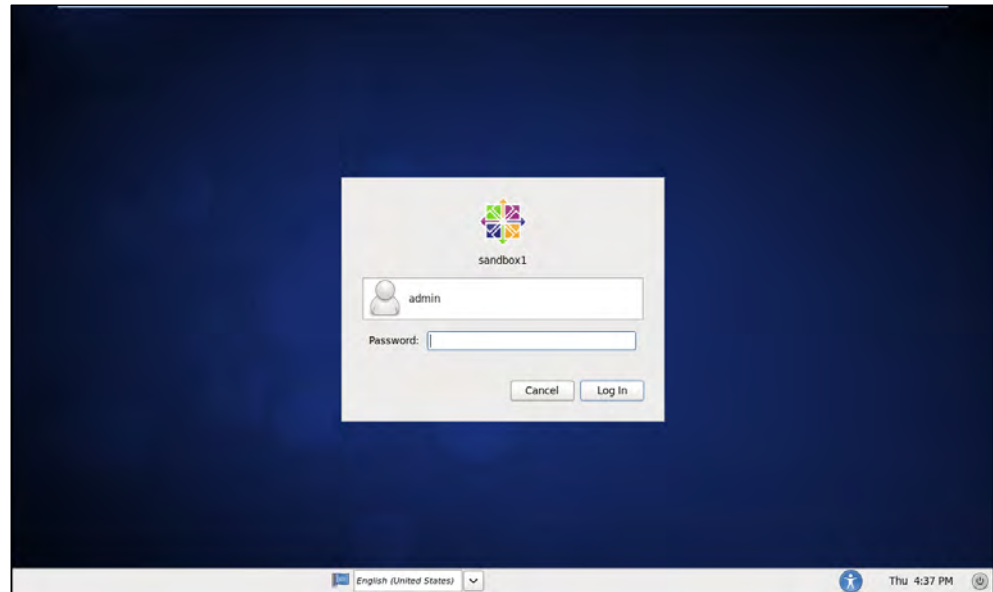
Host Name	IP Address	Aliases
sandbox1	192.168.1.120	console
sandbox2	192.168.1.121	switch1, node1, proxy1, msgsvr2
sandbox3	192.168.1.122	switch2, node2, proxy2, msgsvr3
sandbox4	192.168.1.123	tracker, msgsvr1

Networking Configuration Information

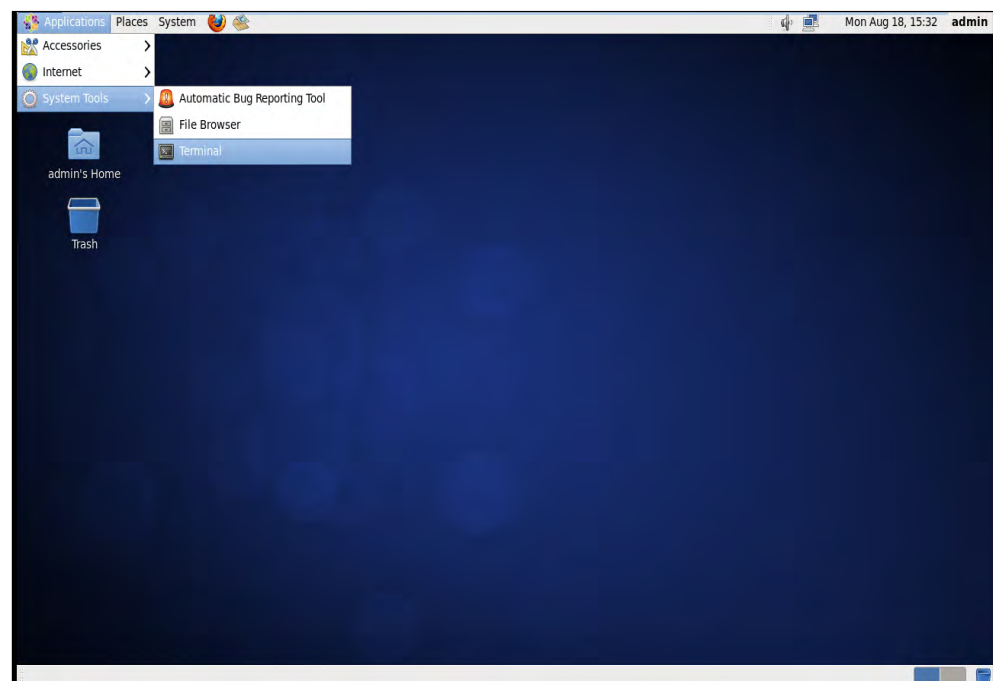
Device	IP Address	Network Mask	Gateway
sandbox1	192.168.1.120	255.255.255.0	192.168.1.251
sandbox2	192.168.1.121	255.255.255.0	192.168.1.251
sandbox3	192.168.1.122	255.255.255.0	192.168.1.251
sandbox4	192.168.1.123	255.255.255.0	192.168.1.251

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 Installation of 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.

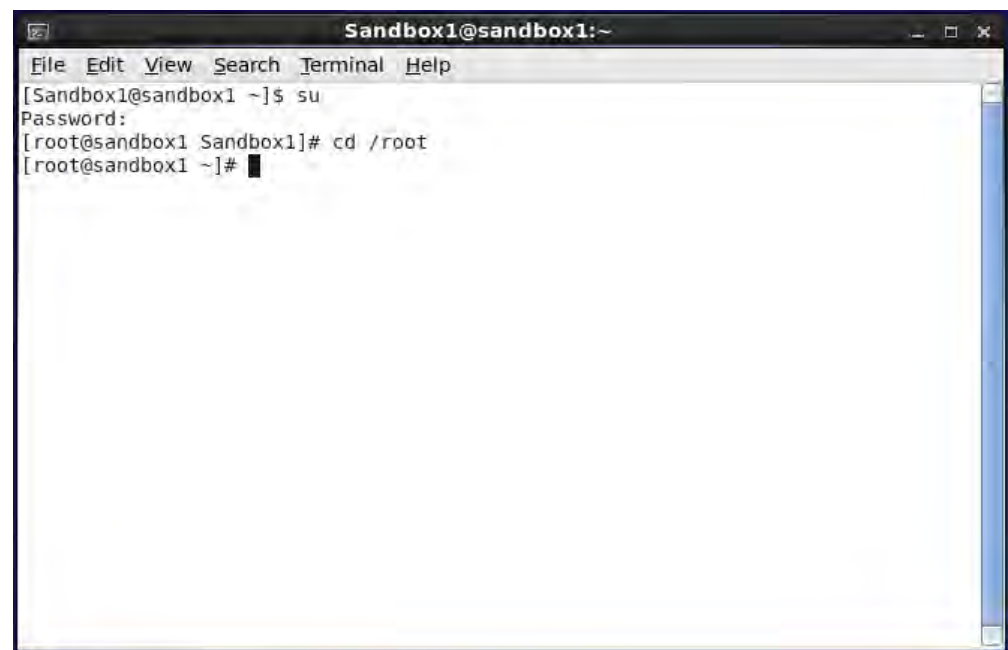
Some of the software components are configured by ZeroNines to install together in the correct order as a complete appliance. This simplifies and speeds installation on your part.

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**.



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

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

4.2.1 Download ZeroNines Installation Package



```
Sandbox1@localhost:~  
File Edit View Search Terminal Help  
[Sandbox1@localhost ~]$ su  
Password:  
[root@localhost Sandbox1]# cd /root  
[root@localhost ~]# wget http://www.zeronines.com/download02/AAv7_1.tar.gz
```

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
```

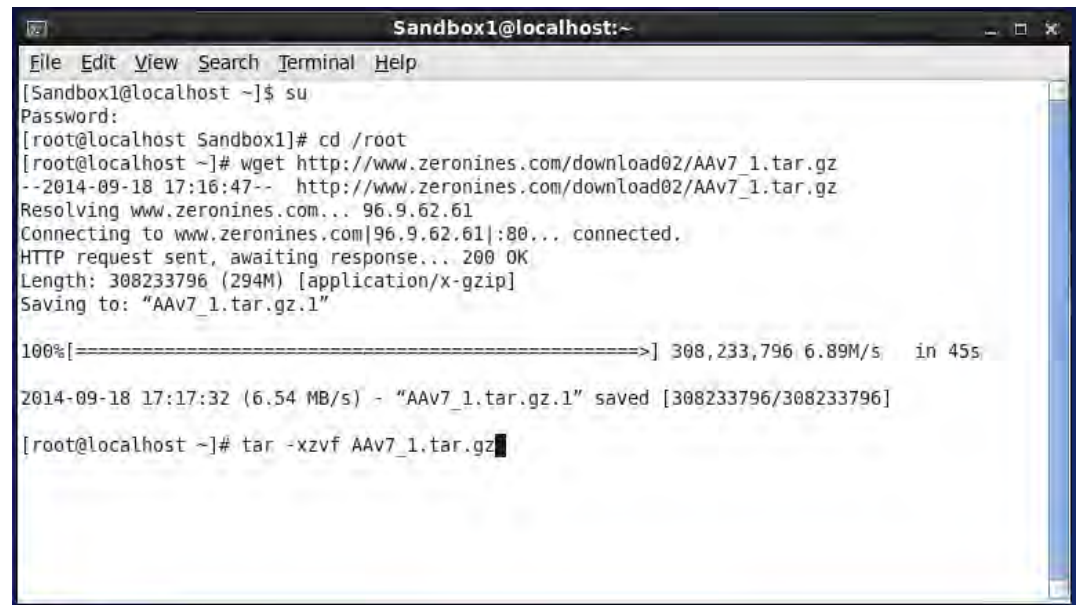


```
Sandbox1@localhost:~  
File Edit View Search Terminal Help  
[Sandbox1@localhost ~]$ su  
Password:  
[root@localhost Sandbox1]# cd /root  
[root@localhost ~]# wget http://www.zeronines.com/download02/AAv7_1.tar.gz  
--2014-09-18 17:16:47-- http://www.zeronines.com/download02/AAv7_1.tar.gz  
Resolving www.zeronines.com... 96.9.62.61  
Connecting to www.zeronines.com|96.9.62.61|:80... connected.  
HTTP request sent, awaiting response... 200 OK  
Length: 308233796 (294M) [application/x-gzip]  
Saving to: "AAv7_1.tar.gz.1"  
  
5% [=>] 16,717,896 5.67M/s
```

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



```
Sandbox1@localhost:~  
File Edit View Search Terminal Help  
[Sandbox1@localhost ~]$ su  
Password:  
[root@localhost Sandbox1]# cd /root  
[root@localhost ~]# wget http://www.zeronines.com/download02/AAv7_1.tar.gz  
--2014-09-18 17:16:47-- http://www.zeronines.com/download02/AAv7_1.tar.gz  
Resolving www.zeronines.com... 96.9.62.61  
Connecting to www.zeronines.com|96.9.62.61|:80... connected.  
HTTP request sent, awaiting response... 200 OK  
Length: 308233796 (294M) [application/x-gzip]  
Saving to: "AAv7_1.tar.gz.1"  
  
100%[=====>] 308,233,796 6.89M/s in 45s  
  
2014-09-18 17:17:32 (6.54 MB/s) - "AAv7_1.tar.gz.1" saved [308233796/308233796]  
  
[root@localhost ~]# tar -xzf AAv7_1.tar.gz
```

Unpack the ZeroNines installation package to the working directory:

```
[user@servername ~]# tar -xzf 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.

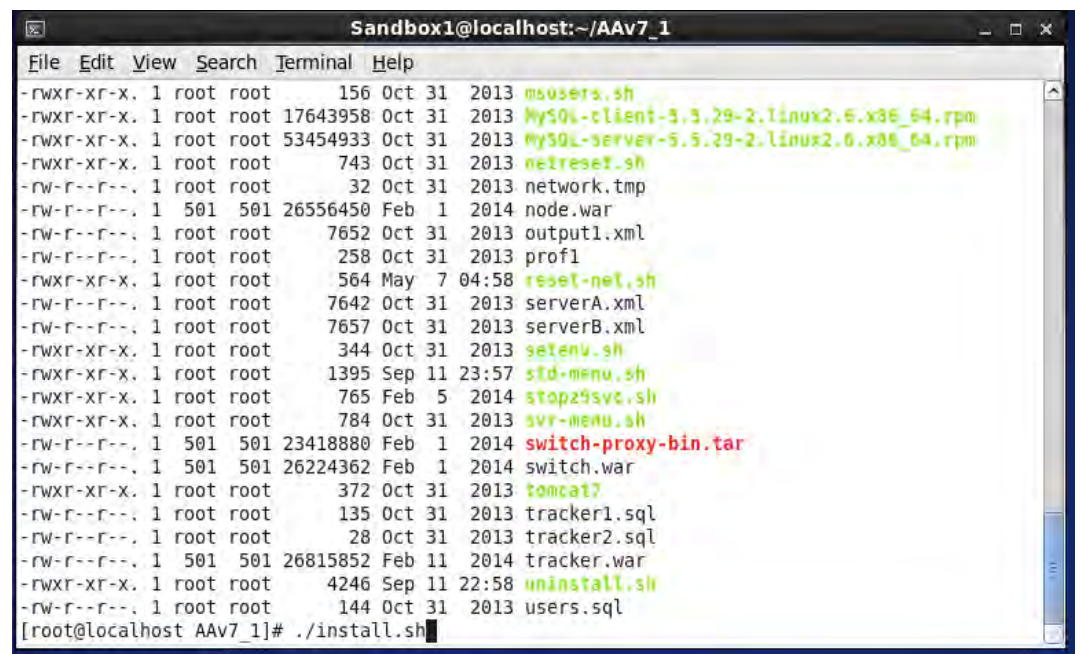
You may now begin the installation.

4.2.3 Start the Installation Menu



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

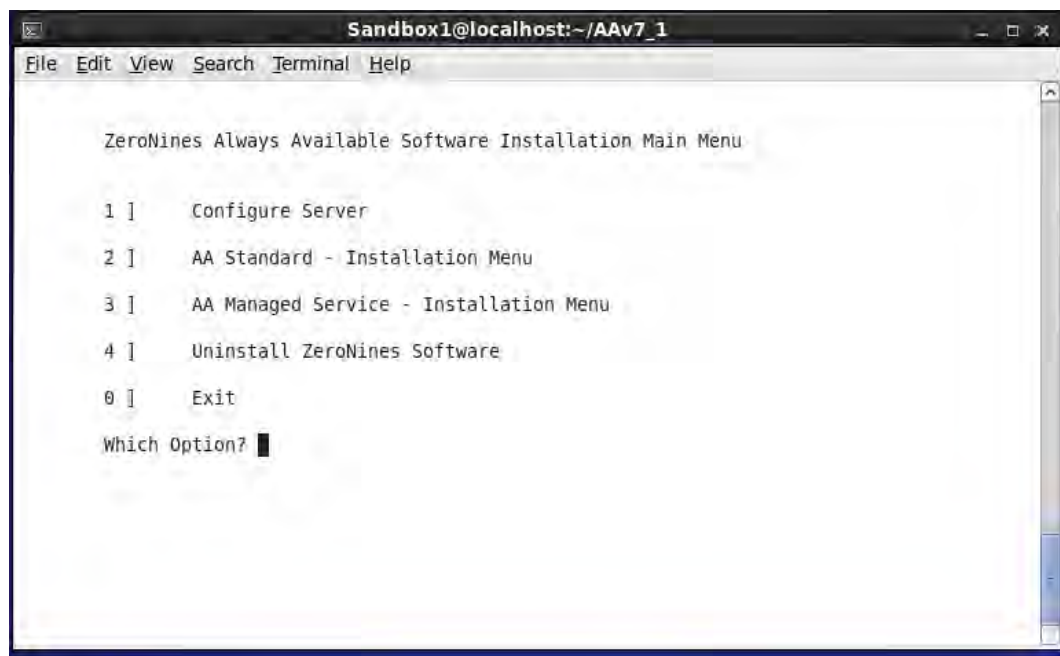
```
[user@servername ~] # cd AAv7_1
```



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



```
Sandbox1@localhost:~/AAv7_1
File Edit View Search Terminal Help

ZeroNines Always Available Software Installation Main Menu

1 | Configure Server
2 | AA Standard - Installation Menu
3 | AA Managed Service - Installation Menu
4 | Uninstall ZeroNines Software
0 | Exit
Which Option? █
```

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 standard model or managed services (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 Model – 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 focus on the AA MSP multi-tenant installation procedure. For documentation on installing the proof of concept (POC) or AA standard configuration, contact ZeroNines at support@zeronines.com.

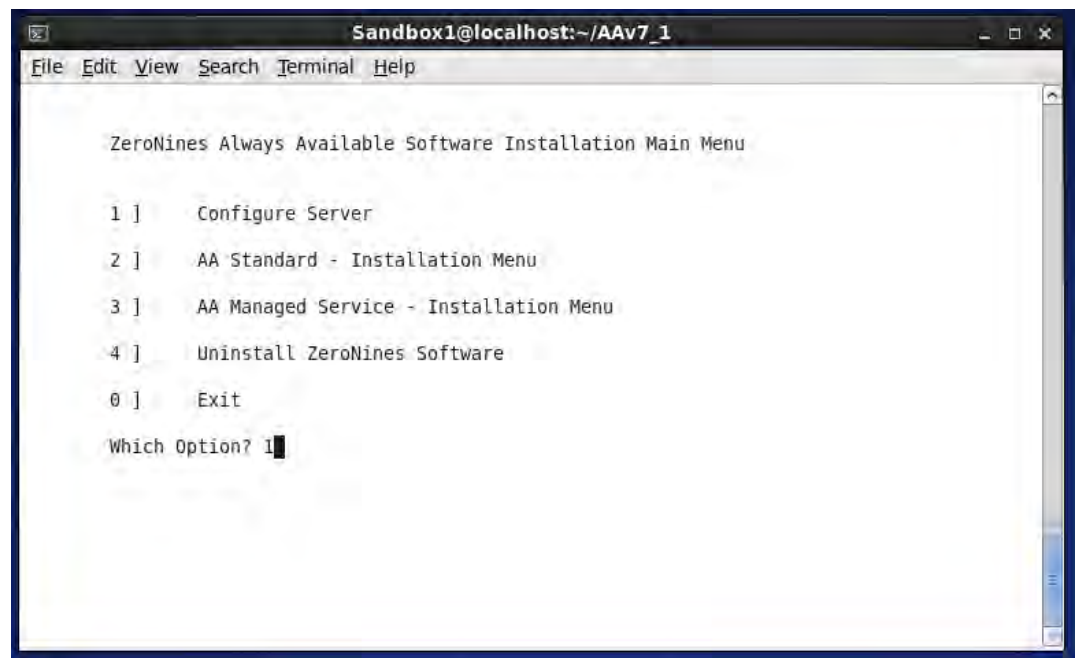
4.4 Configure Host Names

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 "Host Names Worksheet":

- IP address
- Hostname
- Any aliases

To configure the host files, follow the instructions below.

A screenshot of a terminal window titled "Sandbox1@localhost:~/AAv7_1". The window displays the "ZeroNines Always Available Software Installation Main Menu" with the following options:

```
ZeroNines Always Available Software Installation Main Menu

1 ]    Configure Server
2 ]    AA Standard - Installation Menu
3 ]    AA Managed Service - Installation Menu
4 ]    Uninstall ZeroNines Software
0 ]    Exit

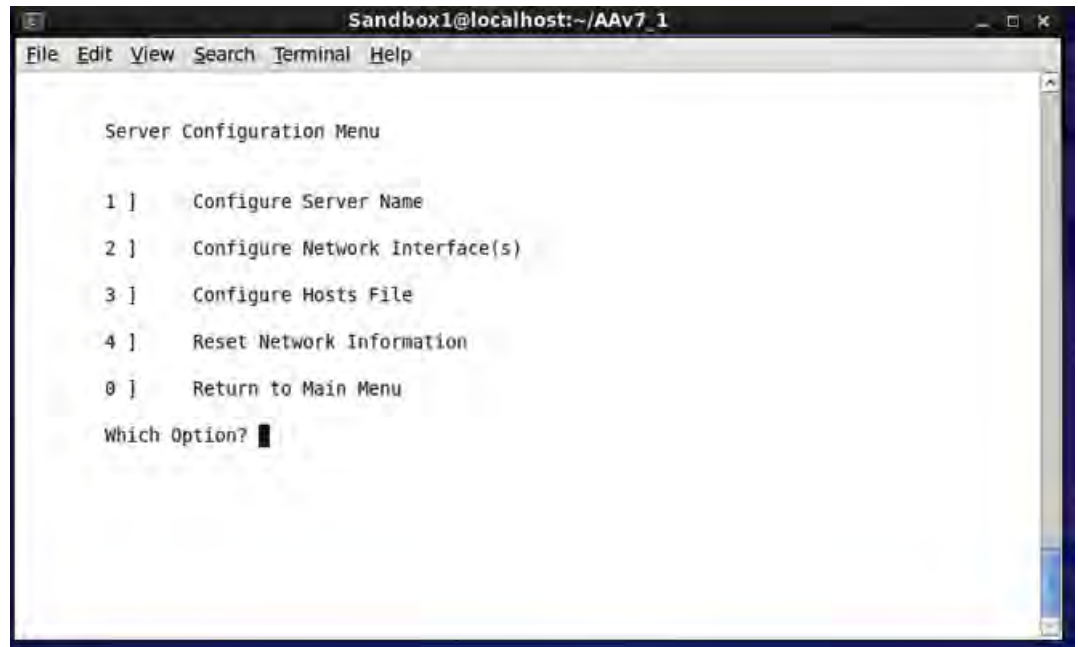
Which Option? 1
```

The cursor is positioned at the end of the "Which Option?" prompt, with the number "1" entered.

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

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

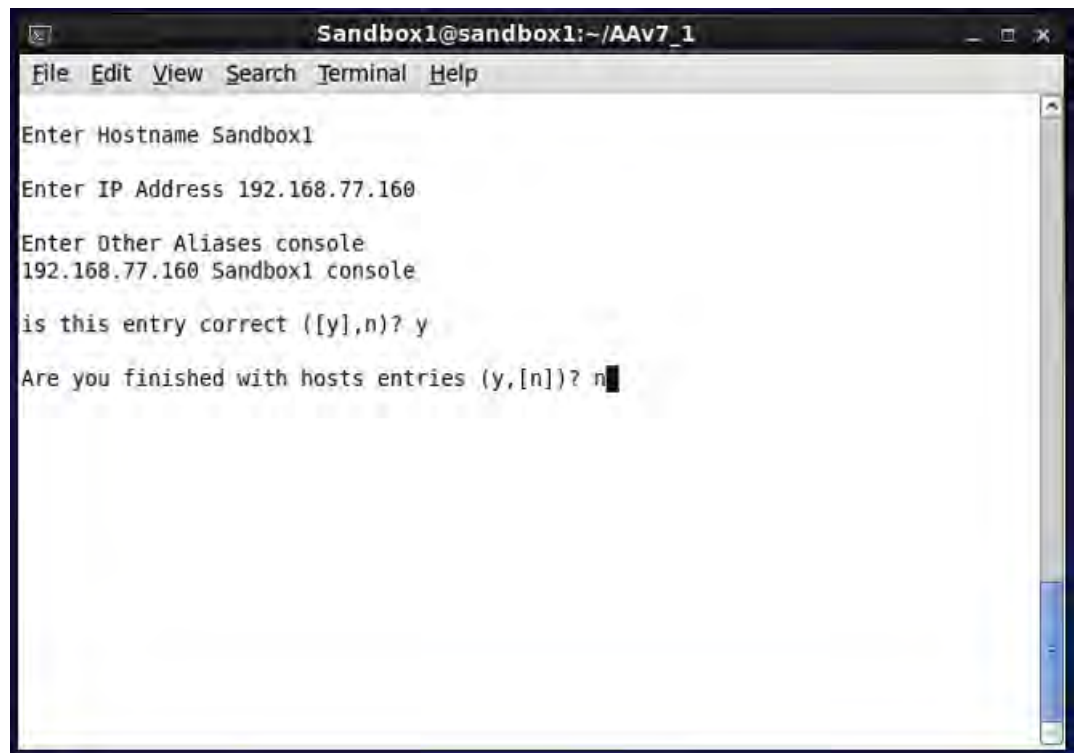
Which option: **1** **[Enter]**

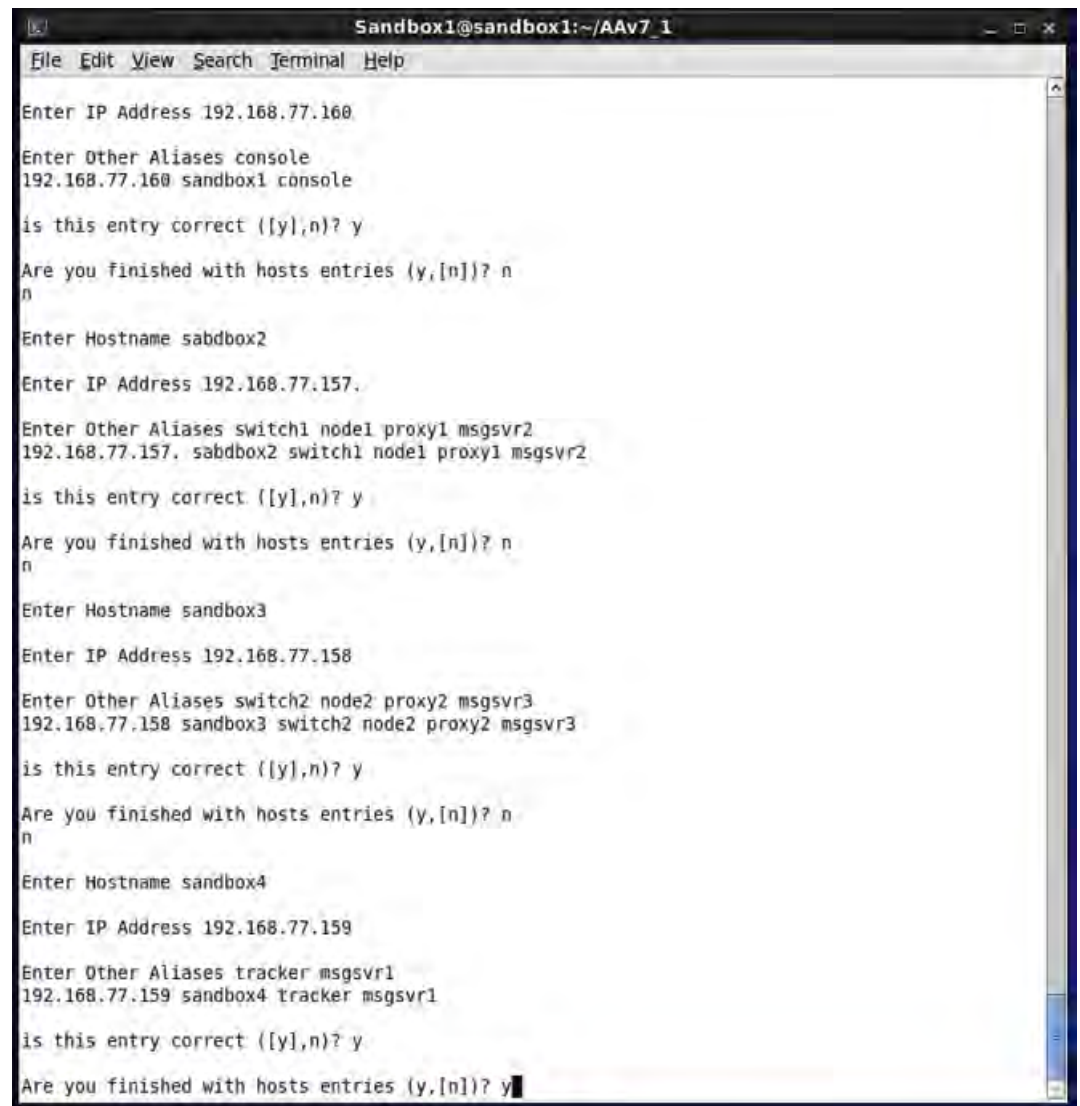


The "Server Configuration Menu" will open, as shown above.

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

4.4.1 Host File Entries





```
Sandbox1@sandbox1:~/AAv7_1
File Edit View Search Terminal Help

Enter IP Address 192.168.77.160
Enter Other Aliases console
192.168.77.160 sandbox1 console
is this entry correct ([y],n)? y
Are you finished with hosts entries (y,[n])? n
n
Enter Hostname sandbox2
Enter IP Address 192.168.77.157.
Enter Other Aliases switch1 node1 proxy1 msgsvr2
192.168.77.157, sandbox2 switch1 node1 proxy1 msgsvr2
is this entry correct ([y],n)? y
Are you finished with hosts entries (y,[n])? n
n
Enter Hostname sandbox3
Enter IP Address 192.168.77.158
Enter Other Aliases switch2 node2 proxy2 msgsvr3
192.168.77.158 sandbox3 switch2 node2 proxy2 msgsvr3
is this entry correct ([y],n)? y
Are you finished with hosts entries (y,[n])? n
n
Enter Hostname sandbox4
Enter IP Address 192.168.77.159
Enter Other Aliases tracker msgsvr1
192.168.77.159 sandbox4 tracker msgsvr1
is this entry correct ([y],n)? y
Are you finished with hosts entries (y,[n])? y
```

For each host entry, you will be prompted to enter the host name, IP address and any aliases for that host.

The recommended setup is as follows:

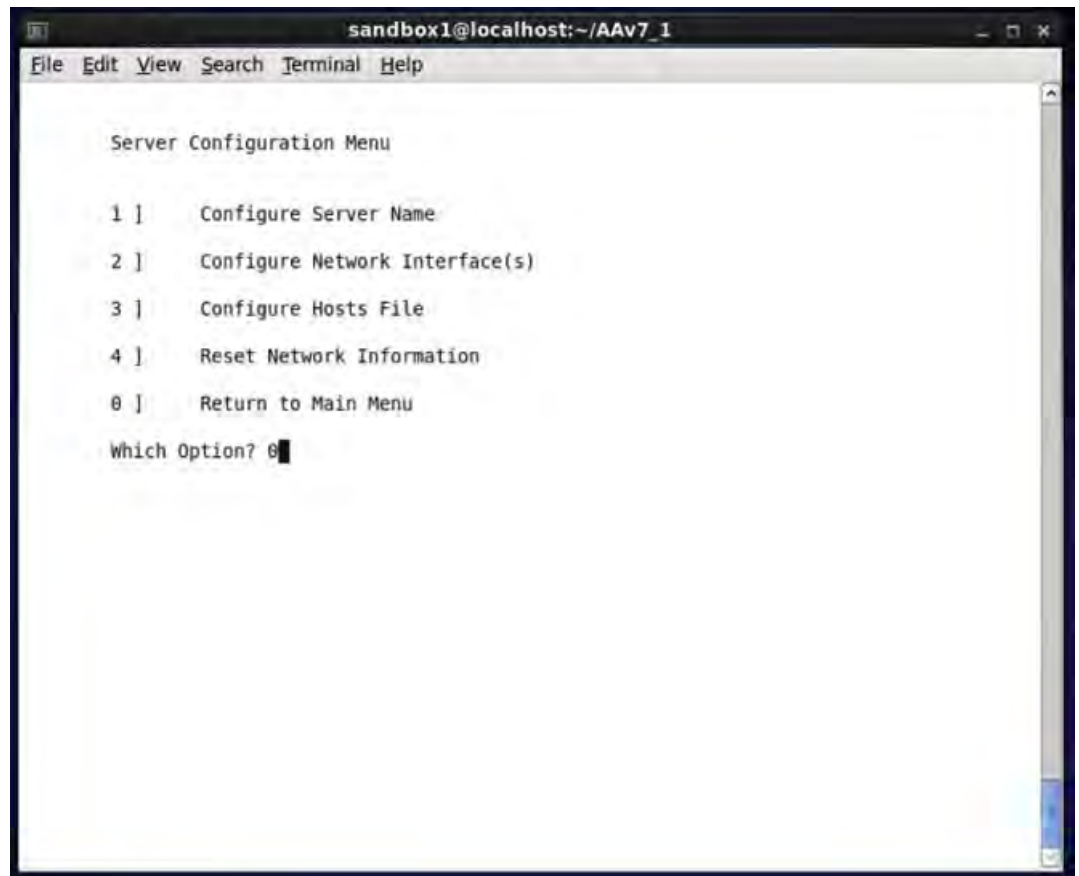
At the “Enter Hostname” prompt, type **sandbox1**

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

At the “Enter Other Aliases” prompt, type **console**

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.)

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.



After the etc/host file has been loaded you will be returned to the Server Configuration Menu. You will then return to the Main Menu by typing zero: **0**

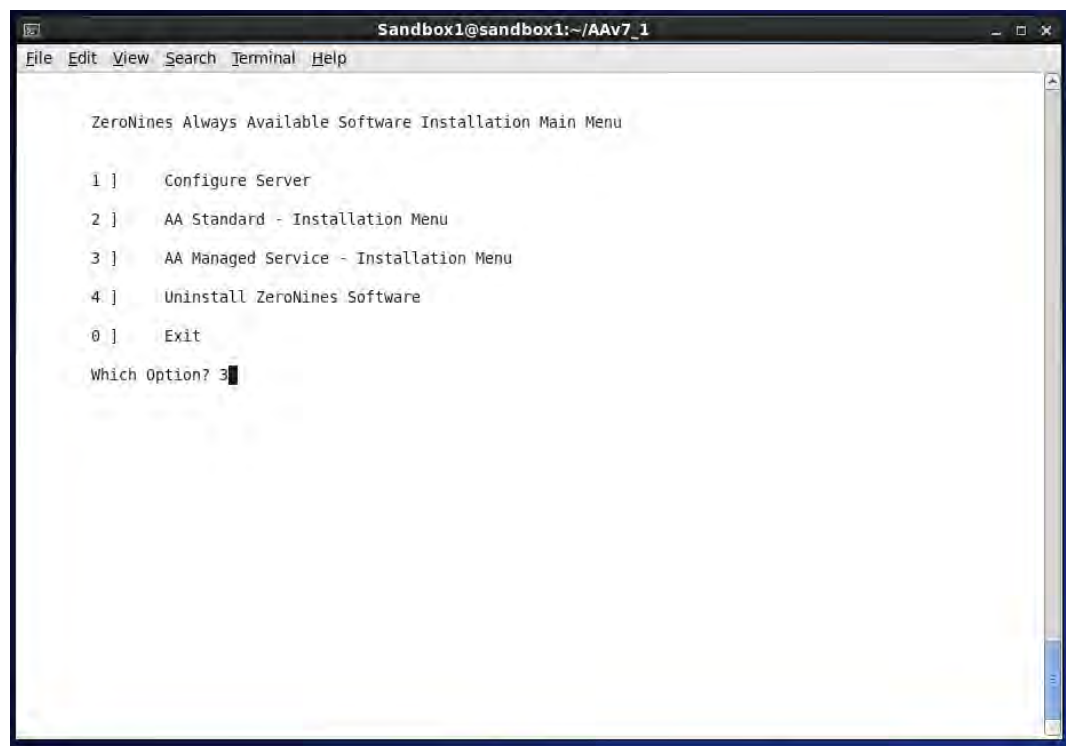
You may proceed with the AA MSP multi-tenant/multi-application installation.

Note: Host File configuration will be required for each server in the AA MSP multi-tenant/multi-application configuration.

4.5 Installing AA Managed Service Provider (MSP) Model


The MSP model installs an independent management console for the overall system. Each client or application group will install a separate journal server (tracker) and master messaging server on one server, and individual appliance servers and slave message servers in a clustered mode. The appliance consists of the switch, switch proxy and node software components. As with all ZeroNines software, the console and journal server should be installed before any appliances. The following installation procedure assumes that the required servers sandbox1 thru sandbox4 have CentOS and the AAv7_1 software loaded on each server.

4.5.1 Installing the Management Console – Sandbox1



From the Main Menu select option **3** to enter into the "AA Managed Service Installation Menu".

Type **3**

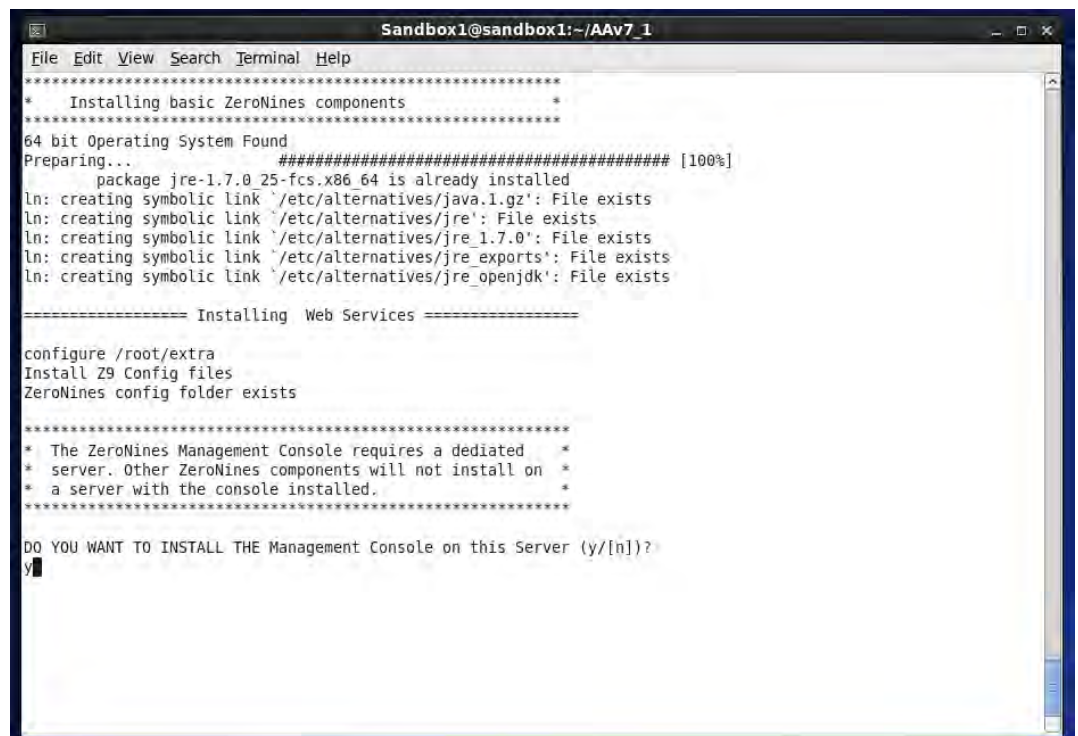


```
Sandbox1@sandbox1:~/AAv7_1
File Edit View Search Terminal Help

AA MSP Model Installation Menu

1 ] Install Console
2 ] Install Journal & Message Server
3 ] Install Appliance & Message Server
4 ] Configure Message Servers
0 ] Exit
Which Option? 1
```

From the AA MSP Menu type **1** to install the Console on the server sandbox1



```
Sandbox1@sandbox1:~/AAv7_1
File Edit View Search Terminal Help

*****
* Installing basic ZeroNines components *
*****
64 bit Operating System Found
Preparing... ##### [100%]
package jre-1.7.0_25-fcs.x86_64 is already installed
ln: creating symbolic link '/etc/alternatives/java.1.gz': File exists
ln: creating symbolic link '/etc/alternatives/jre': File exists
ln: creating symbolic link '/etc/alternatives/jre_1.7.0': File exists
ln: creating symbolic link '/etc/alternatives/jre_exports': File exists
ln: creating symbolic link '/etc/alternatives/jre_openjdk': File exists

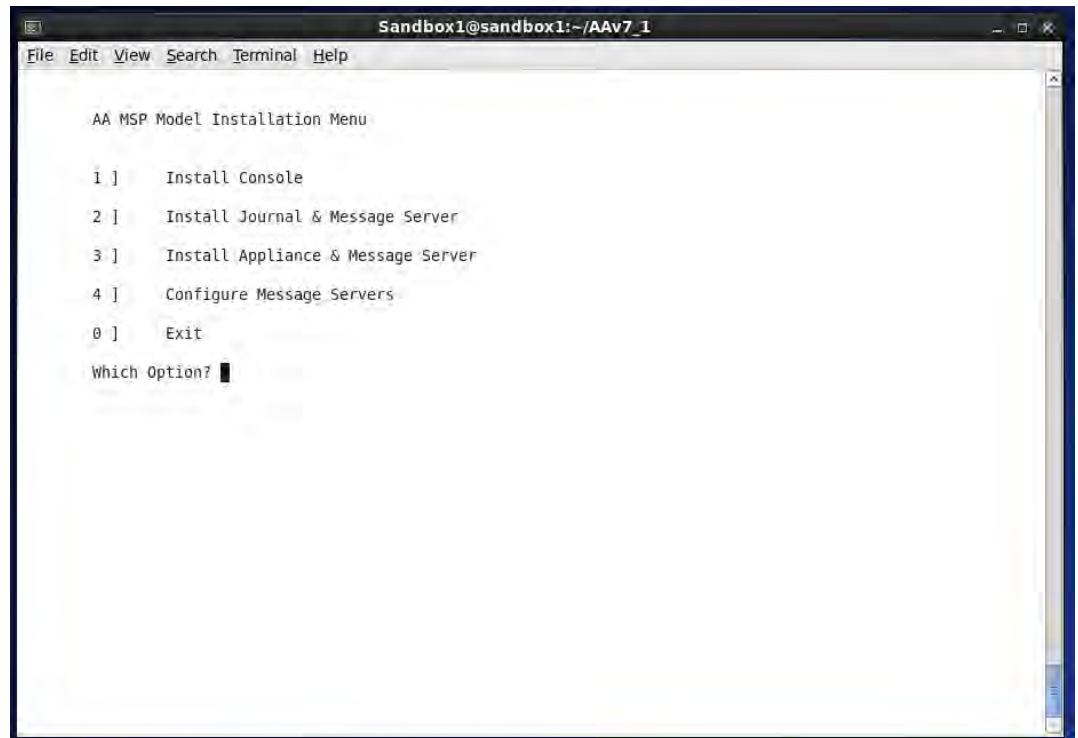
===== Installing Web Services =====

configure /root/extra
Install Z9 Config files
ZeroNines config folder exists

*****
* The ZeroNines Management Console requires a dedicated *
* server. Other ZeroNines components will not install on *
* a server with the console installed. *
*****

DO YOU WANT TO INSTALL THE Management Console on this Server (y/[n])?
y
```

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

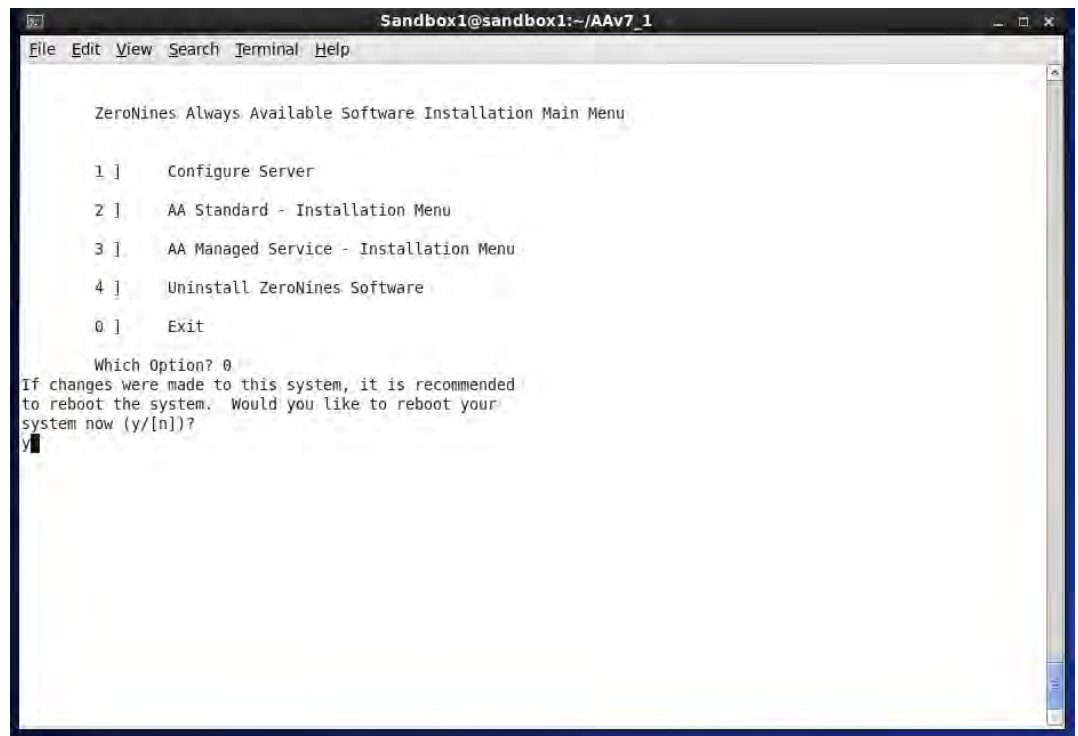


```
Sandbox1@sandbox1:~/AAv7_1
File Edit View Search Terminal Help

AA MSP Model Installation Menu

1 ] Install Console
2 ] Install Journal & Message Server
3 ] Install Appliance & Message Server
4 ] Configure Message Servers
0 ] Exit
Which Option? 
```

Upon completion of the management console load you are returned to the “AA MSP Model Installation Menu”. Now, type **0** to exit back to the main menu.



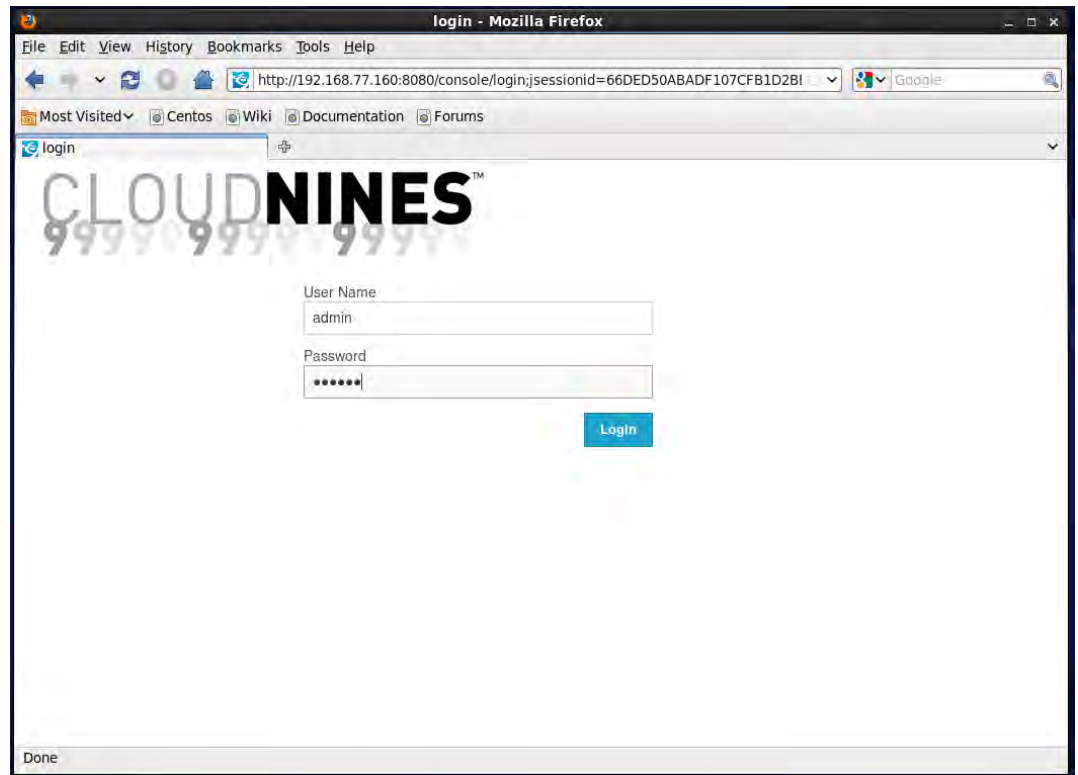
```
Sandbox1@sandbox1:~/AAv7_1
File Edit View Search Terminal Help

ZeroNines Always Available Software Installation Main Menu

1 ] Configure Server
2 ] AA Standard - Installation Menu
3 ] AA Managed Service - Installation Menu
4 ] Uninstall ZeroNines Software
0 ] Exit
Which Option? 0
If changes were made to this system, it is recommended
to reboot the system. Would you like to reboot your
system now (y/[n])?
y
```

At the Main Menu type **0** to exit. Then, initiate a reboot of the system by typing **y**. This will complete the Management Console installation.

4.5.2 Confirm Management Console Installation



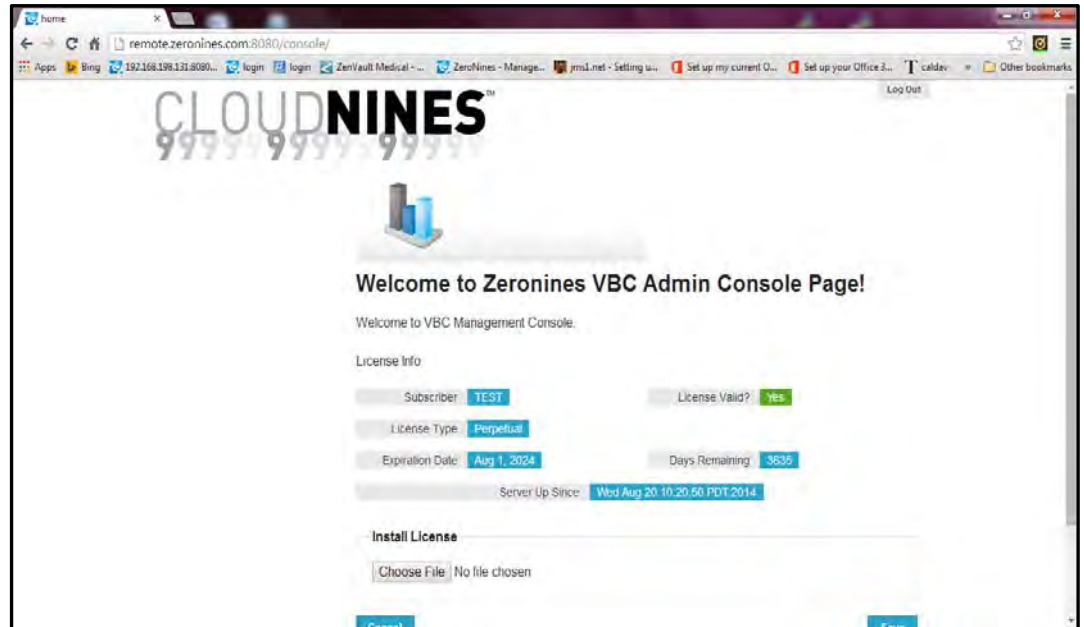
Once the console server has been installed, you can confirm the installation by accessing the ZeroNines console. Using a browser, enter the IP address or URL for the console server through port 8080.

For example: <http://192.168.77.160:8080/console>

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

User Name: [admin](#)

Password: [s3cret](#)

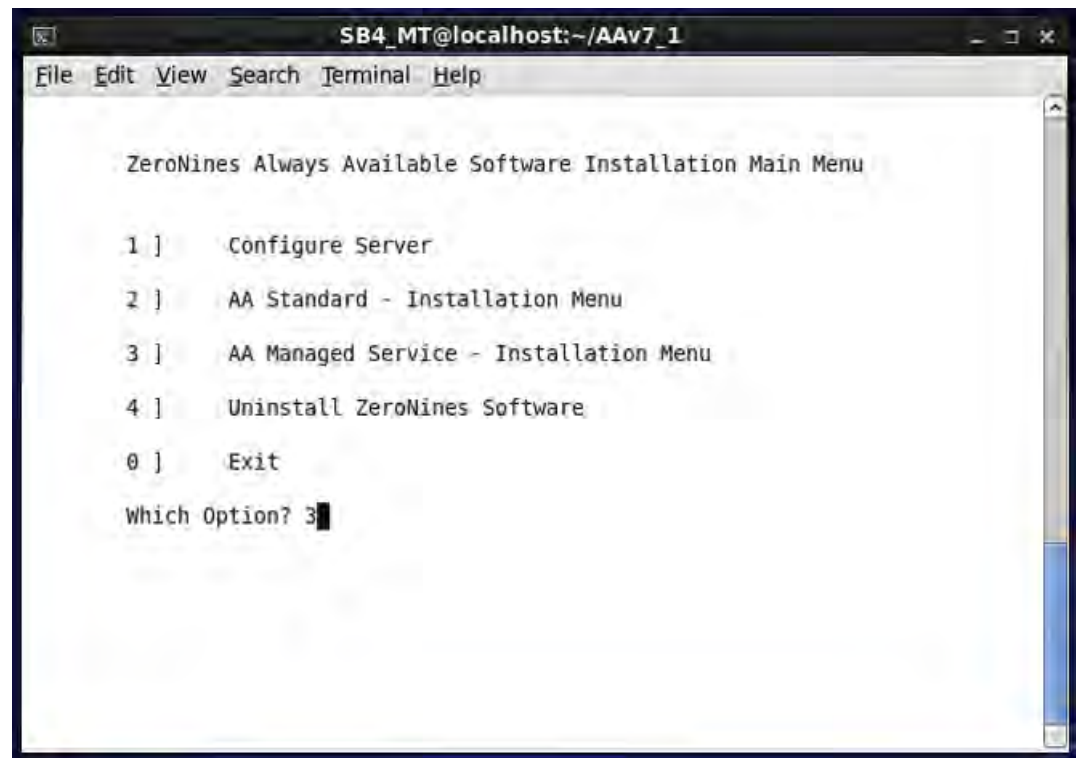


Once you authenticate with the management console, the system will display the base information of the installation.

Unlike the console installed after the standard model installation, there is no client/application group displayed on the left navigation pane. Each client/application group will be established when a new journal server and message server is installed, as described in the next step.

4.5.3 Install Journal and Message Server – Sandbox4

Note: As a pre-requisite to installing the journal and messaging server on sandbox4 the “Configure Server” steps must also be completed for this server. If the host file for this server has been populated you may continue with the following steps.



From the Main Menu type **3** to select the “AA Managed Service Installation Menu”.

```

SB4_MT@localhost:~/AAv7_1
File Edit View Search Terminal Help

AA MSP Model Installation Menu

1 ]   Install Console
2 ]   Install Journal & Message Server
3 ]   Install Appliance & Message Server
4 ]   Configure Message Servers
0 ]   Exit

Which Option? 2

```

On the “AA MSP Model Installation Menu”, type **2** for “Install Journal and Messaging Server”. This will begin the installation of the journal and master messaging server. You will be prompted to install the journal on the server.

```

SB4_MT@localhost:~/AAv7_1
File Edit View Search Terminal Help

*****
*   Installing basic ZeroNines components   *
*****
64 bit Operating System Found
Preparing... ##### [100%]
  1:jre ##### [100%]
Unpacking JAR files...
  rt.jar...
  jsse.jar...
  charsets.jar...
  localedata.jar...

===== Installing Web Services =====

configure /root/extra
make /root/extra
Install Z9 Config files
vbc/
vbc/jms.properties
vbc/switch.properties
vbc/synchronizer.properties
vbc/GeoLiteCity.dat
vbc/console.properties
vbc/proxy.properties
vbc/GeoIP.dat
vbc/node.properties
vbc/vbc.db
iptables: Flushing firewall rules: [ OK ]
iptables: Setting chains to policy ACCEPT: filter [ OK ]
iptables: Unloading modules: [ OK ]
*****
THE INSTALLATION OF TRACKER DELETES PRIOR MySQL DATA AND USERS
MAKE SURE YOU HAVE A BACKUP OF YOUR DATA.
DO YOU WANT TO INSTALL THE JOURNAL AND SYNCHRONIZER (Tracker)?
Install {y/[n]}?

```

Type **y** to initiate the journal and synchronizer installation process.


```

SB4_MT@localhost:~/AAv7_1
File Edit View Search Terminal Help
vbc/node.properties
vbc/vbc.db
iptables: Flushing firewall rules: [ OK ]
iptables: Setting chains to policy ACCEPT: filter [ OK ]
iptables: Unloading modules: [ OK ]
*****
THE INSTALLATION OF TRACKER DELETES PRIOR MySQL DATA AND USERS
MAKE SURE YOU HAVE A BACKUP OF YOUR DATA.
DO YOU WANT TO INSTALL THE JOURNAL AND SYNCHRONIZER (Tracker)?
Install (y/[n])?
y
userdel: user 'mysql' does not exist
Preparing... ##### [100%]
1:MySQL-server ##### [100%]

PLEASE REMEMBER TO SET A PASSWORD FOR THE MySQL root USER !
To do so, start the server, then issue the following commands:

/usr/bin/mysqladmin -u root password 'new-password'
/usr/bin/mysqladmin -u root -h localhost.localdomain password 'new-password'

Alternatively you can run:
/usr/bin/mysql_secure_installation

which will also give you the option of removing the test
databases and anonymous user created by default. This is
strongly recommended for production servers.

See the manual for more instructions.

Please report any problems with the /usr/bin/mysqlbug script!

Preparing... ##### [100%]
1:MySQL-client ##### [100%]
Configuring MySQL database
ERROR! MySQL server PID file could not be found!
Starting MySQL.. SUCCESS!
Assign 'root' password for the database:
Password

```

The installation process begins by installing the MySQL journal database server. The system will prompt you to assign a database server password. In this example we used **Password**. We suggest you select a different database password.

```

sandbox4@sandbox4:~/AAv7_1
File Edit View Search Terminal Help
/usr/bin/mysqladmin -u root -h sandbox4 password 'new-password'

Alternatively you can run:
/usr/bin/mysql_secure_installation

which will also give you the option of removing the test
databases and anonymous user created by default. This is
strongly recommended for production servers.

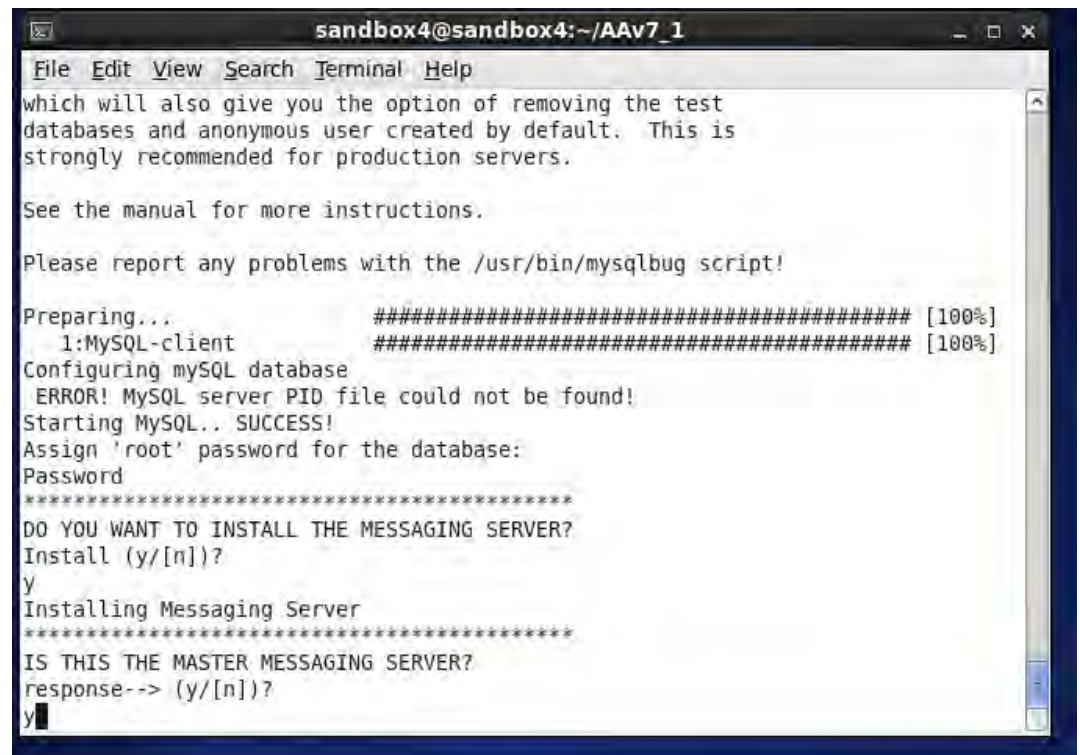
See the manual for more instructions.

Please report any problems with the /usr/bin/mysqlbug script!

Preparing... ##### [100%]
1:MySQL-client ##### [100%]
Configuring MySQL database
ERROR! MySQL server PID file could not be found!
Starting MySQL.. SUCCESS!
Assign 'root' password for the database:
Password
*****
DO YOU WANT TO INSTALL THE MESSAGING SERVER?
Install (y/[n])?

```

You will then be prompted to install the messaging server on this system. Type **y** to begin this installation.



```
sandbox4@sandbox4:~/AAv7_1
File Edit View Search Terminal Help
which will also give you the option of removing the test
databases and anonymous user created by default. This is
strongly recommended for production servers.

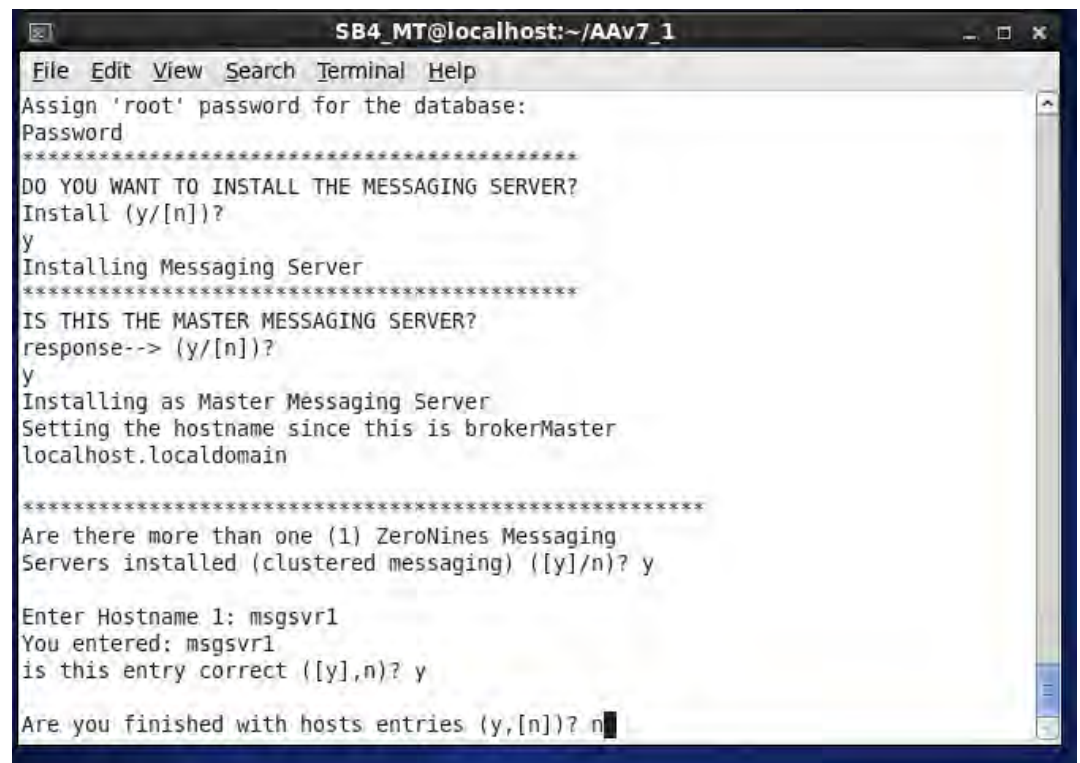
See the manual for more instructions.

Please report any problems with the /usr/bin/mysqlbug script!

Preparing... ##### [100%]
1:MySQL-client ##### [100%]
Configuring MySQL database
ERROR! MySQL server PID file could not be found!
Starting MySQL.. SUCCESS!
Assign 'root' password for the database:
Password
*****
DO YOU WANT TO INSTALL THE MESSAGING SERVER?
Install (y/[n])?
y
Installing Messaging Server
*****
IS THIS THE MASTER MESSAGING SERVER?
response--> (y/[n])?
y
```

You will be prompted to indicate whether this system is to be the master-messaging server.

Type **y** to make the system install and configure this server as the master messaging server.



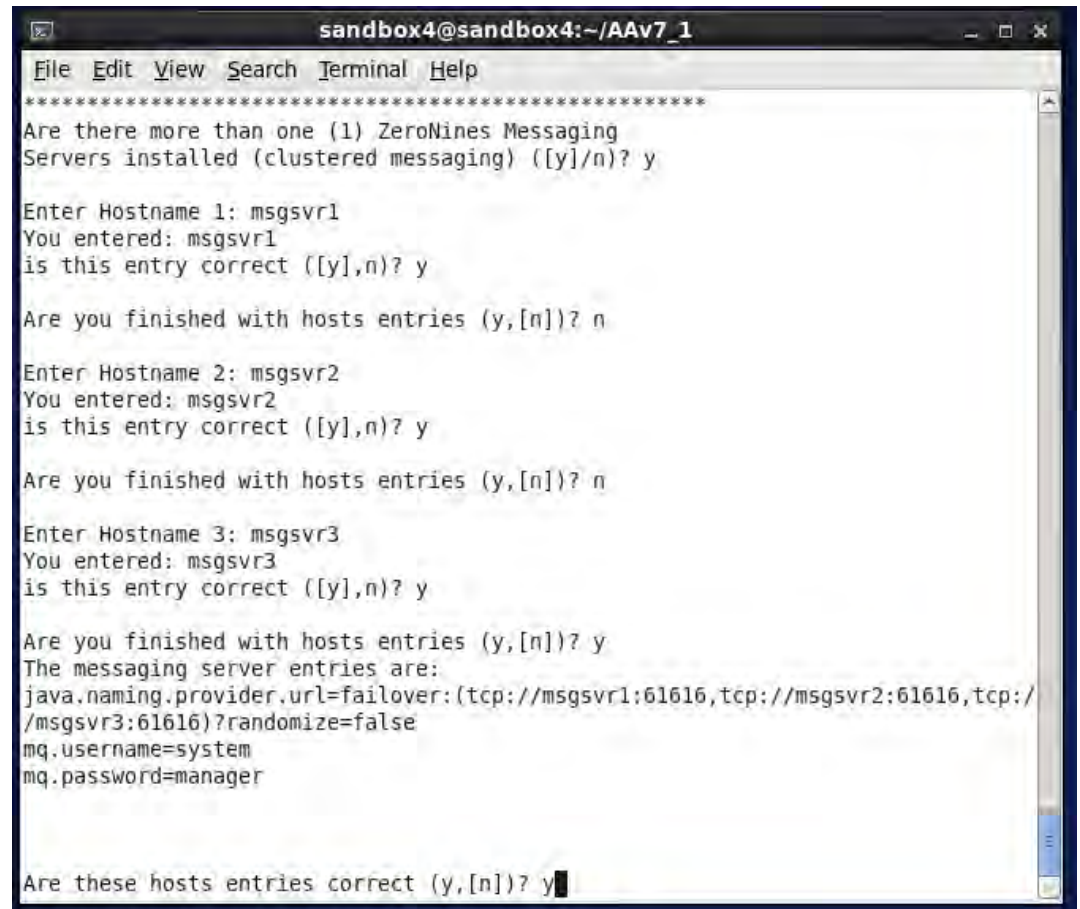
```
SB4_MT@localhost:~/AAv7_1
File Edit View Search Terminal Help
Assign 'root' password for the database:
Password
*****
DO YOU WANT TO INSTALL THE MESSAGING SERVER?
Install (y/[n])?
y
Installing Messaging Server
*****
IS THIS THE MASTER MESSAGING SERVER?
response--> (y/[n])?
y
Installing as Master Messaging Server
Setting the hostname since this is brokerMaster
localhost.localdomain

*****
Are there more than one (1) ZeroNines Messaging
Servers installed (clustered messaging) ([y]/n)? y

Enter Hostname 1: msgsvr1
You entered: msgsvr1
is this entry correct ([y],n)? y

Are you finished with hosts entries (y,[n])? n
```


Once the master messaging server has been installed and configured, the system will prompt you to indicate whether there are other messaging servers. Type **y** to indicate that there will be other messaging servers within the configuration and you will begin to identify the additional messaging servers within the configuration, msgsvr1 through msgsvr3.



```
sandbox4@sandbox4:~/AAv7_1
File Edit View Search Terminal Help
*****
Are there more than one (1) ZeroNines Messaging
Servers installed (clustered messaging) ([y]/n)? y

Enter Hostname 1: msgsvr1
You entered: msgsvr1
is this entry correct ([y],n)? y

Are you finished with hosts entries (y,[n])? n

Enter Hostname 2: msgsvr2
You entered: msgsvr2
is this entry correct ([y],n)? y

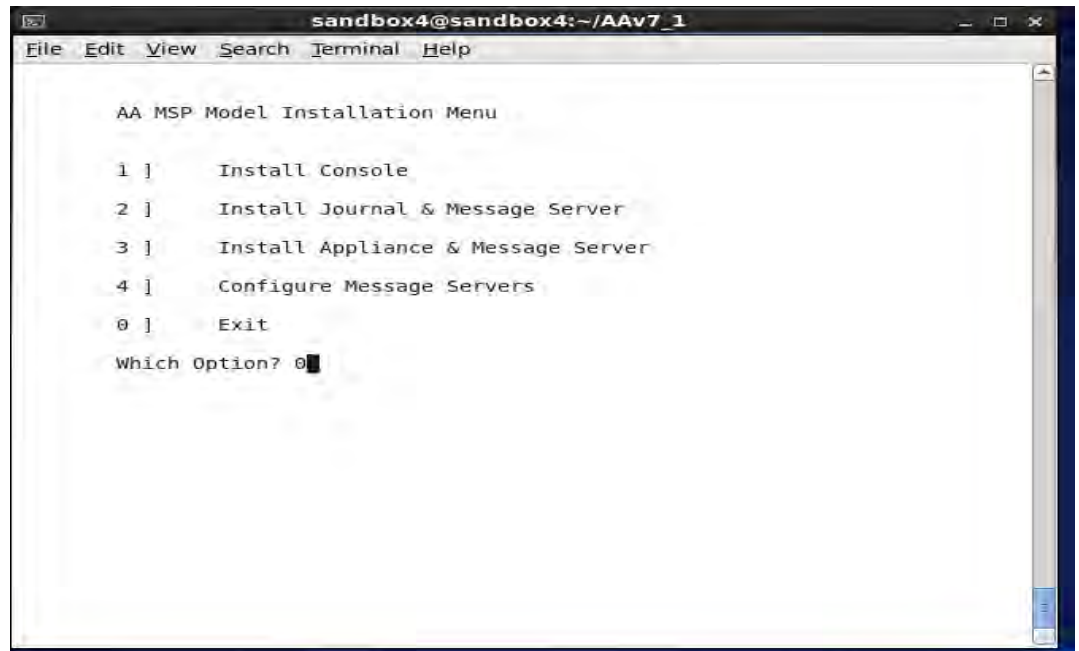
Are you finished with hosts entries (y,[n])? n

Enter Hostname 3: msgsvr3
You entered: msgsvr3
is this entry correct ([y],n)? y

Are you finished with hosts entries (y,[n])? y
The messaging server entries are:
java.naming.provider.url=failover:(tcp://msgsvr1:61616,tcp://msgsvr2:61616,tcp://
/msgsvr3:61616)?randomize=false
mq.username=system
mq.password=manager

Are these hosts entries correct (y,[n])? y
```

Subsequently, you should name and confirm any slave messaging servers (e.g. msgsvr2, msgsvr3, and so forth). Once all the messaging server entries are completed, you will be prompted to confirm the entries by typing **y**. Each messaging server name should appear in the “failover” entry line, which identifies the sequence in which the messaging servers will take over for each other in the event of a failure.



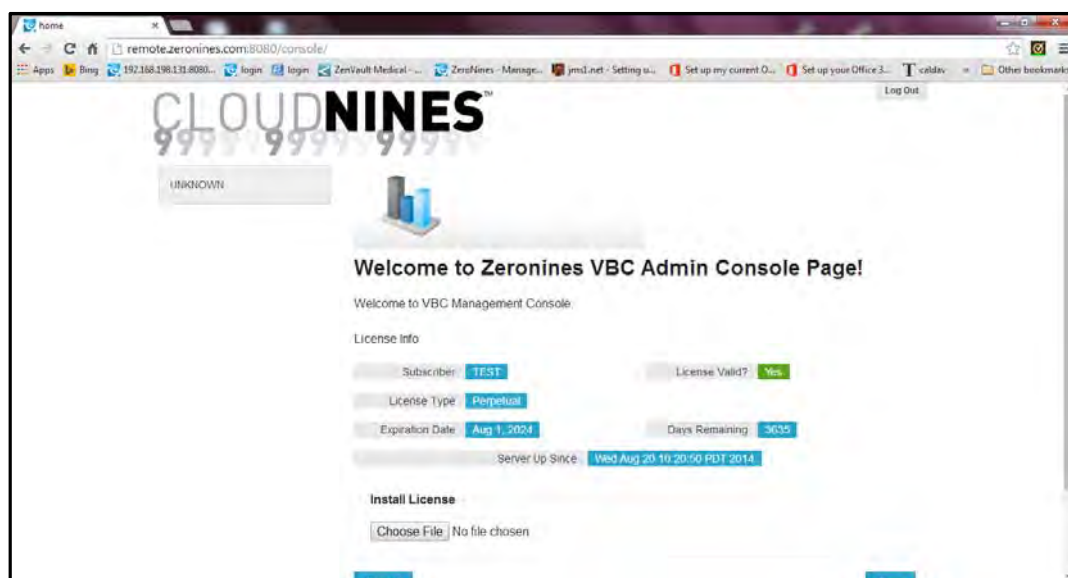
The screenshot shows a terminal window titled 'sandbox4@sandbox4:~/AAv7_1'. The window contains a menu titled 'AA MSP Model Installation Menu' with the following options:

```
1 | Install Console
2 | Install Journal & Message Server
3 | Install Appliance & Message Server
4 | Configure Message Servers
0 | Exit
```

Below the menu, the prompt 'Which Option?' is followed by the number '0' and a cursor, indicating that the user has selected the 'Exit' option.

At the completion of the messaging server entries you will be returned to the “AA MSP Model Installation Menu”. Here, type **0** to exit to the main menu where you will type **0** to exit and reboot the server sandbox4.

4.5.4 Confirming Journal and Messaging Server Installation – Sandbox4

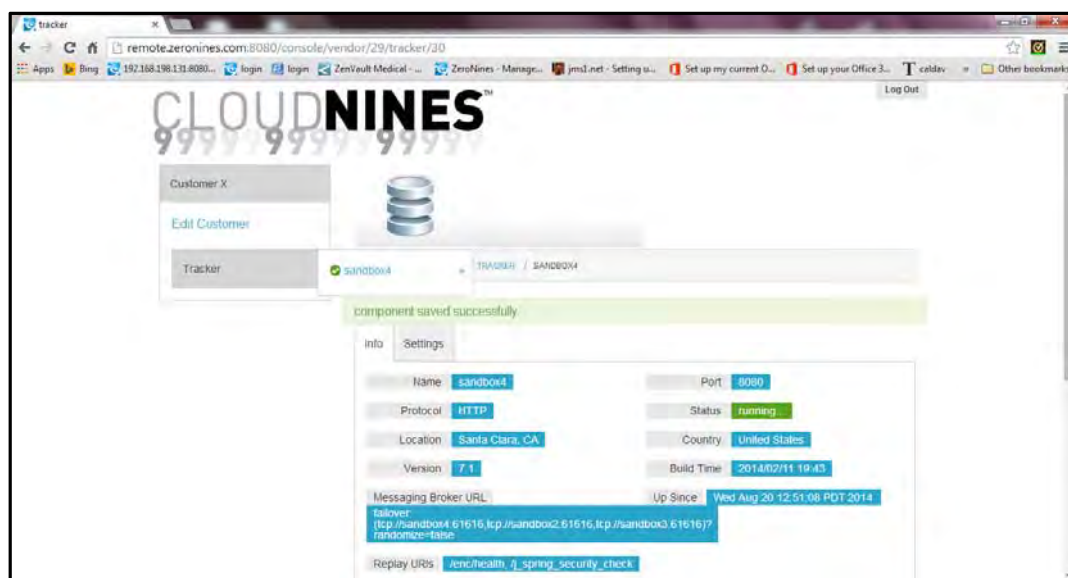


Once the journal server has been successfully installed, confirm the installation by logging in to the management console using the console address:

<http://192.168.77.160:8080/console>

The left navigation pane lists the customers/groups in your installation. In the example above, the group is displayed as “UNKNOWN” because no name has yet been provided for it.

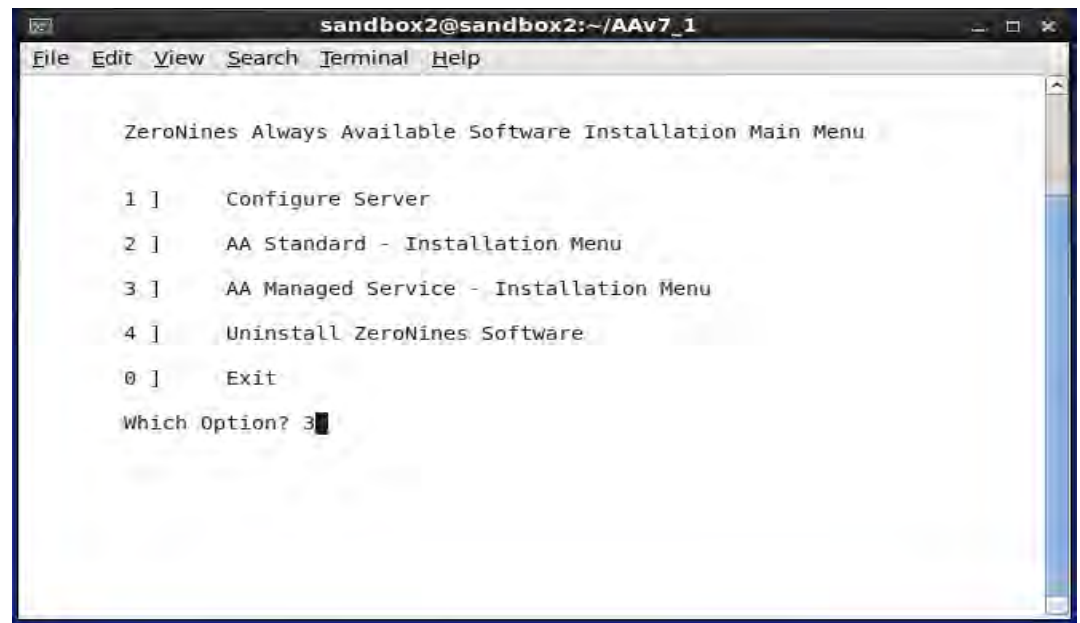
You can expand the groups displayed in the left navigation by double-clicking on them. Once expanded, they will display the components installed for each group, and the server name that runs each component along with a server status icon.



In the example above, the administrator has expanded the group “Customer X” and clicked on the tracker component. The server name that runs this component is “sandbox4”. The green checked icon indicates that the system is up and running. If the system were down, a red flag would be displayed.

4.5.5 Installing Appliance and Messaging Server – Sandbox2

Note: As a prerequisite to installing the appliance and messaging server on sandbox2 and sandbox3 the “Configure Server” steps must also be completed for these servers. If the host files for server sandbox2 have been loaded you may continue with the following steps to install appliance and messaging server software.



```
sandbox2@sandbox2:~/AAv7_1
File Edit View Search Terminal Help

ZeroNines Always Available Software Installation Main Menu

1 ]    Configure Server
2 ]    AA Standard - Installation Menu
3 ]    AA Managed Service - Installation Menu
4 ]    Uninstall ZeroNines Software
0 ]    Exit
Which Option? 3
```

At the Main Menu type **3** to enter the “AA Managed Service Installation Menu”.



```
sandbox2@sandbox2:~/AAv7_1
File Edit View Search Terminal Help

AA MSP Model Installation Menu

1 ]    Install Console
2 ]    Install Journal & Message Server
3 ]    Install Appliance & Message Server
4 ]    Configure Message Servers
0 ]    Exit
Which Option?
```

Type **3** to install the appliance and message server software.

```
sandbox2@sandbox2:~/AAv7_1
File Edit View Search Terminal Help
*****
* Installing basic ZeroNines components *
*****
64 bit Operating System Found
Preparing... ##### [100%]
package jre-1.7.0_25-fcs.x86_64 is already installed
ln: creating symbolic link '/etc/alternatives/java.1.gz': File exists
ln: creating symbolic link '/etc/alternatives/jre': File exists
ln: creating symbolic link '/etc/alternatives/jre_1.7.0': File exists
ln: creating symbolic link '/etc/alternatives/jre_exports': File exists
ln: creating symbolic link '/etc/alternatives/jre_openjdk': File exists

===== Installing Web Services =====

configure /root/extra
Install Z9 Config files
ZeroNines config folder exists
*****
DO YOU WANT TO INSTALL THE MESSAGING SERVER?
Install (y/[n])?
y
```

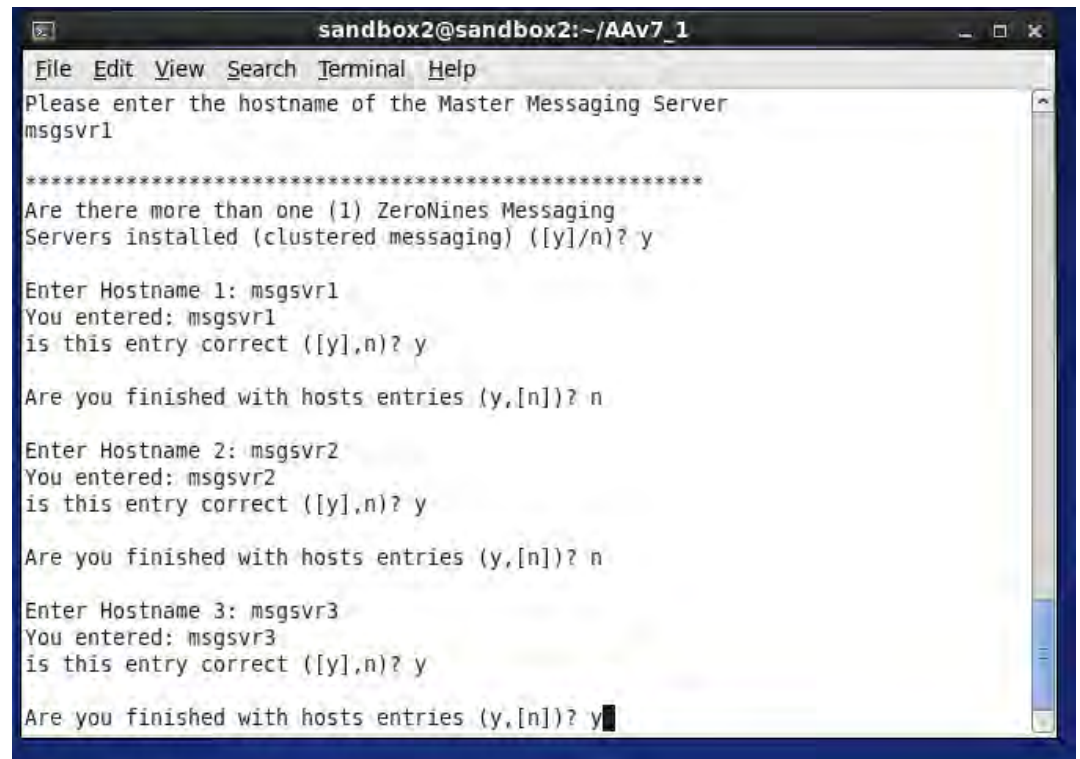
When asked if you want to install the messaging server type **y**

```
sandbox2@sandbox2:~/AAv7_1
File Edit View Search Terminal Help
ln: creating symbolic link '/etc/alternatives/java.1.gz': File exists
ln: creating symbolic link '/etc/alternatives/jre': File exists
ln: creating symbolic link '/etc/alternatives/jre_1.7.0': File exists
ln: creating symbolic link '/etc/alternatives/jre_exports': File exists
ln: creating symbolic link '/etc/alternatives/jre_openjdk': File exists

===== Installing Web Services =====

configure /root/extra
Install Z9 Config files
ZeroNines config folder exists
*****
DO YOU WANT TO INSTALL THE MESSAGING SERVER?
Install (y/[n])?
y
Installing Messaging Server
*****
IS THIS THE MASTER MESSAGING SERVER?
response--> (y/[n])?
n
Installing as a Slave Messaging Server: sandbox2
Setting the hostname since this is brokerSlave
Please enter the hostname of the Master Messaging Server
msgsvr1
```

When asked if this is the master messaging server type **n** (for no). When asked to enter the name of the master messaging server, type **msgsvr1**



```
sandbox2@sandbox2:~/AAv7_1
File Edit View Search Terminal Help
Please enter the hostname of the Master Messaging Server
msgsvr1

*****
Are there more than one (1) ZeroNines Messaging
Servers installed (clustered messaging) ([y]/n)? y

Enter Hostname 1: msgsvr1
You entered: msgsvr1
is this entry correct ([y],n)? y

Are you finished with hosts entries (y,[n])? n

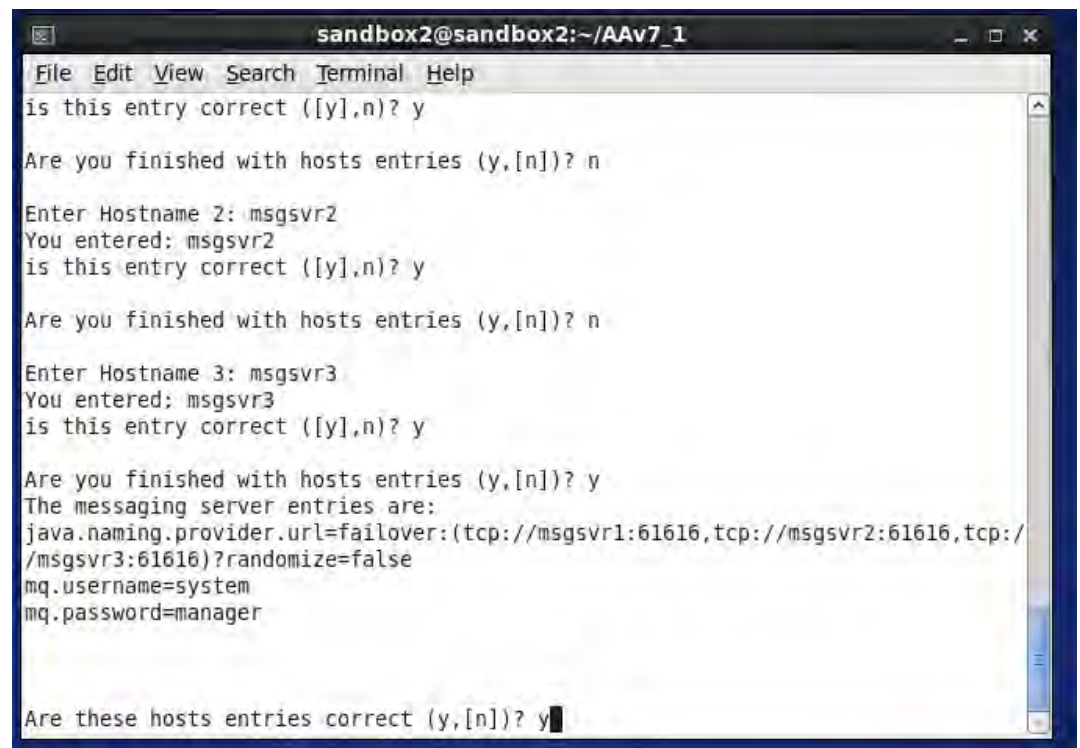
Enter Hostname 2: msgsvr2
You entered: msgsvr2
is this entry correct ([y],n)? y

Are you finished with hosts entries (y,[n])? n

Enter Hostname 3: msgsvr3
You entered: msgsvr3
is this entry correct ([y],n)? y

Are you finished with hosts entries (y,[n])? y
```

You will now provide the names of each of the messaging servers in your configuration. In our example the names are **msgsvr1**, **msgsvr2**, and **msgsvr3**. Once you have provided all entries, complete this step by typing **y**



```
sandbox2@sandbox2:~/AAv7_1
File Edit View Search Terminal Help
is this entry correct ([y],n)? y

Are you finished with hosts entries (y,[n])? n

Enter Hostname 2: msgsvr2
You entered: msgsvr2
is this entry correct ([y],n)? y

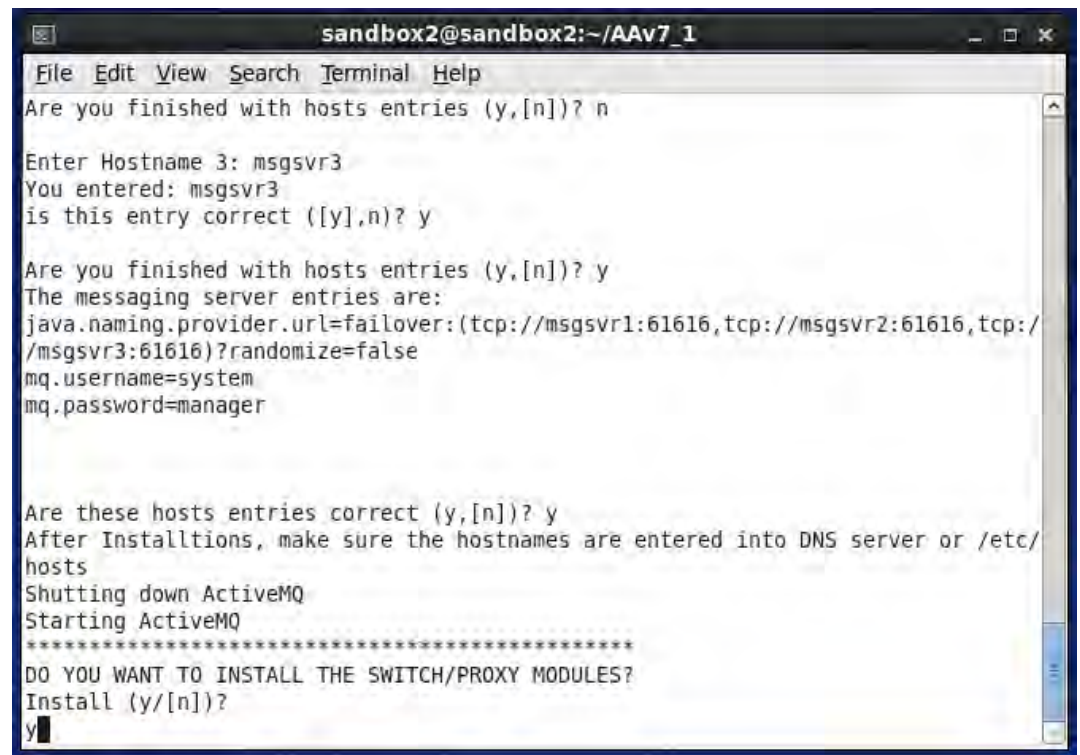
Are you finished with hosts entries (y,[n])? n

Enter Hostname 3: msgsvr3
You entered: msgsvr3
is this entry correct ([y],n)? y

Are you finished with hosts entries (y,[n])? y
The messaging server entries are:
java.naming.provider.url=failover:(tcp://msgsvr1:61616,tcp://msgsvr2:61616,tcp://msgsvr3:61616)?randomize=false
mq.username=system
mq.password=manager

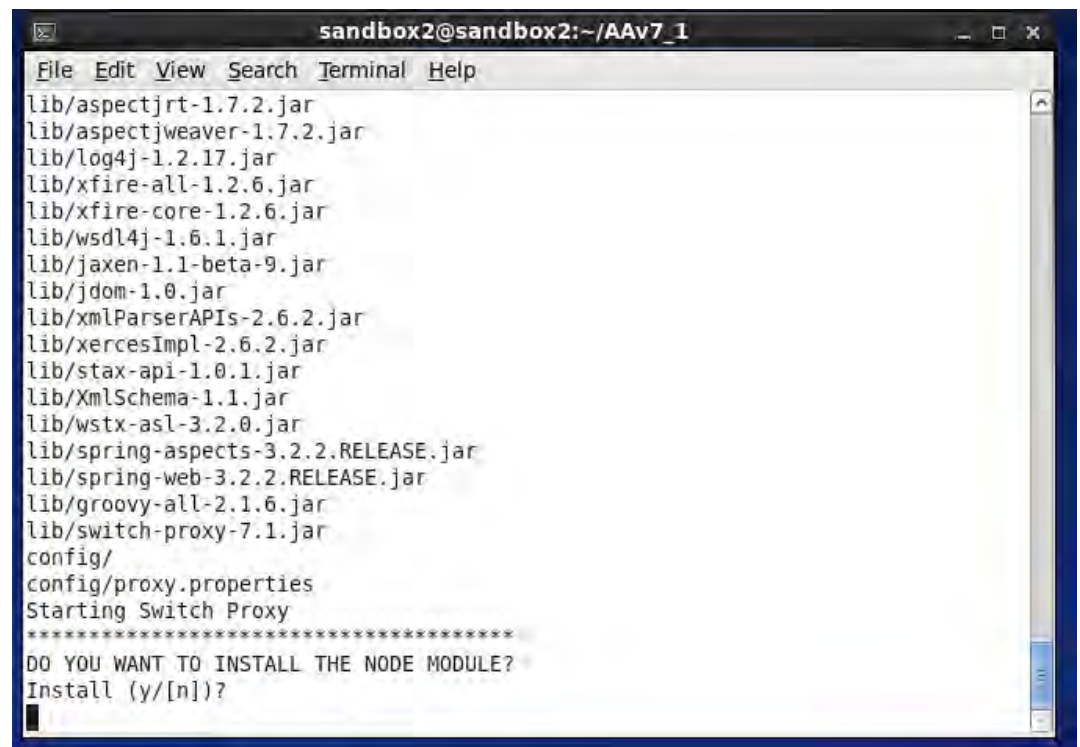
Are these hosts entries correct (y,[n])? y
```

You are then asked if the entries are correct. If they are correct, type **y**



```
sandbox2@sandbox2:~/AAv7_1
File Edit View Search Terminal Help
Are you finished with hosts entries (y,[n])? n
Enter Hostname 3: msgsvr3
You entered: msgsvr3
is this entry correct ([y],n)? y
Are you finished with hosts entries (y,[n])? y
The messaging server entries are:
java.naming.provider.url=failover:(tcp://msgsvr1:61616,tcp://msgsvr2:61616,tcp://msgsvr3:61616)?randomize=false
mq.username=system
mq.password=manager
Are these hosts entries correct (y,[n])? y
After Installtions, make sure the hostnames are entered into DNS server or /etc/hosts
Shutting down ActiveMQ
Starting ActiveMQ
*****
DO YOU WANT TO INSTALL THE SWITCH/PROXY MODULES?
Install (y/[n])?
y
```

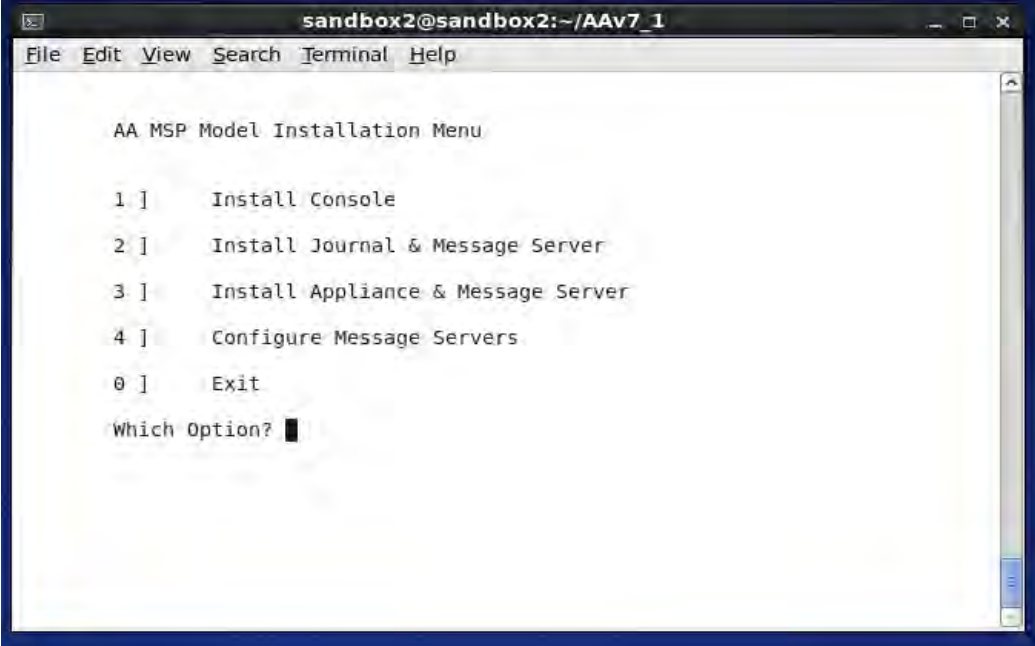
You are now asked to install the switch/proxy modules. Type **y** to initiate the load.



```
sandbox2@sandbox2:~/AAv7_1
File Edit View Search Terminal Help
lib/aspectjrt-1.7.2.jar
lib/aspectjweaver-1.7.2.jar
lib/log4j-1.2.17.jar
lib/xfire-all-1.2.6.jar
lib/xfire-core-1.2.6.jar
lib/wsdl4j-1.6.1.jar
lib/jaxen-1.1-beta-9.jar
lib/jdom-1.0.jar
lib/xmlParserAPIs-2.6.2.jar
lib/xercesImpl-2.6.2.jar
lib/stax-api-1.0.1.jar
lib/XmlSchema-1.1.jar
lib/wstx-asl-3.2.0.jar
lib/spring-aspects-3.2.2.RELEASE.jar
lib/spring-web-3.2.2.RELEASE.jar
lib/groovy-all-2.1.6.jar
lib/switch-proxy-7.1.jar
config/
config/proxy.properties
Starting Switch Proxy
*****
DO YOU WANT TO INSTALL THE NODE MODULE?
Install (y/[n])?

```

With the switch/proxy module completed you are asked to install the node module. Type **y** to load the node module.




```
sandbox2@sandbox2:~/AAv7_1
File Edit View Search Terminal Help

AA MSP Model Installation Menu

1 | Install Console
2 | Install Journal & Message Server
3 | Install Appliance & Message Server
4 | Configure Message Servers
0 | Exit
Which Option? █
```

Once the node module has loaded you are returned to the “AA MSP Model Installation Menu”. Type **0** to exit to the main menu.



```
sandbox2@sandbox2:~/AAv7_1
File Edit View Search Terminal Help

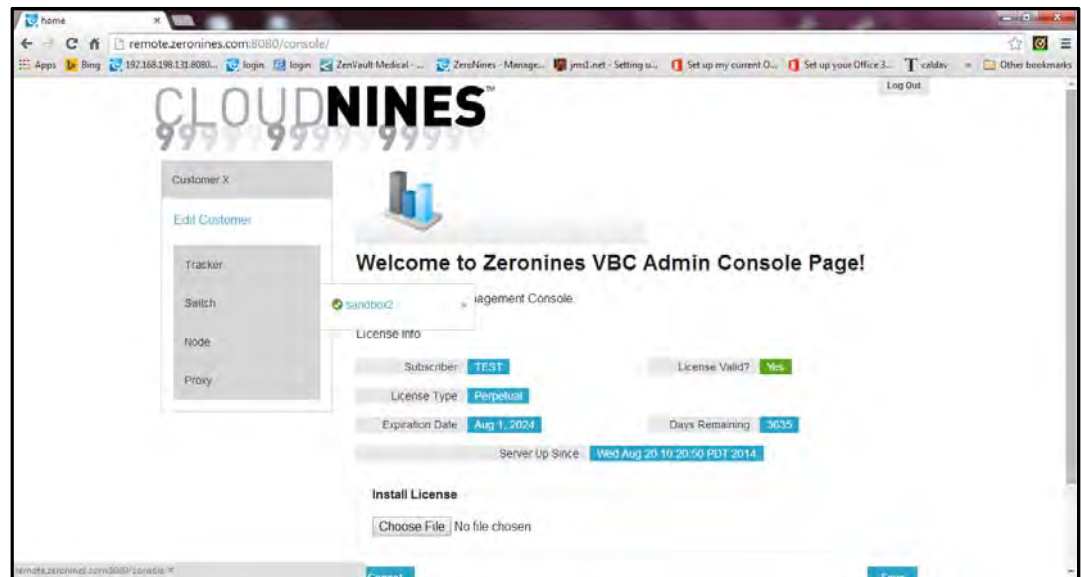
ZeroNines Always Available Software Installation Main Menu

1 | Configure Server
2 | AA Standard - Installation Menu
3 | AA Managed Service - Installation Menu
4 | Uninstall ZeroNines Software
0 | Exit
Which Option? 0
If changes were made to this system, it is recommended
to reboot the system. Would you like to reboot your
system now (y/[n])?
y█
```

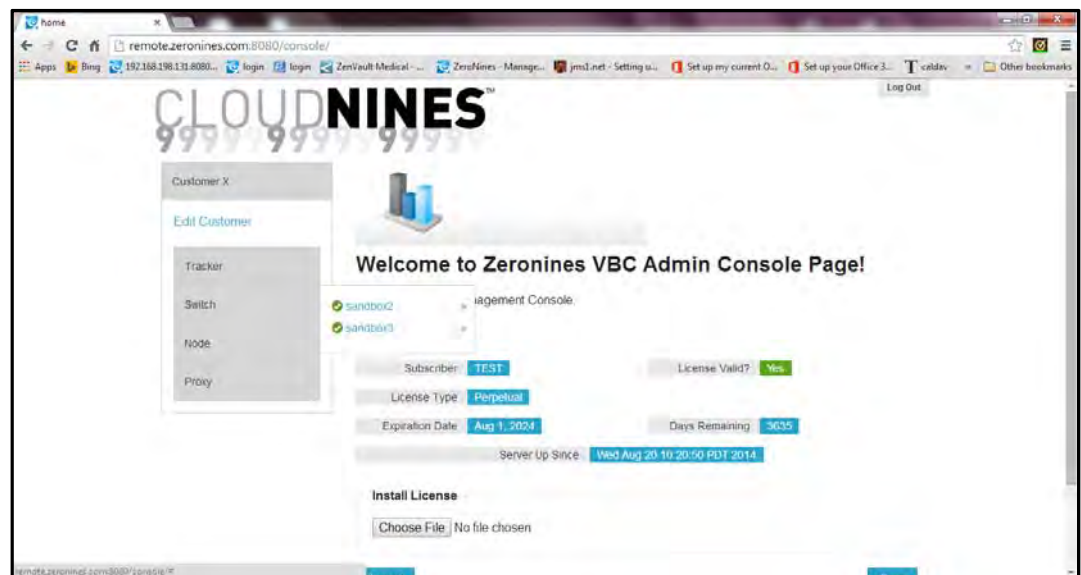
Now type **0** to exit the main menu. Type **y** to re-boot server sandbox2. This completes the configuration of sandbox2.

Repeat the steps described in Section 4.5.5 to configure the server sandbox3. With the successful configuration of sandbox3 you will have completed the installation of the Always Available multi-tenant/multi-application “MSP” model.

4.5.6 Confirming Appliance and Messaging Server Installation

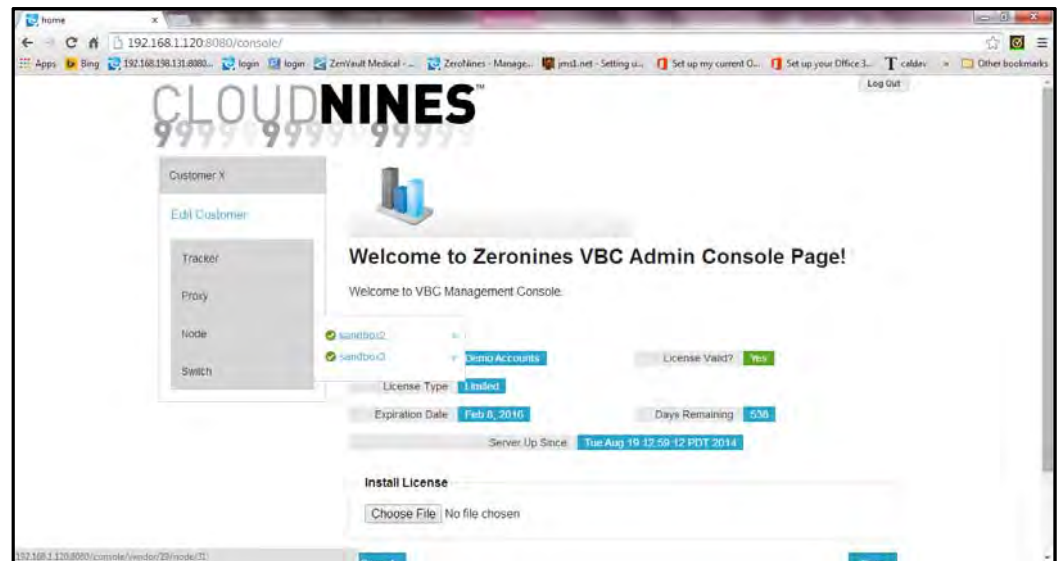


You can confirm the successful installation of the appliance and messaging server by logging in to the management console. The new appliance components will be displayed in the client/application group listing (proxy, switch, and node) as "sandbox2".



Once the administrator completes the installation of a second switch/node appliance, the management console will reflect a successful installation by displaying the names of the hosts that have the switch, node and proxy modules running. In this example, they are "sandbox2" and "sandbox3".

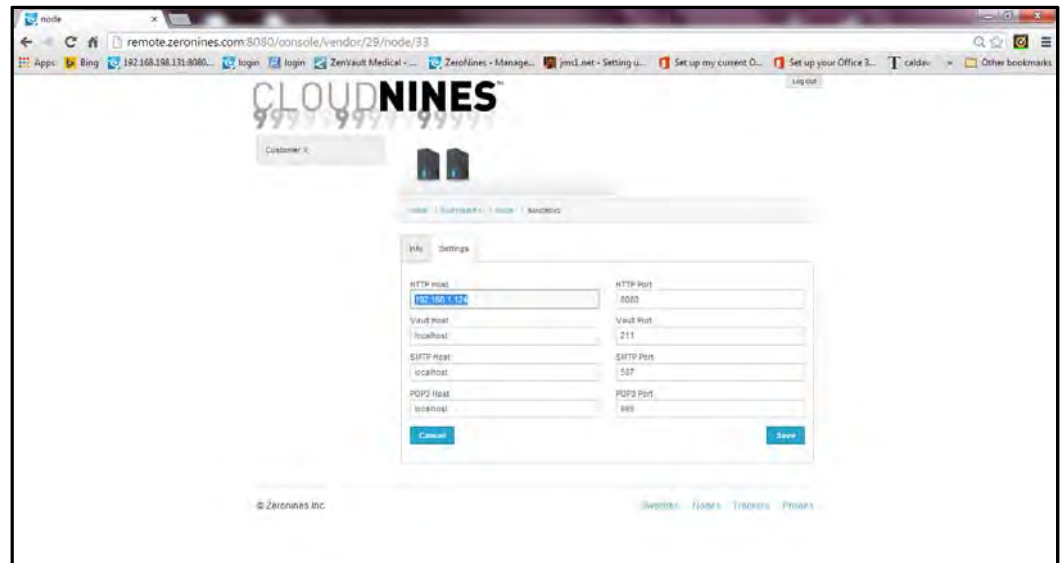
4.6 Configuring Appliance to Communicate with Application Server



Once the administrator has logged into the server, click on the **Node** button on the left, and then click on either the **sandbox2** or **sandbox3** servers that appear in the pop-up box. In this example, the administrator has selected 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 application server, enter the server name or IP address for the application server.



By selecting the “Settings” tab, you 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, you may 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”.



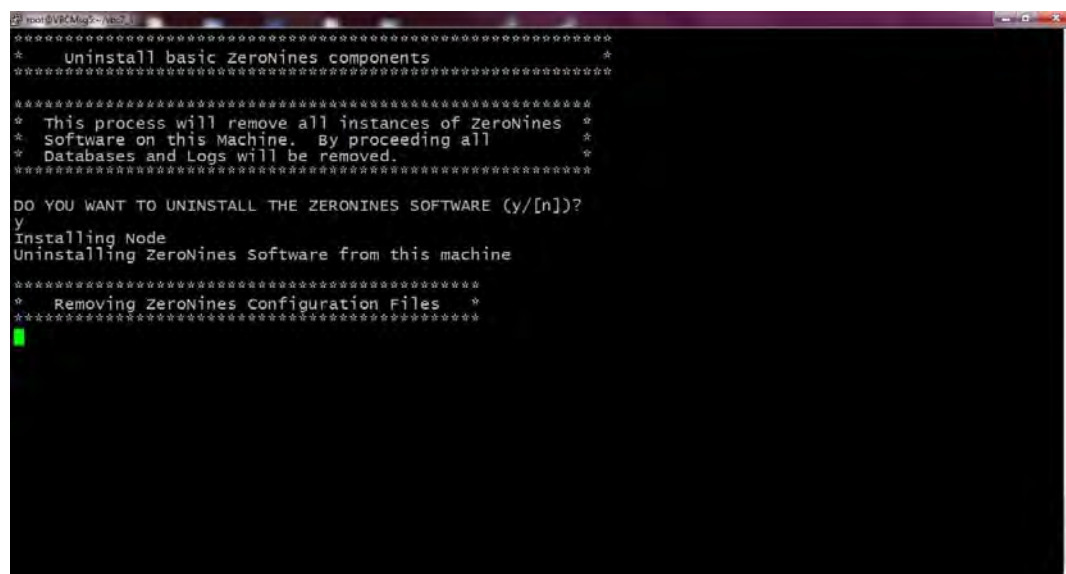
You should then perform the same process to configure the second node (sandbox3) to communicate with the second application server. In our example, the second application server is identified by IP address [192.168.1.125](#) and port [8080](#)

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.

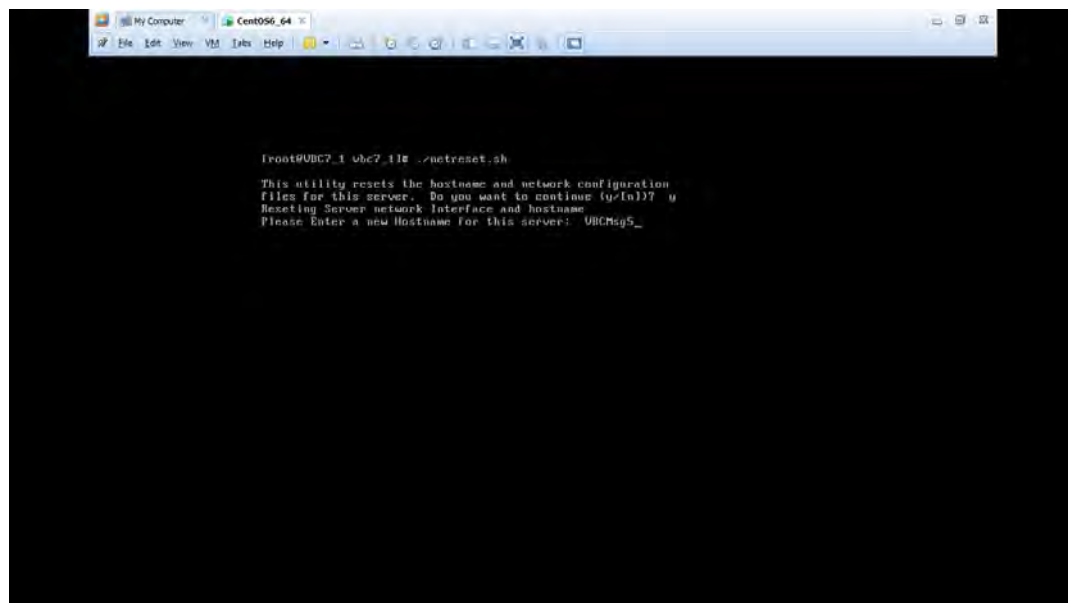


```
root@VPC-Mag2 ~ /bin/1
*****
*      Uninstall basic ZeroNines components      *
*****
* This process will remove all instances of ZeroNines *
* Software on this Machine. By proceeding all *
* Databases and Logs will be removed. *
*****
DO YOU WANT TO UNINSTALL THE ZERONINES SOFTWARE (y/[n])?
y
Installing Node
Uninstalling ZeroNines Software from this machine
*****
* Removing ZeroNines Configuration Files *
*****
```

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

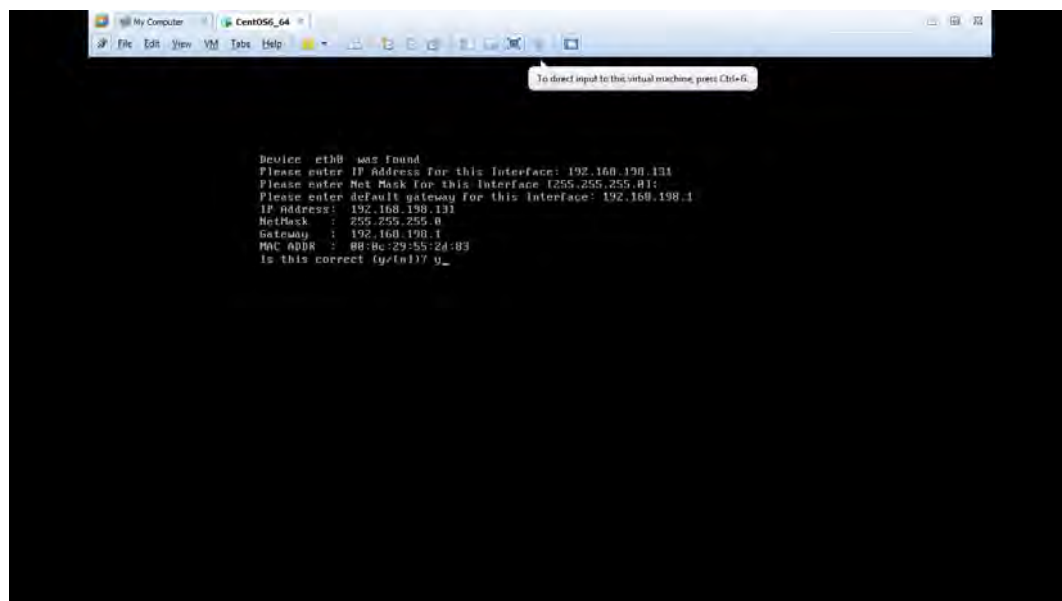
ZeroNines has provided administrators with a utility that will rename the server and reset the network configuration files. When administrators import OVA/OVF virtual server templates into a virtual server or when they clone a virtual machine, the original hostname and network information is also imported 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.

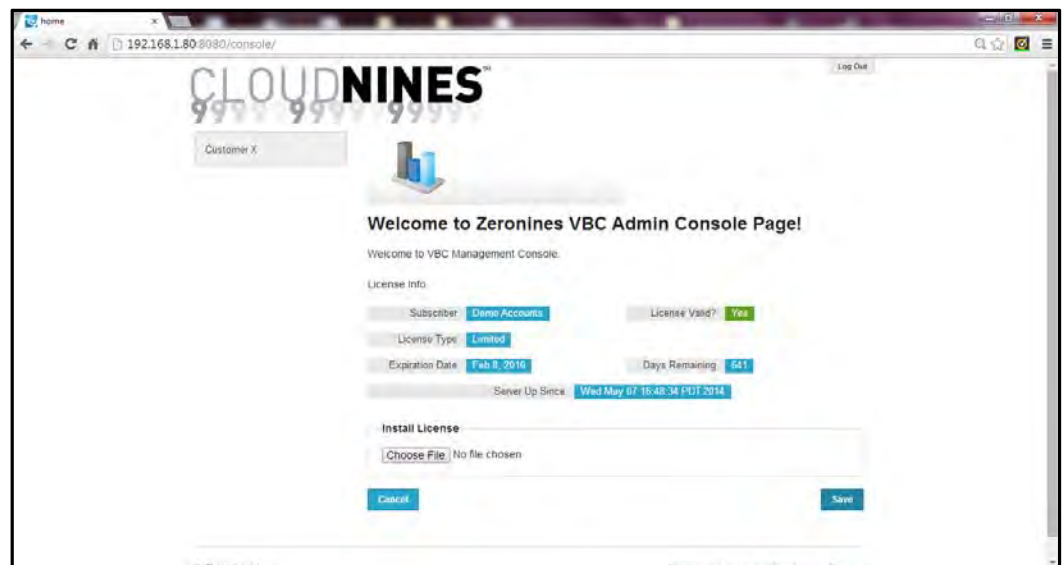
5.2 Configuring the Network

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.

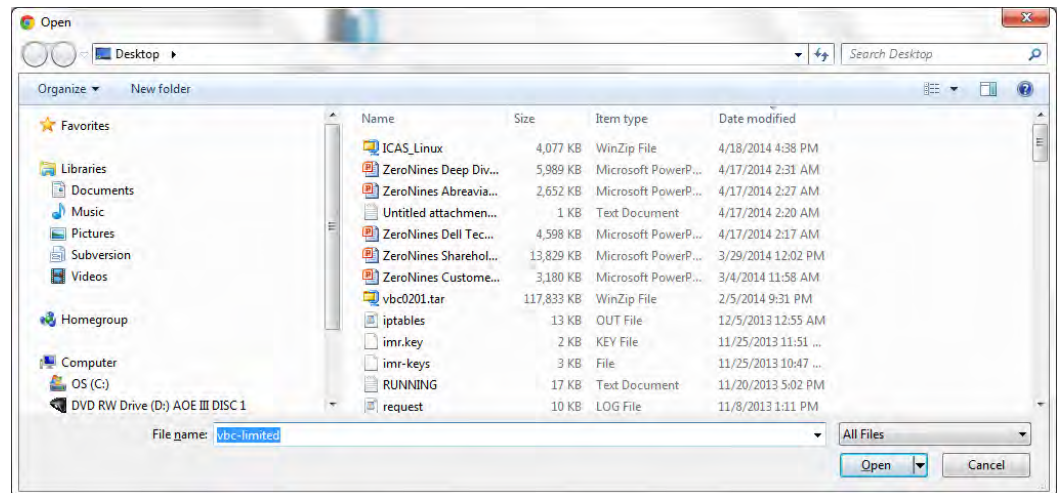
5.3 Licensing File Installation

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.

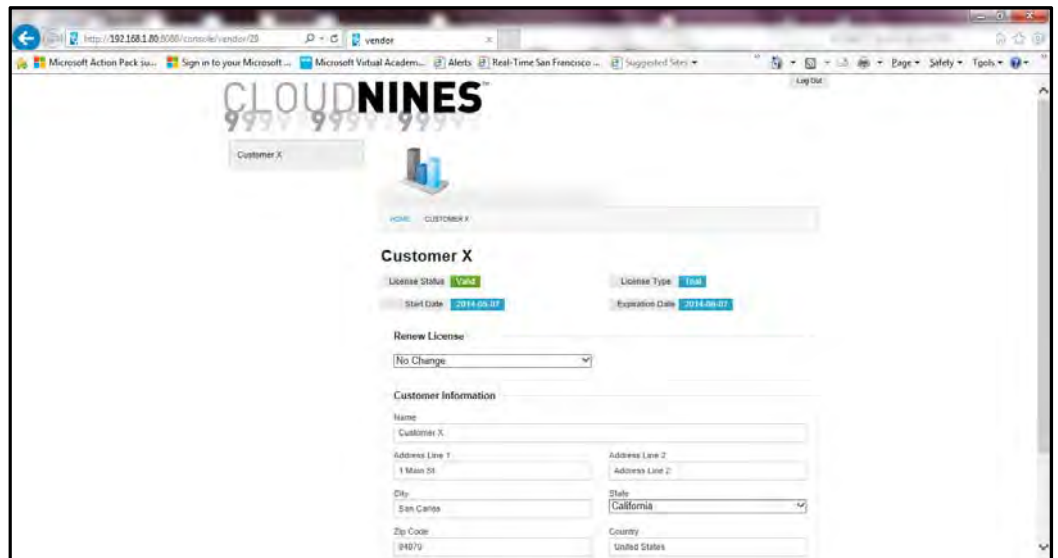


First, you must obtain the license file from ZeroNines. This may be available as a download from a self-help website, or you may receive it via email. If you do not know how to obtain a license file, request it from support@zeronines.com.

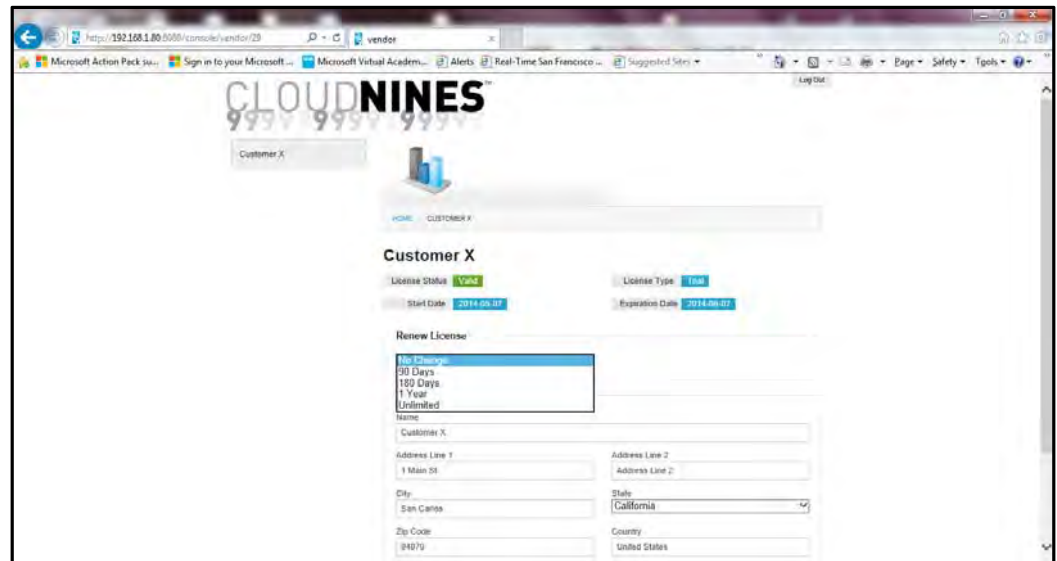
Once you have logged in to the console, the ZeroNines license file can be installed. From the main console page, within the “Install License” dialog box, select the “Choose File” button.



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.



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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