Oracle® Communications Platform

TPD Initial Product Manufacture

Software Installation Procedure

Release 6.7.2+

E53017 Revision 5

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Oracle Communications TPD Initial Product Manufacture, Release 6.7.2+

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Important Notices

CAUTION: Use only the procedure downloaded from Oracle Technology Network (OTN) (http://www.oracle.com/technetwork/indexes/documentation/oracle-comms-tekelec-2136003.html).

Before upgrading your system, access **My Oracle Support** web portal (**https://support.oracle.com**) and review any Alerts that may be related to the System Health Check or the Upgrade.

Before beginning this procedure, contact Oracle Support to inform them of your upgrade plans.

1 Introduction

1.1 Purpose and Scope

This document details the procedure for installing the Operating System on Oracle approved hardware. The intended audiences for this document are the Oracle manufacturing engineers who will work with manufacturing technicians to build the systems. It will also be useful to test and development engineers who need to rebuild systems in the lab. Customer Access Support staff may also benefit from the information contained within this document. The Initial Product Manufacture (IPM) will be used for all Oracle approved hardware at Oracle manufacturing and Lab facilities.

This document applies to various TPD releases, starting with TPD 6.7.2. Since the output may vary slightly across versions of TPD, the figures should be used as a sample of the output to expect and not as exact text.

The following items are considered out of the scope of this document:

- Application Server unpacking
- Application Server assembly
- Application Server diagnostics and acceptance testing
- Application Server application install/upgrade
- Application Server platform upgrade
- Specific part/configuration information for the terminal device (or equivalent) and null modem serial cable used to initiate and monitor the IPM process
- Use of a VGA monitor and PC keyboard to initiate and monitor the IPM process
- Use of the Platform Management and Configuration (PM&C) Application to initiate and monitor the IPM process.

1.2 My Oracle Support

Web portal (preferred option): My Oracle Support (MOS) at https://support.oracle.com/

Phone: +1.800.223.1711 (toll-free in the US),

Or retrieve your local hotline from Oracle Support Contacts Global Directory at http://www.oracle.com/support/contact.html

Make the following selections on the Support telephone menu:

Select **2** for New Service Request

Then select **3** for Hardware, Networking, and Solaris Operating System Support

Then either

- select **1** for **Technical Issues**,
  When talking to the agent, please indicate that you are an existing Tekelec customer.

  Note: Oracle support personnel performing installations or upgrades on a customer site must obtain the customer Support Identification (SI) number prior to seeking assistance.
  OR
- select **2** for **Non-Technical Issues**, for example, for My Oracle Support (MOS) registration.
  When talking to the agent, mention that you are a Tekelec Customer new to MOS.

1.3 References

[1] http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00729544/c00729544.pdf

[2] Oracle Integrated Lights Out Manager (ILOM) 3.1 Quick Start Guide, E24524-06, Feb 2014

[3] Netra Server X5-2 Documentation Library: http://docs.oracle.com/cd/E53596_01

1.4 Glossary

This section lists terms and acronyms specific to this document.

Table 1. Glossary

Acronym/Term	Definition
BIOS	Basic Input Output System
c-Class	HP marketing term for their enterprise blade server platform
CD	Compact Disk
DVD	Digital Versatile Disc
E5-APP-B	E5 Application Server B
GRUB	Grand Unified Bootloader
iLO	HP Integrated Lights-Out
ILOM	Oracle Integrated Lights Out Manager
IPM	Initial Product Manufacture – the process of installing TPD on a hardware platform
IPM Media Kit	The IPM media kit is distributed as a DVD or USB. The type of media used depends on the hardware configuration as some configurations do not come with DVD drives.
KVM	Kernel-based Virtual Machine
MBR	Master Boot Record
OS	Operating System (e.g. TPD)
PM&C	Platform Management & Configuration
RMS	Rack Mount Server
TPD	Tekelec Platform Distribution
USB	Universal Serial Bus
VSP	Virtual Serial Port

2 Pre-Installation Setup

2.1 Installation Prerequisites

The following items are required in order to IPM a server:

- A properly assembled server.
- Appropriate IPM Media Kit
- A terminal device (or equivalent) and null modem serial cable to initiate and monitor the IPM process.

  HP rack mount servers and Oracle rack mount servers require a VGA display and USB keyboard for BIOS management, as well as an iLO/ILOM network connection with web-browser-equipped workstation for loading TPD.

Note: A VGA monitor and keyboard are viable for alternative access on the rack mount servers to execute the IPM process.

Note: The ILOM Remote Console Redirection only works with the 32-bit version of Java.

Note: Do not connect to the Oracle ILOM serial console during IPM. This can cause issues during post IPM when configuring BIOS/ILOM settings. Best case, you will be kicked out of the console when this configuration is being done. Worst case this will cause the BIOS/ILOM configuration to fail causing IPM to fail**.**

In general, ANSI standard terminal emulations are supported. As of this writing, the following terminal emulations are known to work: ANSI BBS, VT-52, VT-100, VT-102, VT-220, and VT-320. Console port settings for the E5-App-B are configured as specified below.

System	Baud Rate	Data Bits	Parity	Stop Bits	Flow Control
E5-APP-B	115200	8	None	1	None

Note:

1. Default password(s) will be changed by the manufacturing process –or– will be disclosed to customer with recommendation to change. Standard UNIX commands are used to change user passwords.
2. To login as root, contact Oracle Support.

2.2 System Configuration

Assemble and configure the system as appropriate and documented in the applicable application installation setup guides.

2.3 Network Connections

Optionally a connection to the iLO/ILOM depending on the hardware type listed in Table 2.

2.4 Console Connections

A connection to the console is required to initiate and monitor the progress of the IPM installation. The location and type of the connection varies by system:

Table 2: Console port connections

System	Port type	Port location
E5-APP-B	RJ45 – Serial	Back of unit
HP Blade Servers	iLO VGA or virtual serial	Accessed via network
HP Rack Mount Servers	iLO VGA or virtual serial	Accessed via network
Oracle Rack Mount Servers	ILOM VGA or virtual serial	Accessed via network

2.5 Verify System Health before the first IPM

1. Verify the server console port is setup correctly. Refer to Table 2 for the type and location of the console port.
2. Power on the terminal device (if necessary) and establish a connection to the server console port.
3. Power on the server using the following instructions:

Table 3: Power-on instructions

System	Instructions
E5-APP-B	Insert the blade server into a configured and powered EAGLE shelf. Ensure that both hard disk latches and the eject latch are in the locked position (the word LOCKED is shown on the latch).
HP Rack Mount Servers	Attach power cables to both power inputs. If the power LED in the middle of the power button on the front of the server is not illuminated green press the power button.
Oracle Rack Mount Servers	Attach power cables to both power inputs. While the Service Processor is booting the tiny LED by the "SP" label will flash. Once that becomes steady green and the LED by the "OK" label does a slow blink press the power button. The "OK" LED will blink faster when the server is booting.
Blade Servers	Insert the blade server into a configured and powered enclosure. Press the power button on the front of the blade if the power LED in the middle of the power button is not illuminated green.

2.6 Time Estimates

Table 4: Time Estimates for IPM in Minutes

	Phase	Setup	Media Check	OS CD/DVD	Initial Reboot	Syscheck
	Activity	**Cable and Power up**	**Optional step to check media**	**IPM Install of OS**	**OS Boot**	**System health check**
TPD	This Step	5	5	15	15	2
	Cumulative	5	10	25	40	42

Table 4: Time Estimates for IPM in Minutes

	Phase	Setup	Media Check	OS CD/DVD	Initial Reboot	Syscheck
	Activity	**Cable and Power up**	**Optional step to check media**	**IPM Install of OS**	**OS Boot**	**System health check**
TPD scrub 3 146 GB Disks	This Step	5	5	60	4	1
	Cumulative	5	10	70	74	75
TPDnoraid scrub diskconfig=HPHW 2 300 GB Disks	This Step	5	5	90	6	1
	Cumulative	5	10	100	106	107
TPDnoraid X4-2 with 2 300GB Disks using USB	This Step	5	N/A	10	6	1
	Cumulative	5	5	15	21	22

Note: The above times are estimates and will vary depending on the release of TPD being installed as some versions have more RPMs than others, the speed of the drives being installed onto, and the IPM media used, like USB, CD/DVD, or virtual media. Virtual media has other factors that will cause the time to vary, like network latency. If you need a better estimate of time for your specific installation, you will need to recreate your exact scenario.

3 Software Installation and Validation Procedures

3.1 Setting Server's CMOS clock

The date and time in the server's CMOS clock must be set accurately before running the IPM procedure. There are a number of different ways to set the server's CMOS clock. The following method requires the least number of external resources. See Appendix C for other alternatives.

Note: The IPM installation process managed by PM&C for blade servers automatically sets the server's CMOS clock, so there is no need to set the server CMOS clock when using PM&C.

3.2 Setting the CMOS clock and other BIOS parameters from the BIOS setup screen

Setting the clock and other BIOS parameters from the BIOS setup screen does not require TPD to be installed.

1. A few seconds after the server is powered on, as soon as you see the first bit of output on the screen, press the respective key three (3) times to access the BIOS setup screen.
   - On HP servers using a VGA display and USB keyboard, use the F9 key
   - On Oracle servers using a VGA display and USB keyboard, use the F2 key

     On E5-App-B servers using the serial console, use the F4 key.

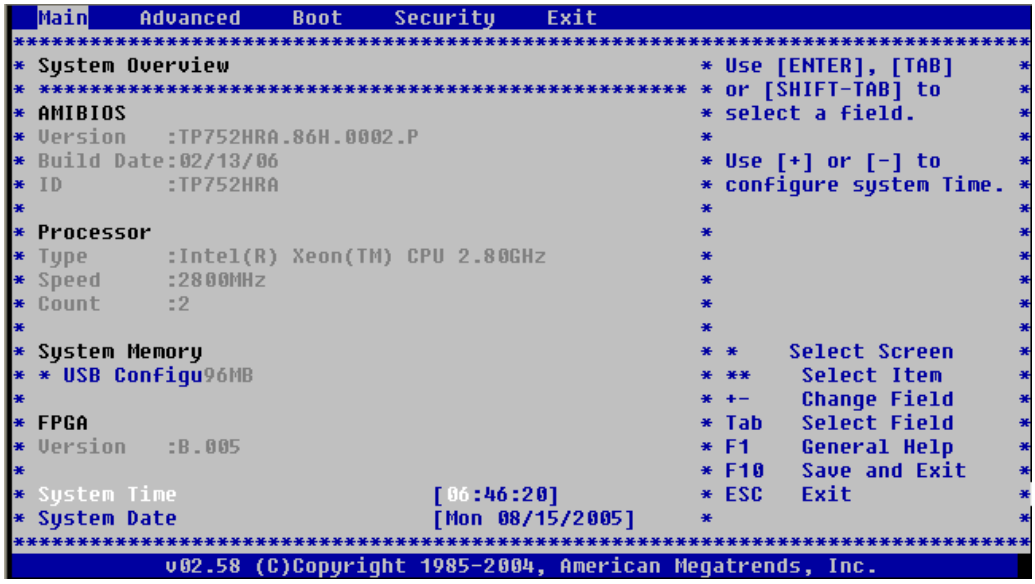

Figure 1 Example Main BIOS Screen

2. Set the server date and time to GMT (Greenwich Mean Time).
3. Check for specific application BIOS settings and apply those. See Appendix E for TPD required settings for your respective server type. If there are no settings listed in the Appendix for your server type, then no changes (from the default) are needed.

   Note: The boot order must be changed on E5-App-B servers as specified in Appendix E.3 in order to IPM the system!
4. If the server is an Oracle server, scroll to the exit screen using the arrow keys.
5. Exit from the BIOS screen, saving changes.

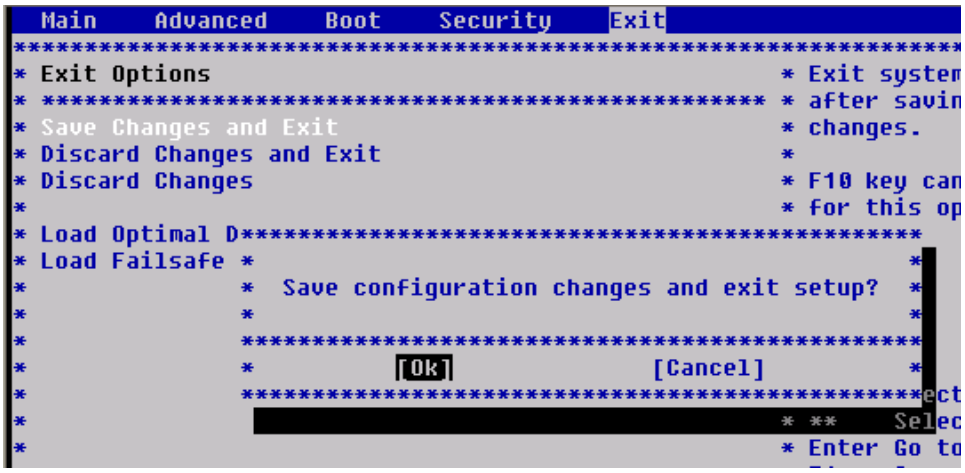

Figure 2 Example Exit BIOS Screen

3.3 OS IPM Install

The IPM installation media must now be inserted into the system. Installation will then begin by resetting (or power cycling) the system so that the BIOS can find and then boot from the IPM installation media. The reboot steps are different for the different rack mount servers.

Note: Do not remove power from the E5-App-B servers as this will reset the BIOS to factory settings. Follow the steps specified in Appendix E.3 in order to IPM the system!

Note: On all supported rack mount servers, this procedure can be accomplished by either configuring an IP address on the iLO/ILOM and accessing the console using the iLO/ILOM, or the VGA monitor and keyboard. The remote media function of the iLO/ILOM can also be used to provide access to the installation media. See Appendix F for instructions on configuring the iLO/ILOM.

3.3.1 Rack mount servers – Boot from CD/DVD/USB

1. Insert the OS IPM media (CD/DVD or USB) into the CD/DVD tray/USB slot of the Application Server.
2. Power cycle the server:
   - For HP rack mount servers, hold the power button in until the button turns amber, then release. Wait 5 seconds, then press the power button and release it again to power on the system.
   - For Oracle rack mount servers, hold the power button in until the "OK" LED turns off, and starts a slow blink. Wait 5 seconds and press the power button and release it again to power on the system. In a second or 2 the "OK" LED will start to blink faster as the system powers up.
3. For some servers you must select a boot method so that the server does not boot directly to the hard drive.
   - For HP rack mount servers, hit F11 when prompted to bring up the boot menu and select the appropriate boot method.
   - For Oracle rack mount servers, hit F8 when prompted to bring up the Boot Pop Up Menu then select the appropriate boot method.
4. Proceed to steps in Section 3.4.

3.4 IPM Command line procedures

1. Figure 3 Example boot from media screen, TPD 7.0.0.0.0 is a sample output screen indicating the initial boot from the install media was successful. The information in this screen output is representative of TPD 7.0.0.0.0.

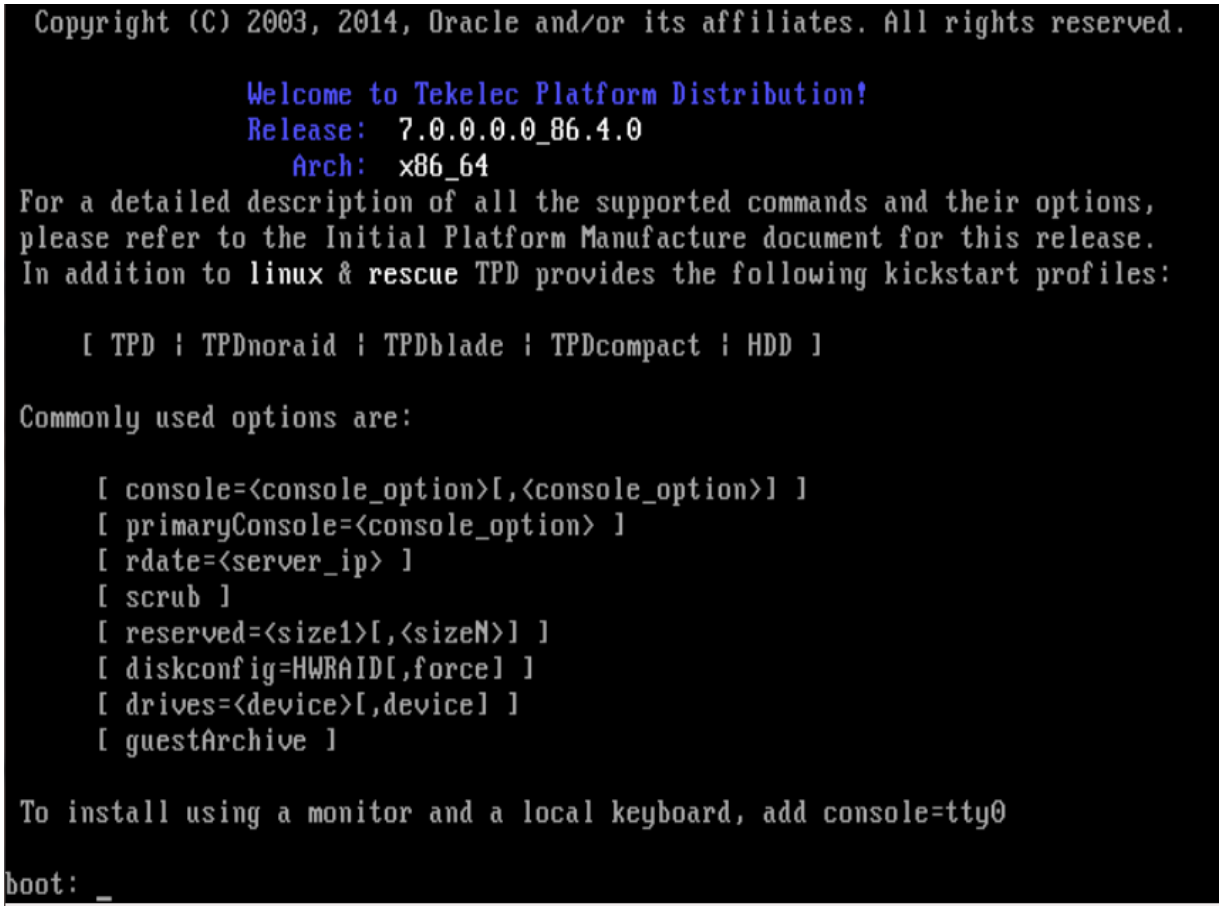

Figure 3 Example boot from media screen, TPD 7.0.0.0.0

2. Optional Step: If media has not been previously verified, perform a media check now; refer to Appendix B, "Media Check".
3. The command to start the installation is dependent upon several factors, including the type of system, knowledge of whether an application has previously been installed or a prior IPM install failed, and what application will be installed.

   Note: Text case is important, and the entries must be typed exactly as listed.

   If installing on a server that has never had an application installed (a "fresh install"), start the IPM process by entering the **TPD** command at the boot prompt. There are other boot targets and options available as well. The following is a description of the alternative boot targets:

   - TPD – To install with software RAID. The number of software RAID enabled partitions will vary depending on the TPD release.
   - TPDnoraid – To install on first device found. Creates a /boot partition and five logical volumes. Very useful for machines that do not require software RAID because they already include hardware RAID. This target is appropriate for servers using hardware RAID setup instead of software.
   - TPDlvm – To install with logical volumes on top of a software RAID. This is like the TPD option but instead of partitions, logical volumes are used like in the TPDnoraid setup. This is useful for machines that do not have a

hardware RAID but want to have the benefit of having OS filesystems on logical volumes for use of features such as LVM backouts, snapshots, etc. This option was added in TPD 7.0.2.0.0-86.28.

- TPDcompact – To install using the minimum disk space. Create a boot partition and a / (root) partition. This target is not intended for production use.
- TPDblade – To install to one disk with blade partition config. Create a /boot partition and five logical volumes. This target is similar to TPDnoraid but some platform partitions are smaller.
- rescue – To enable rescue mode.
- HDD – This option allows you to boot to the default hard drive after booting from IPM media. This is used when the server has been rebooted while IPM media was left in the DVD/CD-ROM drive.

If the server has had an application installed (and is not a "fresh install"), if its state is not known, or if recovering from a failed installation, start the IPM process by including the **scrub** option with your IPM command. Warning: Make sure you understand the behavior of the "scrub" option (as described in paragraph D.3 on page 40) before using it.

Some applications require disk space to be set aside for use other than being part of the vgroot LVM volume group. See the installation documentation for the application to determine if this is needed and if so, how much space needs to be reserved. The **reserved** option provides this ability to set aside one or more partitions. For more information on the option, see Section D.1.

When installing to a server with more than one drive, it may be desired to limit the TPD installation to a subset of the drives. For example, it may be desired to perform a **TPDnoraid** installation to a drive other than the first. If this special handling is desired, use the **drives** option to specify the device names to which TPD should be installed. In this configuration one will most likely need to specify the parameter(s) to the **drives** option as the specific logical drive(s) for the internal RAID. For more information on the option, see Section D.2.

TPD supports automatically reconfiguring the disk drives so the TPD installation can use hardware mirroring (RAID 1). . This command will reconfigure the onboard RAID controller to support hardware mirroring if passed with the **force** option. Any data on any disk drive managed by the onboard RAID controller may be lost during this reconfiguration, however, no data will be lost if the disks are already in the desired configuration.

When IPMing supported hardware, the correct **diskconfig** option is appended to the IPM command, without the **force** option, if no **diskconfig** or drives option is passed. This option will verify the disk configuration is correct before proceeding with the install. If the configuration is not correct, it will stop the installation without changing the disk configuration so you can reboot and start over manually passing the diskconfig option you want with the force option. If you want to install TPD on a system with a non-standard configuration, you should manually configure the disks and use the **drives=<device>** option to IPM onto a specific device. To force the reconfiguration of the disks for all supported servers you would pass **diskconfig=HWRAID, force.**

Refer to **Appendix D IPM command options** for all TPD IPM command options.

How long the IPM process will take will be determined by the size and speed of the disk drives installed in the server. See Table 4: Time Estimates for IPM in Minutes for time estimates. No status is printed to the screen for several hours as the scrub option is run. If one or more disk drives in the server has any hardware errors, the time required to run a scrub will rise dramatically.

After entering the command to start the installation, the Linux kernel will load, as in the following screenshot:

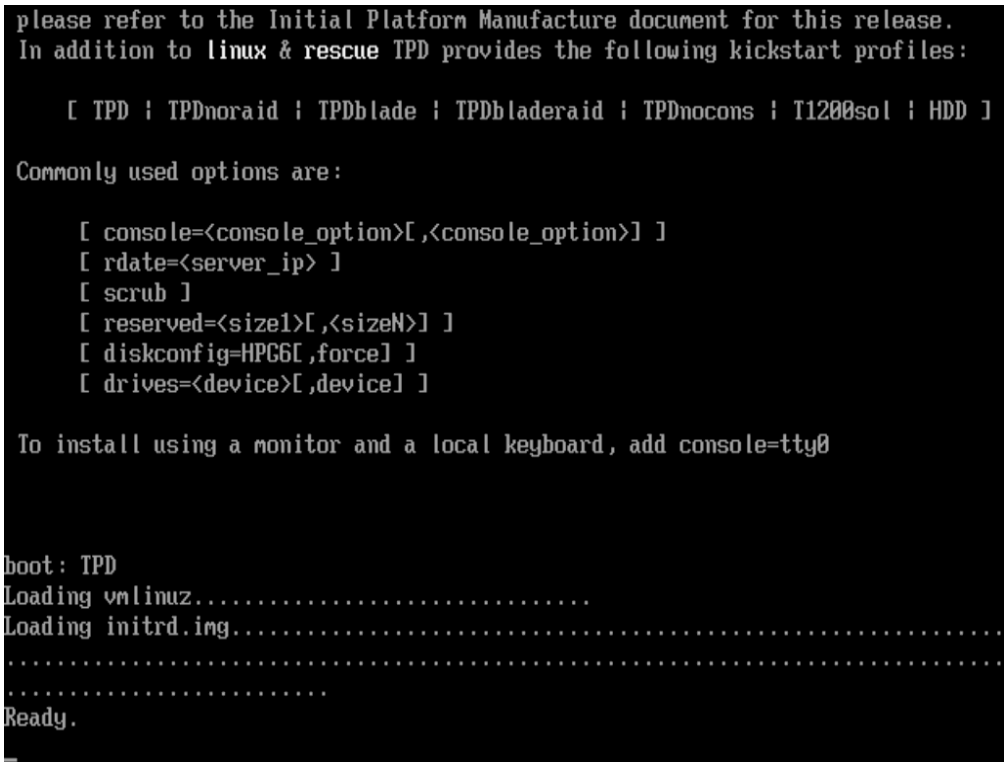

Figure 4 Example kernel loading output

4. After a few seconds, additional messages will begin scrolling by on the screen as the Linux kernel boots, and then the drive formatting and file system creation steps will begin and the following screen will appear indicating that the package installation step is about to begin:

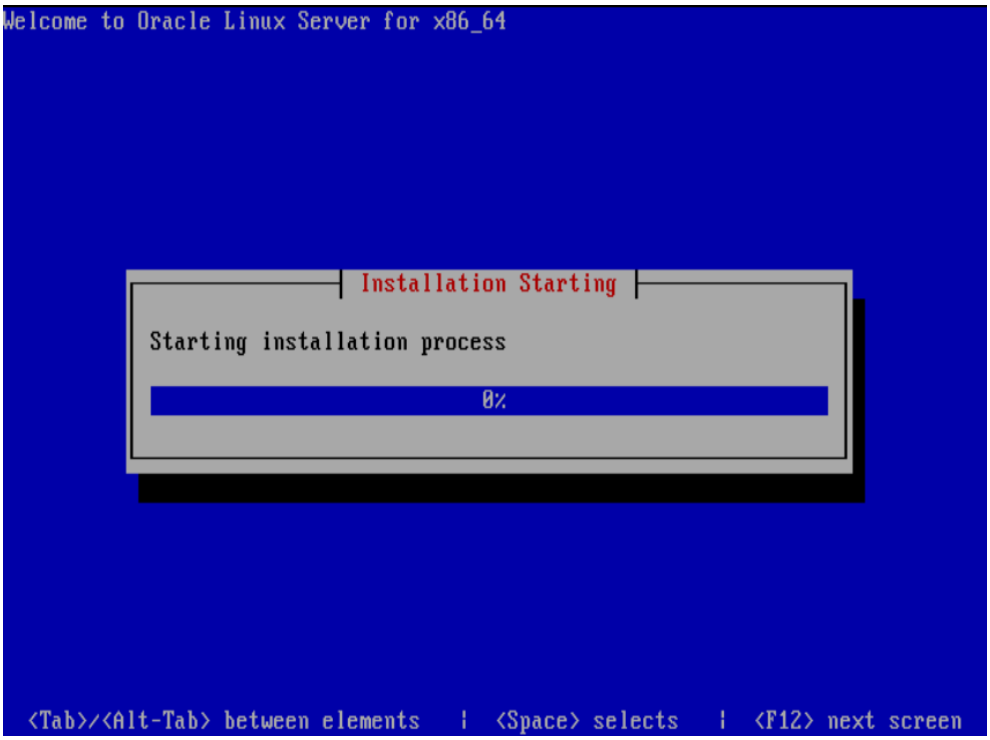

Figure 5: Installation process beginning screen

Once the screen shown in Figure 5: Installation process beginning screen appears, it may take several minutes before the installation process starts. However, after a few minutes, you will see a screen similar to Figure 6: Example package installation screen showing the status of the package installation step.

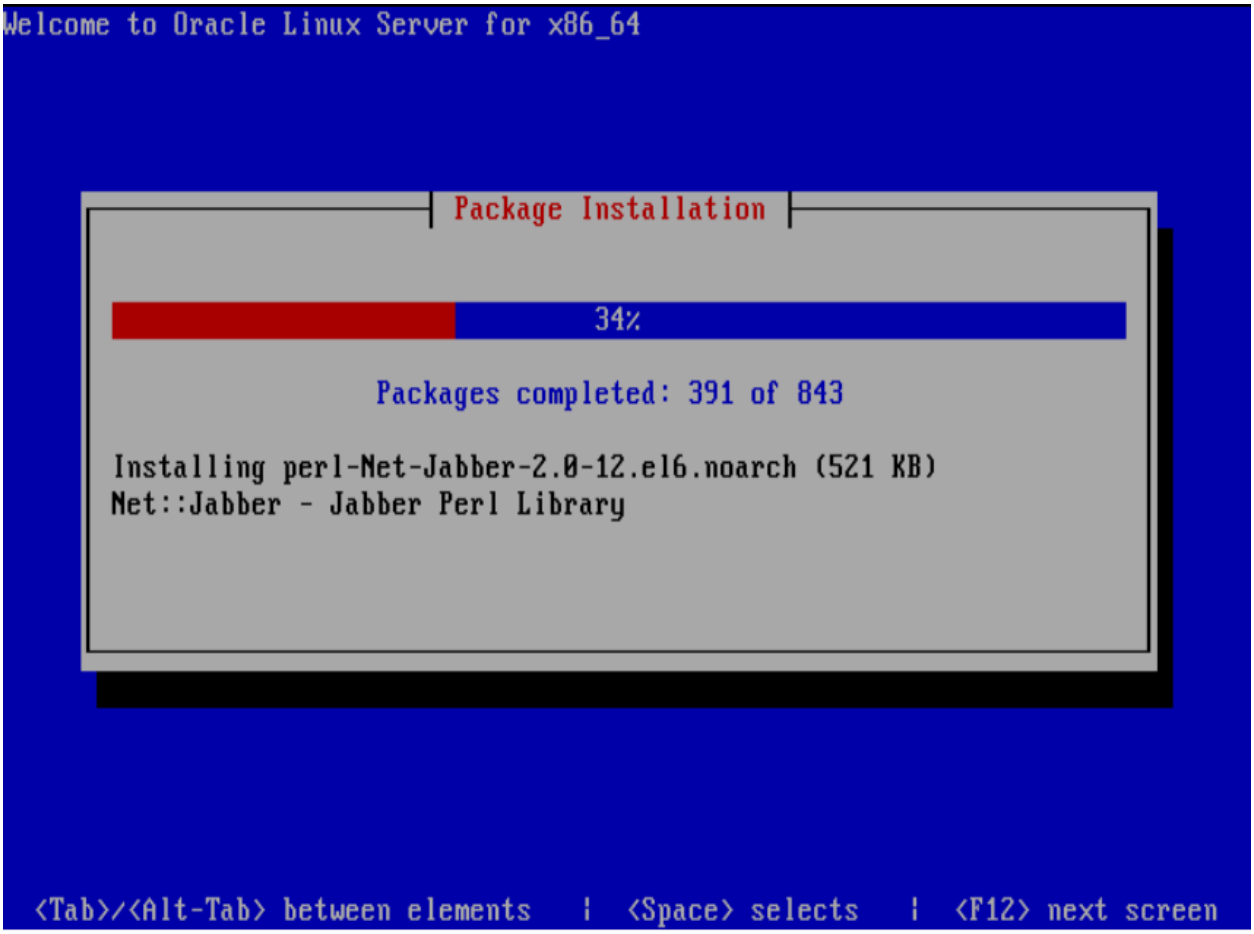

Figure 6: Example package installation screen

5. Once all the packages have been successfully installed, the screen in Figure 7: Example installation complete screen will appear, letting you know the installation process is complete. Remove the installation media and then press <ENTER> to reboot the system.

Figure 7: Example installation complete screen

6. After a few minutes, the BIOS screen will appear again, followed by several messages about each of the Ethernet ports in the system, and finally followed by the following message printed by the boot loader, indicating that it is booting the new IPM load.

```
Booting TPD (2.6.32-431.11.2.el6prerel7.0.0.0.0_86.3.0.x86_64)
Press any key to continue.
Press any key to continue.
Press any key to continue.
Press any key to continue.
Press any key to continue.
Press any key to continue.
Press any key to continue.
```

Figure 8: Example boot loader output

Note: It is possible that the system will reboot several times during the IPM process. No user input is required if this occurs.

7. A successful IPM platform installation process will result in a user login prompt.

3.5 Post-Install Processing

Log in as user syscheck, and the system health check will run automatically. This will check the health of the server, and print out an "OK" if the tests passed, or a descriptive error of the problem if anything failed. The screenshot in Figure 9: Example successful syscheck output shows a successful run of syscheck, where all tests pass, indicating the server is healthy.

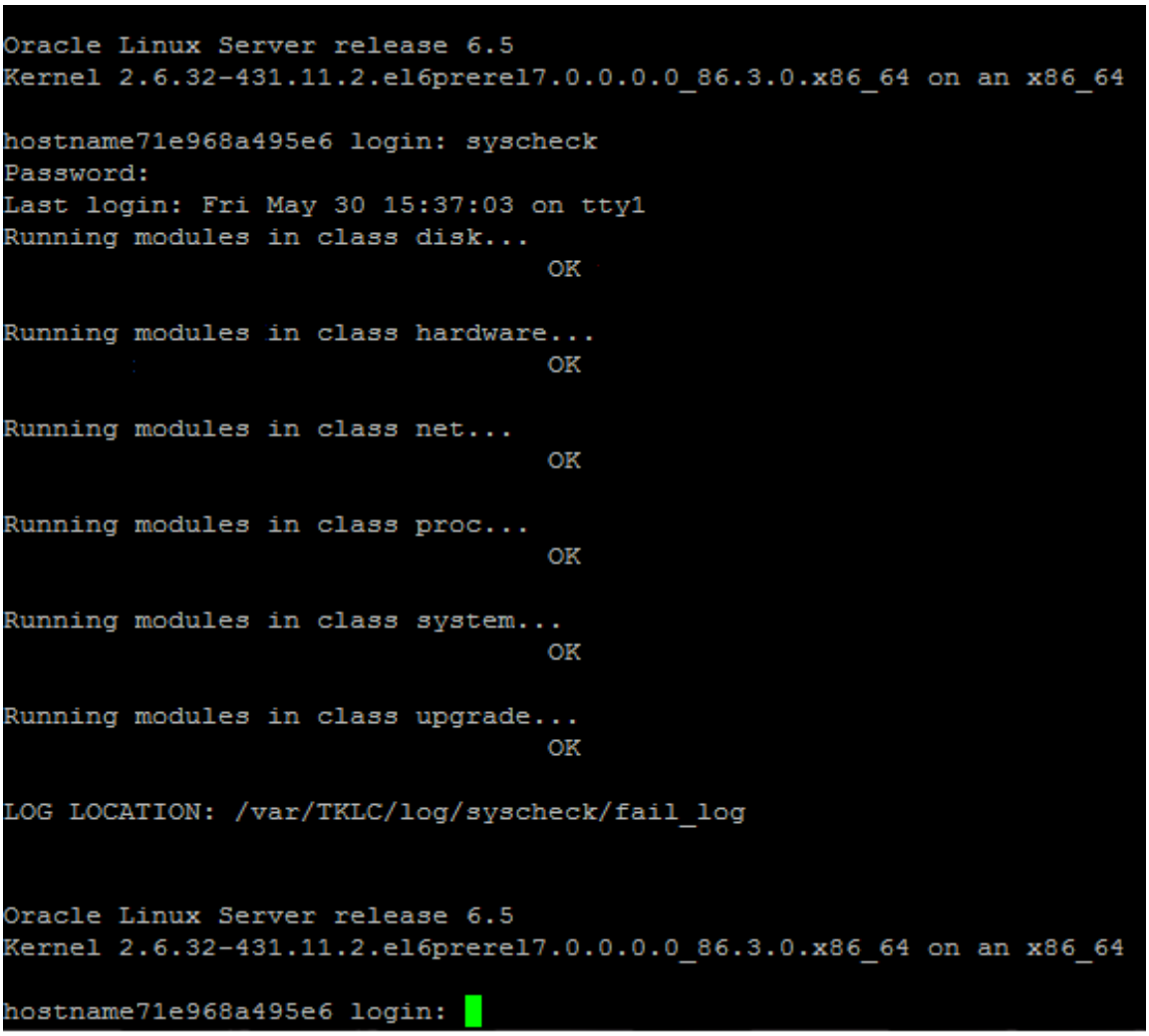

Figure 9: Example successful syscheck output

Since an NTP server will not normally be configured at this point, syscheck may fail due to the NTP test as shown in Figure 10: Example syscheck output with NTP error. The syscheck NTP test will not give this failure during the first 20 minutes after the server is booted up. The error shown in Figure 10 is acceptable and can be ignored.

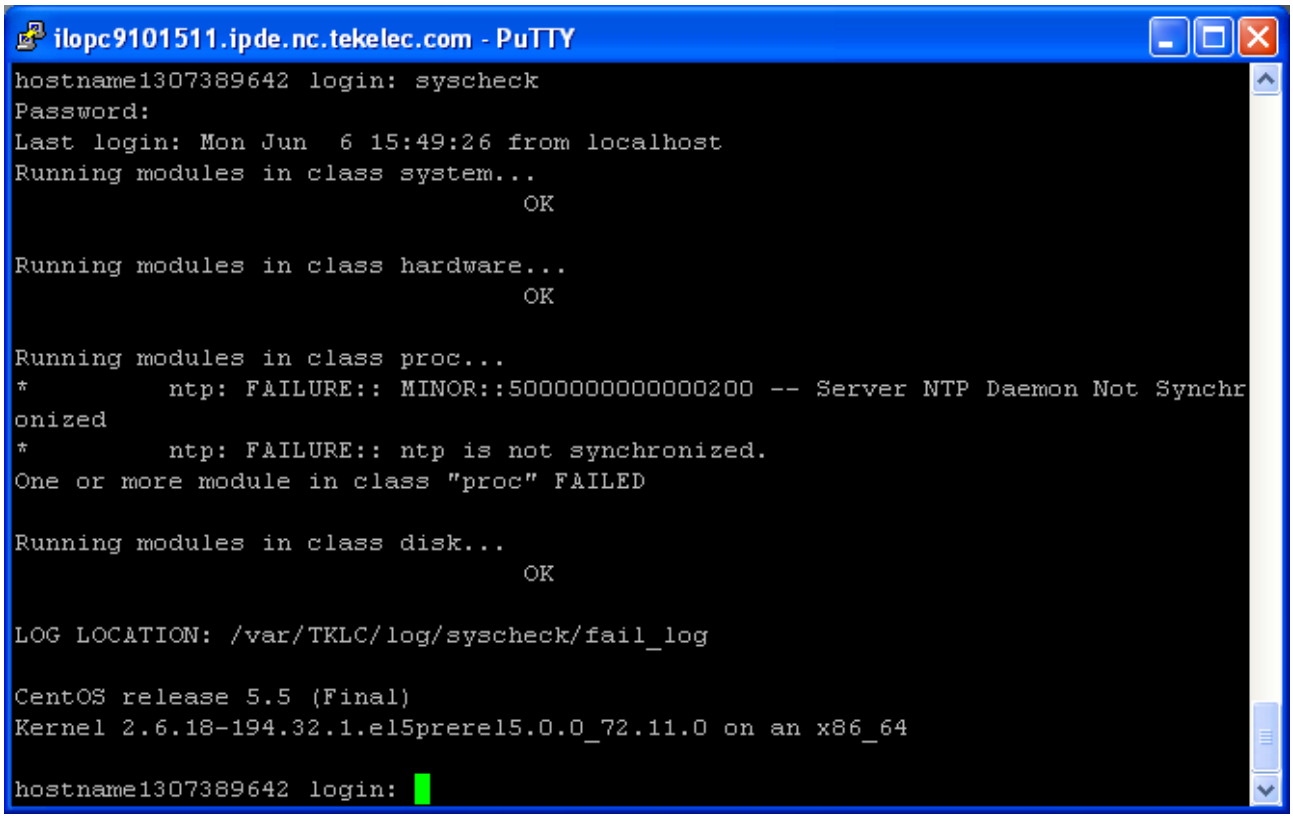

Figure 10: Example syscheck output with NTP error

The screenshot Figure 11 indicates a disk failure in one of the syscheck tests. If the server is using software disk mirroring (RAID1), the syscheck disk test will fail until the disks have synchronized. The amount of time required to synchronize the disks will vary with disk speed and capacity. Continue executing system check every 5 minutes (by logging in as syscheck to run syscheck again) until the health check executes successfully as shown above. If the disk failure persists for more than two (2) hours, or if system check returns any other error message besides a disk failure or the NTP error shown in Figure 10, do not continue, contact Oracle Support and report the error condition.

```
Oracle Linux Server release 6.5
Kernel 2.6.32-431.11.2.el6prerel7.0.0.0.0_86.3.0.x86_64 on an x86_64

hostname006e54e5aa50 login: syscheck
Password:
Last login: Tue Jun  3 13:06:50 on ttyS0
Running modules in class disk...
*       hpdisk: FAILURE:: MAJOR::3000000080000000 -- HP Disks need intervention.
*       hpdisk: FAILURE::  Failure message: physicaldrive 1I:1:1 for controller in slot 0 is Failed.
One or more module in class "disk" FAILED

Running modules in class hardware...
                                OK

Running modules in class net...
                                OK

Running modules in class proc...
                                OK

Running modules in class system...
                                OK

Running modules in class upgrade...
                                OK

LOG LOCATION: /var/TKLC/log/syscheck/fail_log

####################
1401815247: Upstart Job serial: stopping

####################
1401815247: Upstart Job serial: starting
1401815247: Upstart Job serial: started
####################



Oracle Linux Server release 6.5
Kernel 2.6.32-431.11.2.el6prerel7.0.0.0.0_86.3.0.x86_64 on an x86_64

hostname006e54e5aa50 login:
```

Figure 11: Example syscheck disk failure output

Verify that the IPM competed successfully by logging in as root and running verifyIPM. Contact Oracle Support if any output is printed by the verifyIPM command.

```
[root@hostname006e54e5aa50 ~]# verifyIPM
[root@hostname006e54e5aa50 ~]#
```

Figure 12: Example verifyIPM output

Congratulations!
Application Server IPM Process is complete and Post-install checks have passed
You have successfully completed this procedure
Refer to sales order to load appropriate application

Appendix A. Possible Errors During IPM Installation Processing

A.1 IPM Errors

1. During the IPM installation, if failures occur, or if the IPM process stops and requests user input, the installation process is suspended and manual intervention is required.
2. If media check was not performed in section 3.4, step 2, then stop and refer to Appendix B, "Media Check" to run that now.
3. If media check fails, do not continue, and contact Oracle Support to report the error condition.

A.2 Post Installation syscheck errors

If the syscheck command continues to fail in the post-installation step, execute the following steps to isolate the problem

1. Log in as root
2. Run: syscheck -v -k meta disk
3. If the output looks like the screenshot below, then execute all the steps in 3.4 again, but at step 3, append the "scrub" option to the installation start command. **Warning:** Make sure you understand the behavior of the "scrub" option (as described in Section D.3) before using it. Refer to the text for step 3 to determine the proper installation start command for your hardware.

```
Oracle Linux Server release 6.5
Kernel 2.6.32-431.11.2.el6prerel7.0.0.0.0_86.3.0.x86_64 on an x86_64

athens login: root
Password:
Last login: Tue Jun  3 13:42:00 on tty1
[root@athens ~]# syscheck -v -k meta disk
Running modules in class disk...
        meta: Checking md status on system.
        meta: md Status OK, with 7 active volumes.
        meta: Checking md configuration on system.
        meta: md3 is configured, but is not currently active.
*        meta: FAILURE:: MAJOR::3000000000000002 -- Server Internal Disk Error
*        meta: FAILURE:: md configuration check failed.
Active md config doesn't match /etc/raidtab.
One or more module in class "disk" FAILED

LOG LOCATION: /var/TKLC/log/syscheck/fail_log
[root@athens ~]#
```

Figure 13: Example syscheck failure output

Appendix B. Media Check

Media Check only works on CD/DVDs. USB media should be validated when it is created as the validation steps are dependent on how it was created.

1. Refer to Section 3.3.1 to automatically boot from the DVD IPM media.
2. The screen output shown below indicates the initial boot from DVD is successful. Enter the command "linux mediacheck" and press <ENTER>.

   Note: If the system is being accessed using a remote console then "**`console=tty0`**" should be appended to the "**`linux mediacheck`**" command.

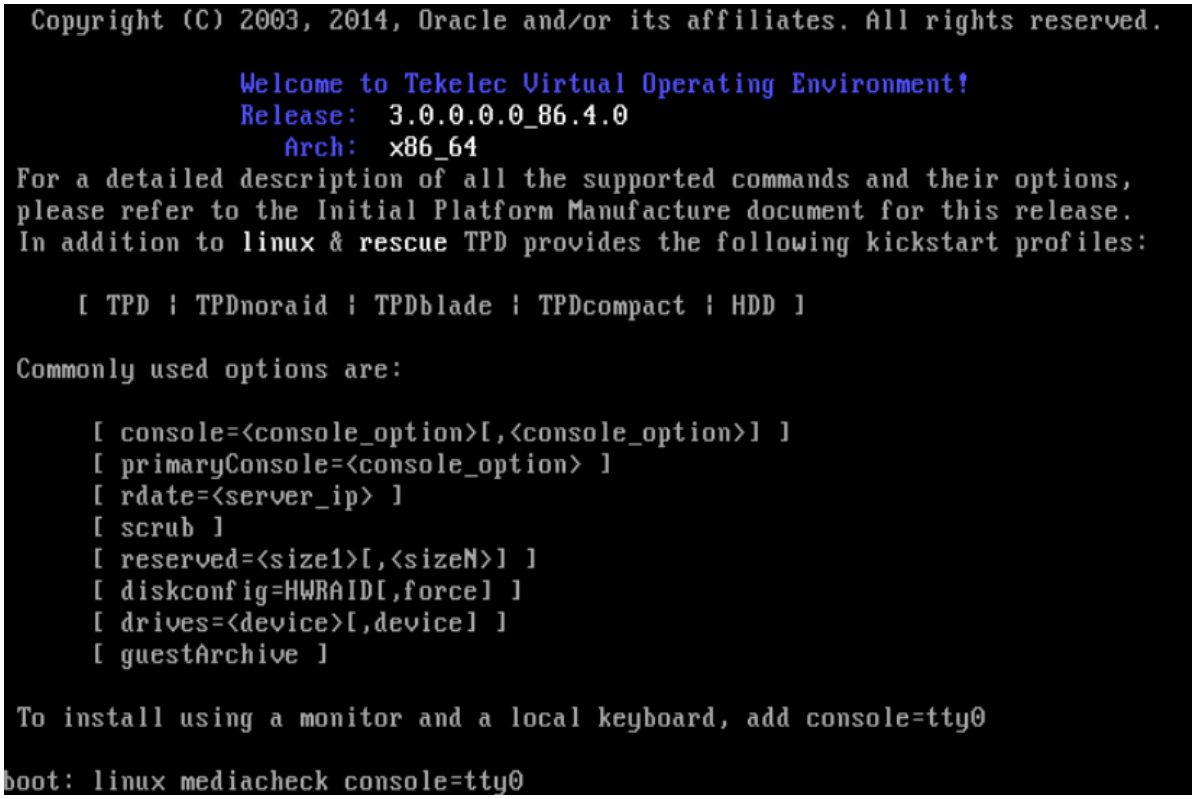

Figure 14: Example media check command

3. When the following screen appears, tab until "OK" is highlighted and then press <ENTER>.

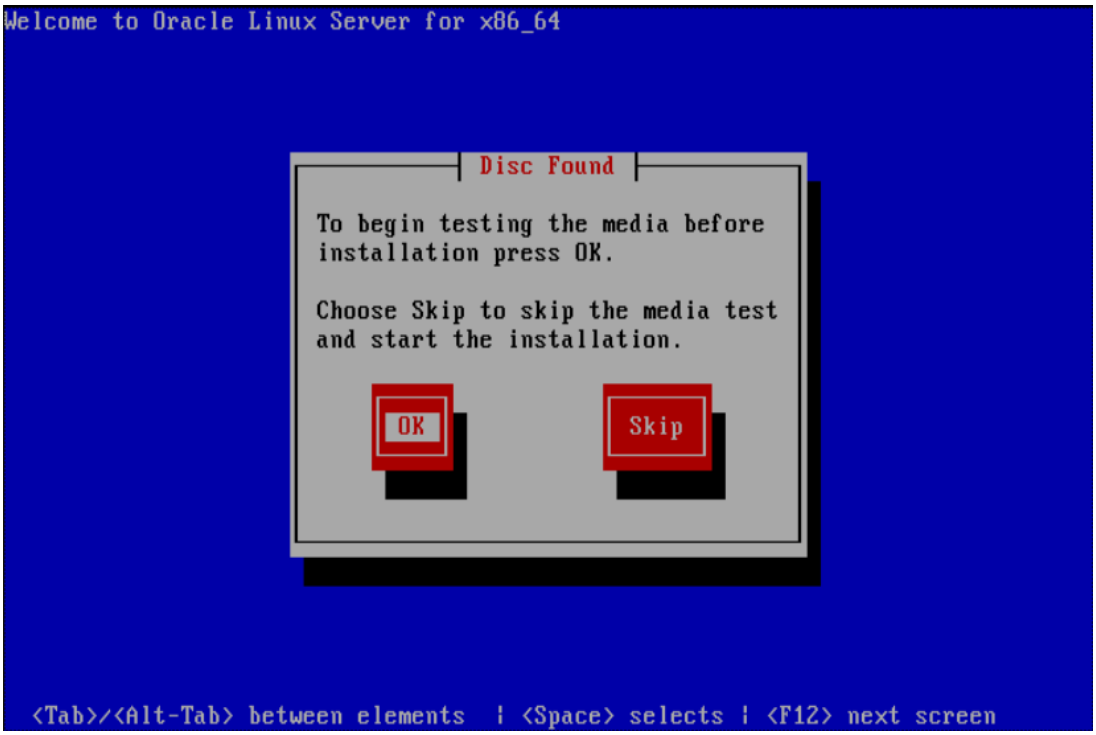

Figure 15: Example media test dialog

4. Next, press tab until "Test" is highlighted, and press <ENTER> to begin testing the currently installed media.

Figure 16: Example dialog with Test highlighted

5. The media check will begin, with a status bar indicating the progress, as shown in the screen shot below:

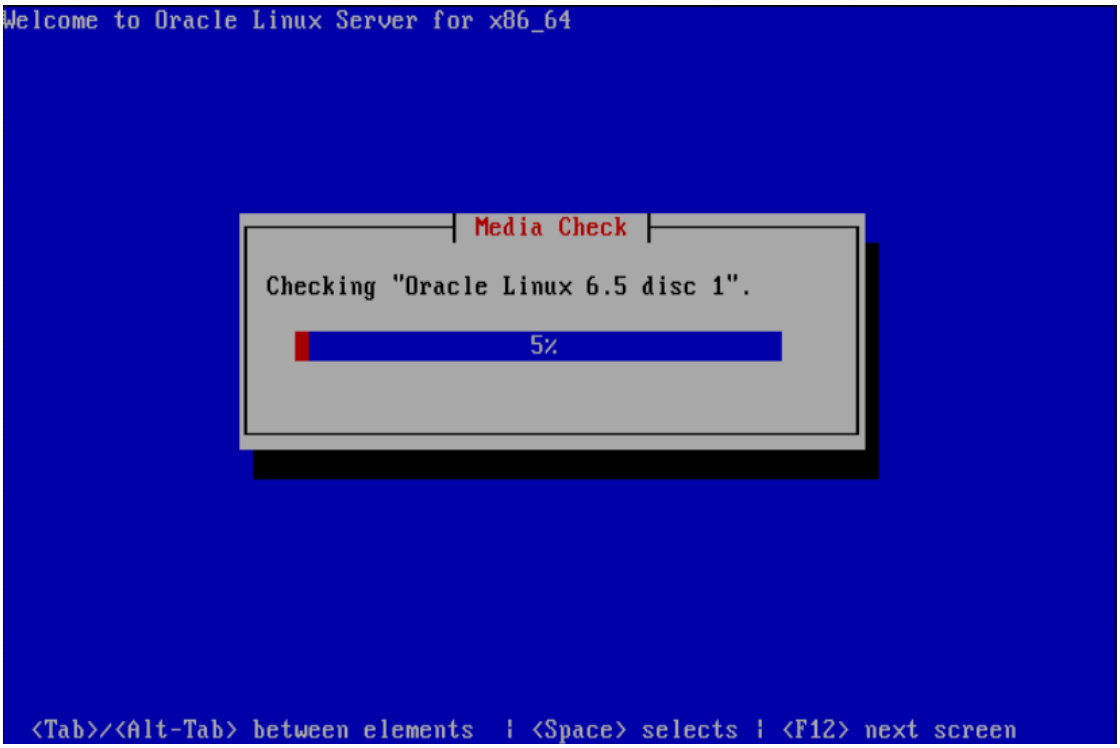

Figure 17: Example media check progress screen

6. If the media check is successful, the following screen will be displayed. Press <ENTER> to continue.

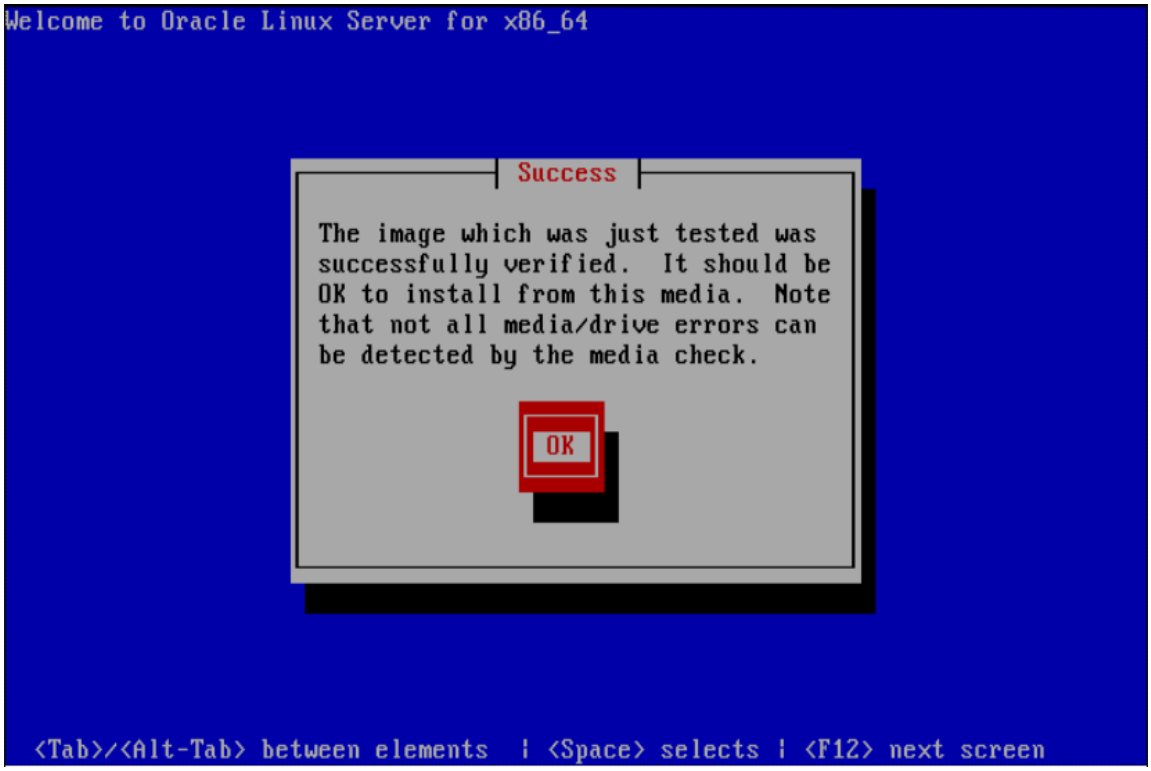

Figure 18: Example media check result

7. Next the media that was tested will be ejected. Press <ENTER> to continue.

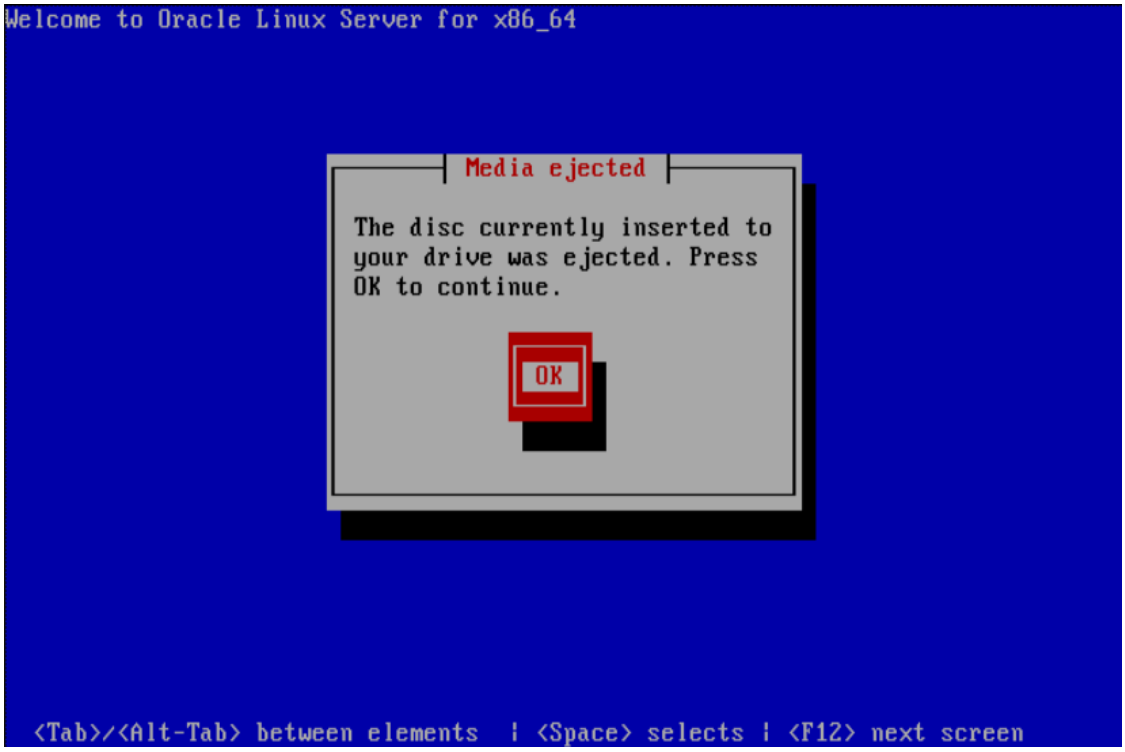

Figure 19: Media check Eject Dialog

8. To test additional media, remove original media, insert new media, tab until "Test" is highlighted and press <ENTER>. If no additional media is available, and the media check passed, remove the current media, insert the original media, tab until "Continue" is highlighted and press <ENTER> to continue the installation again.

Figure 20: Example media check continuation dialog

Appendix C. Alternative Methods of Setting CMOS clock

There are multiple ways to set the Server's CMOS clock. The following methods are offered as alternatives to the method described in section 3.1. Please note that the CMOS clock must be accurate before the IPM is initiated.

C.1 Setting CMOS clock when running TPD.

If the server has TPD installed and you know the root password, you can use the following procedure to set the system clock.

1. Boot the server up.
2. Log in as root.
3. Verify the current date, using the date command:

```
# date
Fri Jul 13 13:14:15 EDT 2007
```

   - If the date, time and time zone are correct, continue to Section 3.3 OS IPM Install.
   - If the time zone or date is not correct, use the platcfg utility to enter the correct time zone and date.
4. Halt the server using the platcfg utility.

C.2 Setting CMOS clock from an NTP server while running TPD.

If the server has TPD installed and you know the root password, you can use the following procedure to set the system clock if the network is configured and an NTP server is available to the server running TPD:

1. Boot up the server
2. Log in as root
3. Verify the current date, using the date command:

```
# date
Fri Jul 13 13:14:15 EDT 2007
```

4. If the date, time and time zone is correct, continue to section 3.3, OS IPM Install
5. Disable ntp:

```
# service ntpd stop
Shutting down ntpd:          [ OK ]
```

6. Use ntpdate to change the local time:

```
# ntpdate <NTP server IP address>
13 Jul 13:15:01 ntpdate[27747]: step time server 198.89.40.60 offset 46.01234 sec
```

7. Reboot the server:

```
# shutdown -r now
```

8. Check the date and time by logging in as root and verifying the current date, using the `date` command:

```
# date
Fri Jul 13 13:18:03 EDT 2007
```

Appendix D. IPM command options

There are multiple options that can be specified on the boot line that affect how the system is manufactured. Multiple options can be specified on a single command.

D.1 reserved

The **reserved** option provides the capability to create one or more extra partitions that are not made part of the vgroot LVM volume group.

The sizes of the partition(s) are indicated after "**reserved=**" and are separated by commas without any whitespace if there are more than one. The sizes use a suffix to indicate whether the value is in units of megabytes ('**M**') or gigabytes ('**G**'). In this context, a megabyte is 1024^2 and a gigabyte is 1024^3.

In the case of a software RAID-1 configuration, such as **TPD** (but not **TPDnoraid**), a single value will actually cause the creation of a partition on 2 drives and a metadevice (md) that incorporates the two partitions.

Examples:

1. **TPD reserved=2G** – This will create a reserved partitions on sda and sdb of 2 GB, and a RAID-1 metadevice using those reserved partitions.
2. **TPDnoraid reserved=512M** – On a HP server, this will create a reserved partition on sda of 0.5 GB.
3. **TPDnoraid reserved=4G,128M** – On a HP server, this will create two reserved partitions of 4 GB and of 128 MB.

The partition(s) or metadevice(s) can be used by storageMgr to create a DRBD device or LVM physical volume. However, to do so, one will need to know the partition number or metadevice number.

Numbering of partitions is performed by anaconda and is controlled by anaconda. Therefore, to get the partition number, a developer would need to examine the partition table after an IPM to determine the number. Also, this number may change due to changes in anaconda in future releases of TPD.

D.2 drives

The **drives** option provides the capability to limit the installation of TPD to certain drives by specifying the device names separately by commas after "**drives=**".

Example:

TPD drives=sda,sdb – May be useful on a system with more than 2 drives where the additional drives are not intended to be used for the root (TPD) install.
TPDnoraid drives= sdb – May be useful on rack mount servers where the logical drive for the internal RAID is not the first device in the system.

Note: If the drives specified do not include the first device in the system, care must be made to set the BIOS to treat one of the drives specified as the first boot disk/controller before starting the IPM. For example #2 to work, the internal RAID controller should be configured as the boot controller.

Note: The order in which the drives are specified in the drives parameter determines the boot drive order sent to anaconda for use. The order in which the drives are specified must correspond to the order in which the drives are specified in the BIOS.

D.3 scrub

This option is typically used as part of the IPM process on machines that have had TPD loaded in the past. The usage of the "scrub" option is used to ensure that the disk and logical volume partitioning that occurs during the early phase of IPM operates correctly.

It is extremely important to understand that the "scrub" option will remove all data from ALL attached disk devices to the machine being IPM'ed. Note that this includes disk drives that are not mentioned in the "drives" parameter. Therefore, whenever the "scrub" option is used, any and all disk drives attached to the machine being IPM'ed, including those not mentioned in the "drives" parameter, will lose all of their data. Technically, this is accomplished by writing zeroes to the entire disk of each attached disk drive.

D.4 clear

This option is used to erase the Master Boot Record (MBR) of all the attached disk drives. Note that this option will operate against all attached disk drives of the machine being IPM'ed. Clearing the MBR also removes each disk drive's partition table, effectively causing the loss of all data on the disk.

It is extremely important to understand that the "clear" option will remove all MBR's from all the attached devices to the machine being IPM'ed. Note that this includes disk drives that are not mentioned in the "drives" parameter .Therefore, whenever the "clear" option is used, any and all disk drives attached to the machine being IPM'ed, including those not mentioned in the "drives" parameter, will lose all of their data. Technically, this is accomplished by writing zeroes to the 512 KBytes of each attached disk drive.

Note: The MBR of any USB drives attached will remain intact since USB devices are ignored.

D.5 diskconfig

This option is intended to direct the IPM process to configure the disks in different ways. At this time diskconfig supports the following options:

- HWRAID - This option detects which disk controller, either HP or LSI, is present and configures the hardware RAID1 appropriately. This is the default if no diskconfig or drives option is passed.
- SWRAID - This option detects which disk controller, either HP or LSI, is present and configures the software RAID appropriately. **Note:** This mode is intended for use during development and testing and is not supported on fielded systems.
- force – specify that if the current disk configuration does not match the desired configuration, that the desired configuration should be forcibly installed. Loss of data on any disk on the same RAID disk controller may result.

D.6 lab

Note: Intended for development use only
This is a debug mode which will provide an interactive shell on failure rather than exiting the IPM process. If this mode is selected and the kickstart file is coming from an http server, the kickstart file will attempt to download the files normally included in the initrd from the http server where the kickstart file is located.

D.7 test

Note: Intended for development use only
This is a debug mode which will cause the IPM process to stop at multiple locations and prompt the user. This mode is useful to check status of scripts used during the IPM process.

D.8 tklcuserdata

This option has been deprecated. It has been replaced by IPMUUID.

D.9 IPMUUID

This value is provided by PM&C to uniquely identify each IPM. All SNMP informs sent will include the IPMUUID if it is provided.

D.10 tklcserverdata

This option has been deprecated. It has been replaced by IPMtrapHosts.

D.11 IPMtrapHosts

This is a colon separated list of IP addresses normally provided by PM&C. The SNMP informs sent during IPM will be sent to this/these address[es].

D.12 ForceFail

This value provides a way to force IPM failures for testing purposes. Three options are available:

- ipmfailed – send "ipmfailed" inform at end of IPM rather than normal "tpdinstalled" trap.
- installfailed – send "install failed" as part of the tpdstate inform on first reboot after IPM.
- ipmabort – Do not put the expected final entry in the kickstart log file. This will cause an "install failed" as part of the tpdstate inform on first reboot after IPM.

If the ForceFail argument is provided with any of the supported options, it will cause the verifyIPM command to fail.

D.13 rdate

This optional argument should be set to the IP address of a server on the local network segment that is running the "time" service. The "time" service is not the same as NTP. If this value is set, the clock on the server will be set using rdate to the provided IP address before the installation of packages begins. If this option is provided, no other setting of the server clock will be required. If the rdate argument is provided, the IP address will be configured as an NTP server when the IPM is completed unless the ntphost option is provided, in which case the IP address provided with the ntphost argument will be used.

D.14 ntphost

This optional argument can be set to the IP address of an NTP server. If this value is provided, TPD will be configured to use this NTP server when the IPM is completed. This option does NOT set the clock of the server before the packages are installed, so it is important the server CMOS clock is set either manually (see Setting Server's CMOS clock or Appendix C) or using the "rdate" option (see D.13).

D.15 primaryConsole

The argument provided to this option will be set as the primary console device for TPD. This means that all init and kernel messages will be sent to this device while the server is running and during startup and shutdown. Additionally, a login prompt will display itself on this console after the system startup. The argument must be a valid console device such as "tty0", "ttyS1,115200", or "ttyS0,9600n8r".

D.16 diskpart

This optional argument is used to override the disk partition template used for TVOE installation. By default, the "TVOE" disk partition template will be used when TVOE is installed. The "TVOE" partition scheme assumes hardware RAID is used and the first disk should have TVOE installed on it. However, it is possible to install TVOE using the default TPD disk partition by passing "diskpart=TPD" on the TPD command line. This might be useful when installing TVOE on platforms that do not have hardware disk mirroring.

D.17 console

The default console is serial console but sometimes it is useful to be able to use another device like a VGA monitor. An example for using a VGA monitor would be to use **`console=tty0`**.

D.18 guestArchive

This optional argument is used to start the system in guest archive creation state. This state is used to IPM a guest system that can be used as a base to create a TVOE guest archive.

Appendix E. BIOS Configuration

Run the appropriate subsection below based on your hardware platform. If your server type is not listed, then no changes from the default configuration are needed.

E.1 Configuring HP Systems

E.1.1 Configuring iLO serial port on G6 and Gen8 DL360 and DL380 rack mount servers.

The serial ports on HP G6 and Gen8 DL360 and DL380 rack mount servers must be configured so that the serial port used by the BIOS and TPD are connected to the "VSP" on the iLO. This will allow the remote administration of the servers without the need for external terminal servers. If this configuration has not been completed correctly and the server rebooted, the syscheck "syscheck –v hardware serial" test will fail.

1. Connect to the server in question using a VGA monitor and USB keyboard.
2. Reboot/reset the server.
3. Press the F9 key when <F9=Setup> appears. Note that this could appear in the lower right hand or lower left hand corner of the screen.
4. Select "Server Availability"
5. Change "Automatic Power-On" to "Enabled"
6. Change Power-On Delay" to "No Delay"
7. Press <ESC> once
8. Select "System Options"
9. Select "Serial Port Options"
10. Change "Embedded Serial Port" to "COM2"
11. Change "Virtual Serial Port" to "COM1"
12. Press <ESC> two times.
13. Select "Standard Boot Order"
14. Select "Hard Drive C:"
15. In the popup, set the IPL Device Boot Order to 1.
16. Press <ESC> two times.
17. Press F10

E.1.2 Configuring HP Gen9 Servers

The HP Gen9 systems can have UEFI boot enabled. Since TPD is configured to use the Legacy BIOS option, both blade and rackmount Gen9s should have their BIOS settings checked before IPM. Rack mount servers should also have the iLO serial port configured at this time. Directions for both settings are below.

1. If this is a rack mount server, connect via a VGA monitor and USB keyboard. If a blade server is being configured, use the iLO Integrated Remote Console.
2. Reboot/reset the server.
3. Press the F9 key to access the System Utilities menu when <F9 System Utilities> appears in the lower left hand corner of the screen.
4. Select the System Configuration menu.
5. Select the "BIOS/Platform Configuration (RBSU)" menu.

6. Select the Boot Options menu.
7. If the Boot Mode is not "Legacy BIOS mode", press <Enter> to open the BIOS mode menu. Otherwise, skip to Step 9.
   Note: A warning message will be displayed. It is safe to ignore and can be bypassed by pressing the <Enter> key.
8. Select "Legacy BIOS Mode".
9. Select the "Legacy BIOS Boot Order" menu.
10. Set "Hard Drive C:" to the first boot option by selecting it and using the "+" key to move it to the top of the list.
11. Press <Esc> twice to back out to the "BIOS/Platform Configuration (RBSU)" menu. If a blade server is being configured, skip to Step 20, otherwise continue to the next step.
12. Select the "System Options" menu.
13. Select the "Serial Port Options" menu.
14. Change "Embedded Serial Port" to "COM2"
15. Change "Virtual Serial Port" to "COM1"
16. Press <Esc> twice to back out to the "BIOS/Platform Configuration (RBSU)" menu.
17. Select the "Server Availability" menu.
18. Set "Automatic Power-On" to "Restore Last Power State".
19. Set "Power-On Delay" to "No Delay" then press <Esc> once to back out to the "BIOS/Platform Configuration (RBSU)" menu.
20. Select the "Power Management" menu.
21. Set the "HP Power Profile" to "Maximum Performance". Press <Esc> once to back out to the "BIOS/Platform Configuration (RBSU)" menu.
22. Press <F10> to save the updated settings, then <y> to confirm the settings change.
23. Press <Esc> twice to back out to the "System Utilities" menu.
24. Select "Reboot the System" and press <Enter> to confirm.

E.2 Oracle Server BIOS configuration.

For all TPD supported Oracle servers, the Energy Performance should be set to "Performance", and on the Oracle X4-2 servers, you must set UEFI Configuration Synchronization so that "Synchronization Late" is Disabled. If this step is not performed the server may reboot a second time after POST on some reboots. This can be especially bothersome when trying to do a one-time boot to USB or CD/DVD-ROM.

NOTE: In the following steps unless stated otherwise "X5-2" refers to all versions of the X5-2 server that is supported by TPD. For example the Netra X5-2 Server, Oracle X5-2 Server, Oracle X5-2M Server, etc.

The following steps describe configuring the BIOS Power Management and UEFI setting appropriately.

1. Connect to the server in question using a VGA monitor and USB keyboard.
2. Reboot/reset the server.
3. Press the F2 key when <Press F2 to run Setup> appears.
4. Go to the Advanced Menu. If this is a X5-2, skip to Step 6.

5. Select Processors
6. Select CPU Power Management Configuration.
7. If this is a X5-2, set ENERGY_PERF_BIAS_CFG mode to Perf, press Enter and skip to Step9. Otherwise, if Energy Performance is not set to [Performance] select Energy Performance and press Enter
8. In the resulting menu select the Performance option and press Enter.
9. Press the Escape key once on the X5-2 or two times on all other Oracle systems to return to the Advanced Menu. Unless this is an Oracle X4-2, skip to Step 14 .
10. Select UEFI Configuration Synchronization and press Enter
11. If Synchronization Late is not [Disabled] press enter to modify the option.
12. In the resulting menu select the Disabled option and press Enter
13. Press the Escape key to return to the Advanced Menu.
14. Go to the Boot Menu.
15. Under Legacy Boot Option Priority, verify the RAID Adapter is listed first. If not, highlight it and use + key to move it to the top of the list.
16. Select the "Exit" or "Save & Exit" Menu and press Enter on "Save Changes and Reset" or "Save Changes and Exit".
17. Answer 'Yes' to the resulting prompt for confirmation.

E.2.1 Configuring CPU Power Limit on Netra X5-2 Servers

To meet NEBS requirements, the Netra X5-2 server has an option in the BIOS to set a CPU Power Limit. When the CPU Power Limit is enabled the server is in NEBS mode, and this function reduces the CPU power to 120 watts from the maximum 145 watts to prevent CPU throttling. By default TPD sets this option to disabled during IPM of a Netra X5-2 server, but this value can be changed after IPM by using the cpuPowerLimit utility. The cpuPowerLimit utility has four options: enable, disable, status, and check. After using the cpuPowerLimit utility to change the value of CPU Power Limit the server must be rebooted for the change to take effect. When running the utility it is important to note that is it reading and/or writing out to the current BIOS values and can take 10-30 seconds to complete each action.

To enable CPU Power Limit after IPMing a Netra X5-2 server log into the server as root and run:

- `/usr/TKLC/plat/sbin/cpuPowerLimit --enable`
- `init 6`

To disable CPU Power Limit log into the server as root and run:

- `/usr/TKLC/plat/sbin/cpuPowerLimit --disable`
- `init 6`

To check the current setting of CPU Power Limit in the BIOS run:

- `/usr/TKLC/plat/sbin/cpuPowerLimit --status`

For more information on the CPU Power Limit option see reference [3].

For more information on the cpuPowerLimit utility see "man cpuPowerLimit" on TPD 7.0.3+ where the Netra X5-2 server is supported.

E.3 E5-App-B BIOS configuration

In order to IPM TPD on the E5-App-B, the boot order must be updated to attempt to boot from the USB key first. Before this setting can be applied, the USB key must be inserted in the system.

1. Connect to the system using the serial console.
2. Reboot/reset the system.
3. A few seconds after the server is powered on, as soon as you see the first bit of output on the screen, press the F4 key three (3) times to access the BIOS setup screen.
4. Enter the Boot screen using the right arrow key.
5. From the Boot screen, select Hard Disk Drives menu, and select 1st Drive .
6. Select the USB drive from the popup menu using the down arrow key.
7. Go to the Exit screen using the right arrow key.
8. Select "Save Changes and Exit".

Note: There is no need to revert the BIOS settings to boot from the Hard Disk as long as the USB key is removed as directed by Step 5 in Section 3.4.

Appendix F. ILO/ILOM Configuration Procedure

This Section Configures the HP Integrated Lights Out (iLO) or Oracle Integrated Lights Out Management (ILOM). iLO/ILOM is an independent subsystem inside an HP or Oracle server which is used for out of band remote access. You will be configuring the IP address for the iLO/ILOM and adding the Oracle user and password. The server will need to be accessed via a keyboard and monitor in order to complete this procedure.

F.1 ILO Configuration Procedure

In configuring the ILO, it will be necessary to make some changes in the BIOS and others in the web GUI after the BIOS settings are completed. See the sections below detailing both procedures.

Note: The HP Gen9 has different BIOS menus than the G6 and Gen8 so there are different instructions for each. The iLO Web GUI settings are the same for all HP servers.

F.1.1 HP G6 and Gen8 ILO BIOS Settings

1. Reboot the server. If the "Press any key to view Option ROM messages" message is displayed, then press a key to view the Option ROM messages.
2. Press F8 when prompted to enter the iLO configuration menu.
3. Disable DHCP in the Network Menu. Use the arrow keys to navigate through the menu and select the 'Network' menu and then go to 'DNS/DHCP enable' – press Enter

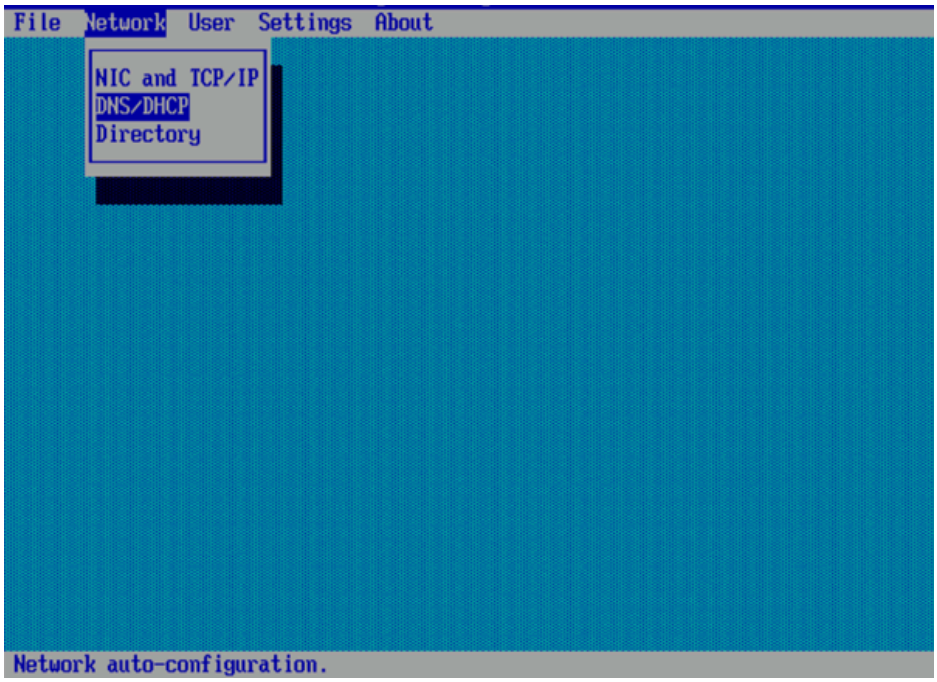

Figure 21 - ILO Network Settings

4. Use the space bar to disable DHCP (the space bar toggles the DHCP option 'ON' and 'OFF'). Save the settings by pressing the [F10] key. Expected result: DHCP is disabled and settings are saved.

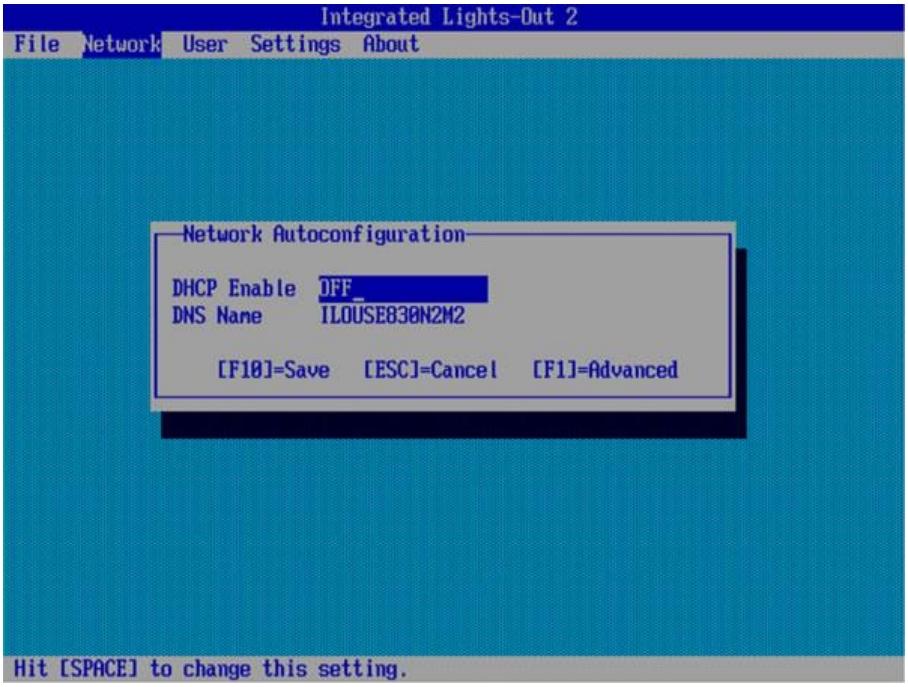

Figure 22 - Disable DHCP

5. Configure the IP Address, Subnet Mask and Default Gateway. Use the arrow keys to navigate through the menu and select the 'Network' menu and then go to 'NIC and TCP/IP'

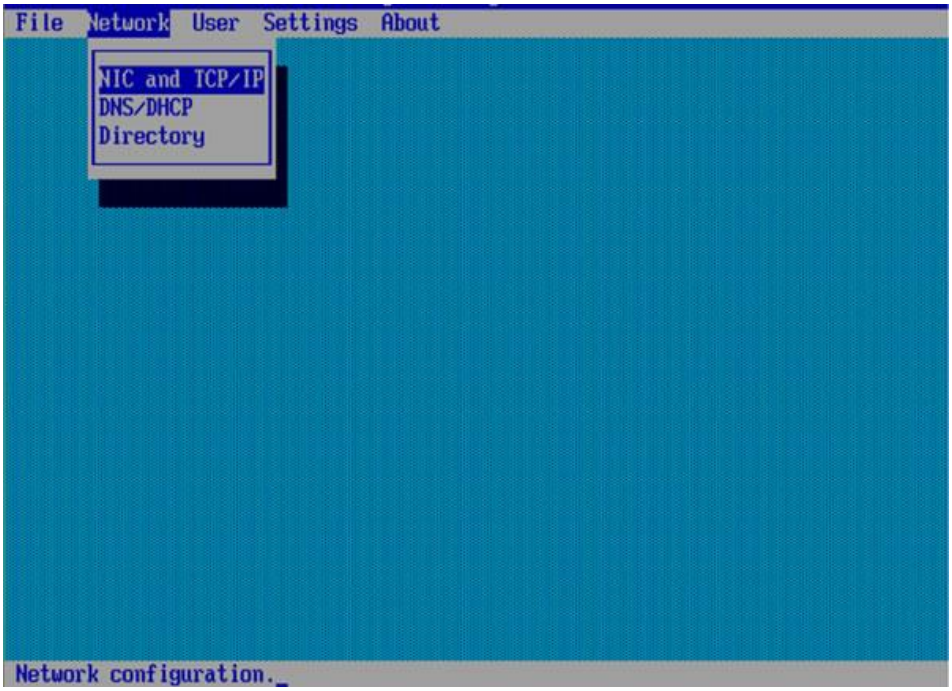

Figure 23 - Setup NIC and TCP/IP

6. Fill in the IP Address information for your server:

   IP Address, Subnet Mask and Default Gateway.

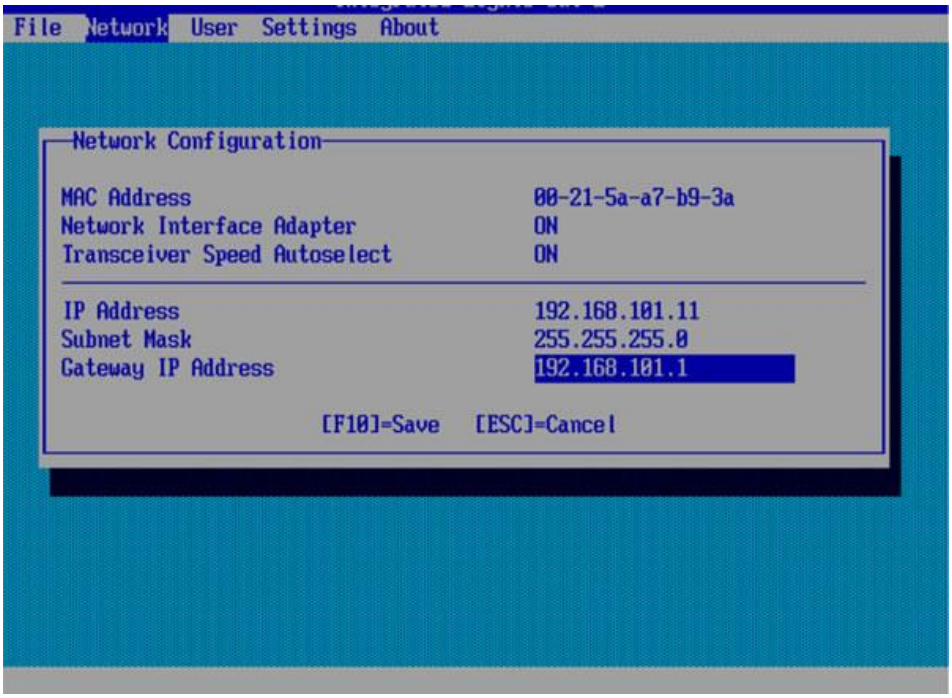

Figure 24 - Set ILO IPv4 Address and Default Gateway

(Screenshot is for reference only and may not match correct values)

Save the settings by pressing the [F10] key

Expected result: Network settings (IP address, default gateway and subnet mask) are configured and saved.

7. Add the user 'root' and password in the user menu. Use the arrow keys to navigate through the menu and select the 'User' menu, then 'Add User'

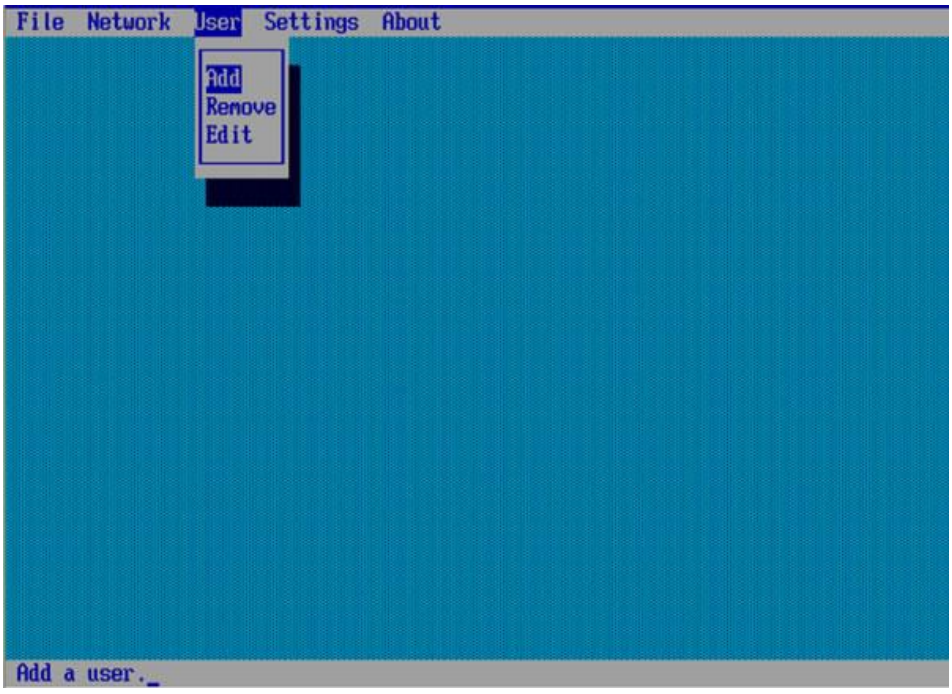

Figure 25 - Add an ILO User

8. Add the root user 'admin' and password
   a. Add
      - User name: admin
      - Login name: admin
      - Password: password

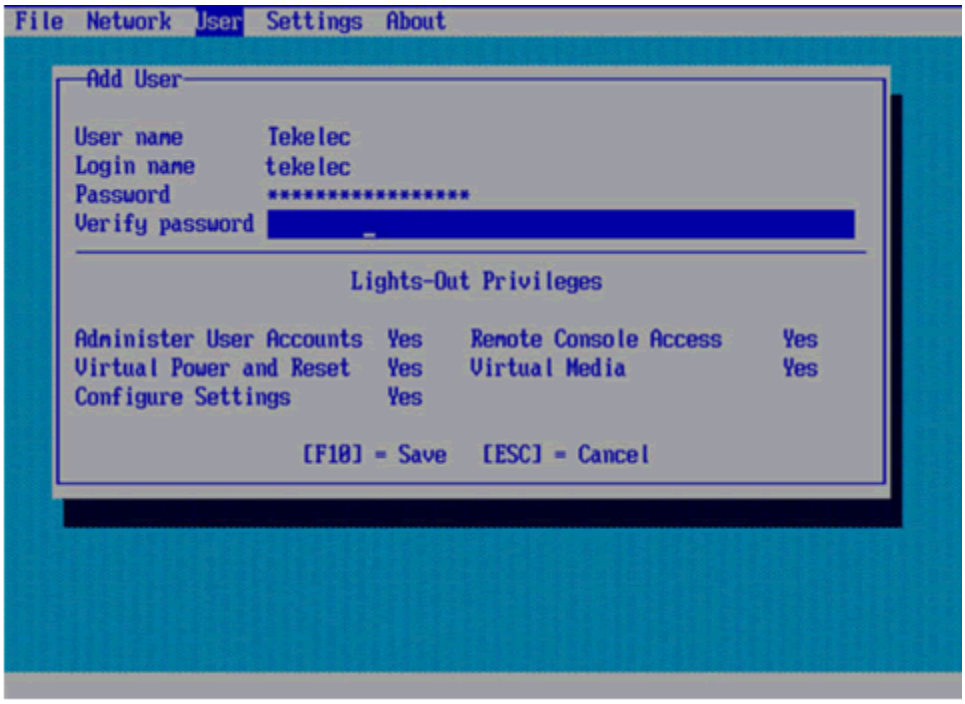

Figure 26 - Set ILO Username and Password

b. Save the settings by pressing the [F10] key

Expected result: User and password is added and is saved.

9. Exit the iLO configuration menu and save changes Use the arrow keys to navigate through the menu and select the 'File' menu, then 'Exit and Save'

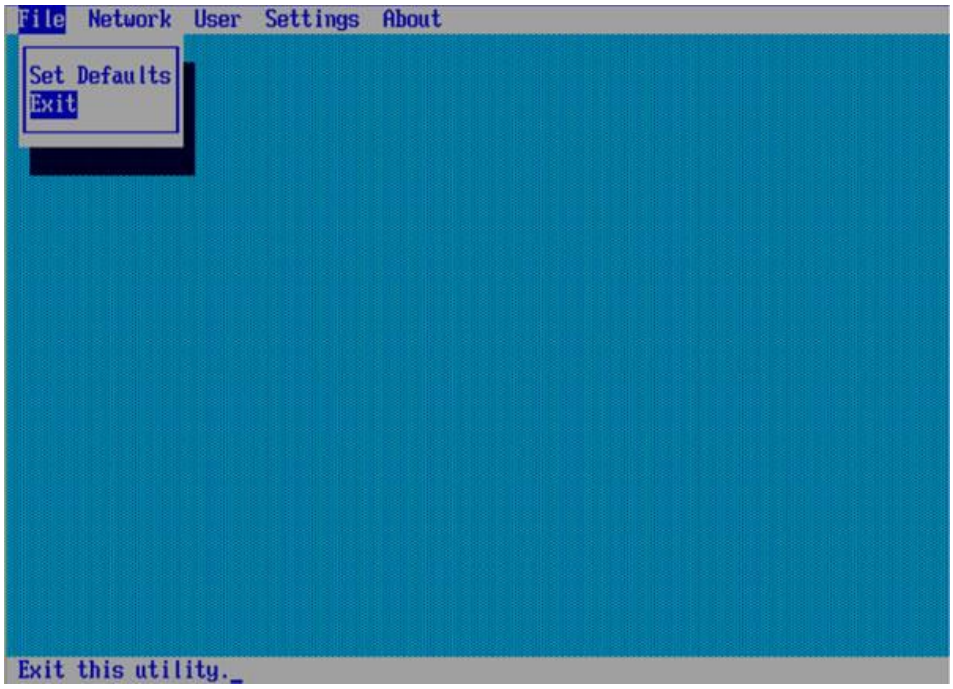

Figure 27 - Exit ILO Setup

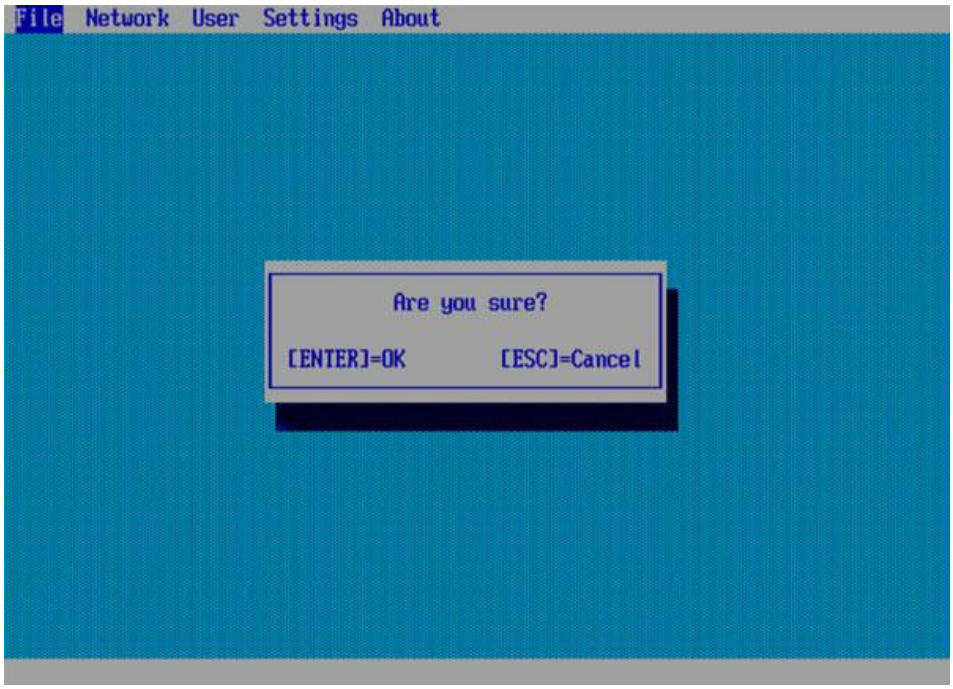

Figure 28 - Verify Exit

10. Answer Yes to prompt: Are you sure?

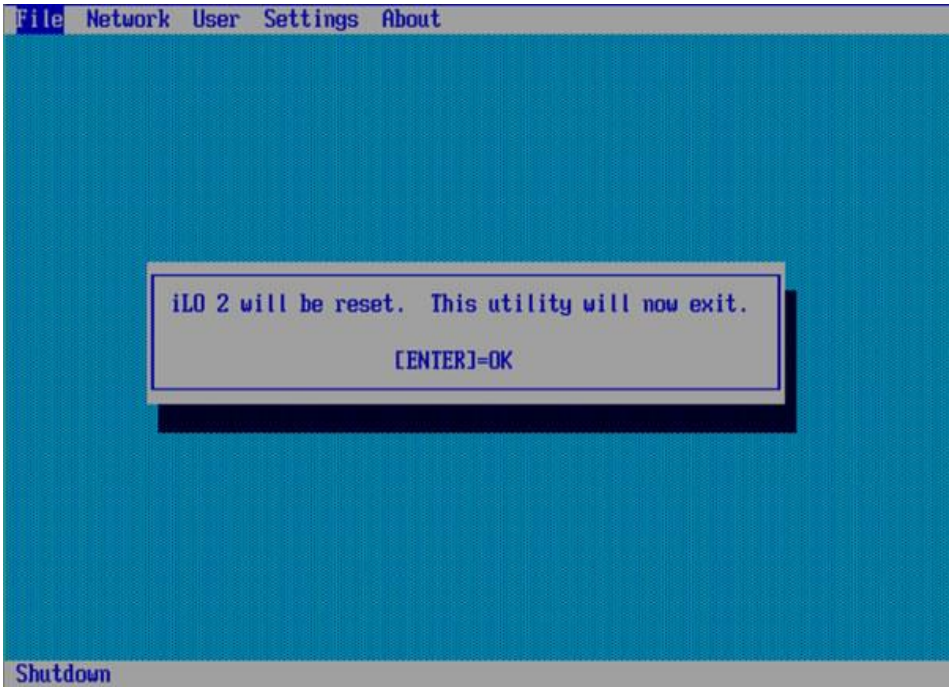

Figure 29 - Reset ILO Prompt

F.1.2 HP Gen9 iLO BIOS Settings

1. Reboot/reset the server.
2. Press the F9 key to access the System Utilities menu when <F9 System Utilities> appears in the lower left hand corner of the screen.
3. Select the System Configuration menu.
4. Select the "iLO 4 Configuration Utility" menu.
5. Select the "Network Options" menu.
6. Set "DHCP Enable" to OFF.
7. Configure the IP Address, Subnet Mask and Default Gateway to the desired values.
8. Press <Esc> to back out to the "iLO 4 Configuration Utility" menu.
9. Select the "User Management" menu.
10. Select "Add User". Add the root user 'admin' with the following information:
    - User name: admin
    - Login name: admin
    - Password: password
11. Press <F10> to save the updated settings, then <y> to confirm the settings change.
12. Press <Esc> four times to back out to the "System Utilities" menu.
13. Select "Reboot the System" and press <Enter> to confirm.

F.1.3 ILO Web GUI Settings

This section details setting the IPv6 address for the ILO via the Web management interface.

Note: The ILO IPv6 address is only supported in ILO version 3 and greater. ILO 3 firmware must also be at version 1.50 or greater.

1. In order to setup the IPv6 address for the iLO, the web management interface must be used. It can be accessed using a supported browser via the iLO IPv4 address.

2. Once logged in, navigate to Network -> iLO Dedicated Network Port

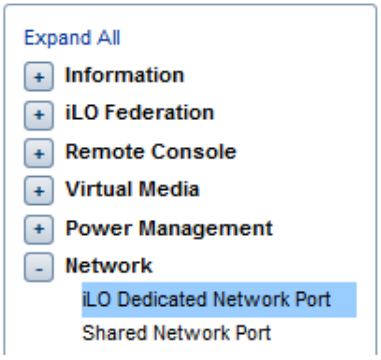

Figure 30 - ILO Network Menu

3. Select the IPv6 tab and update the IPv6 settings. Check the U**se IPv6 first** checkbox. Also disable SLAAC, DHCPv6, and DNS.

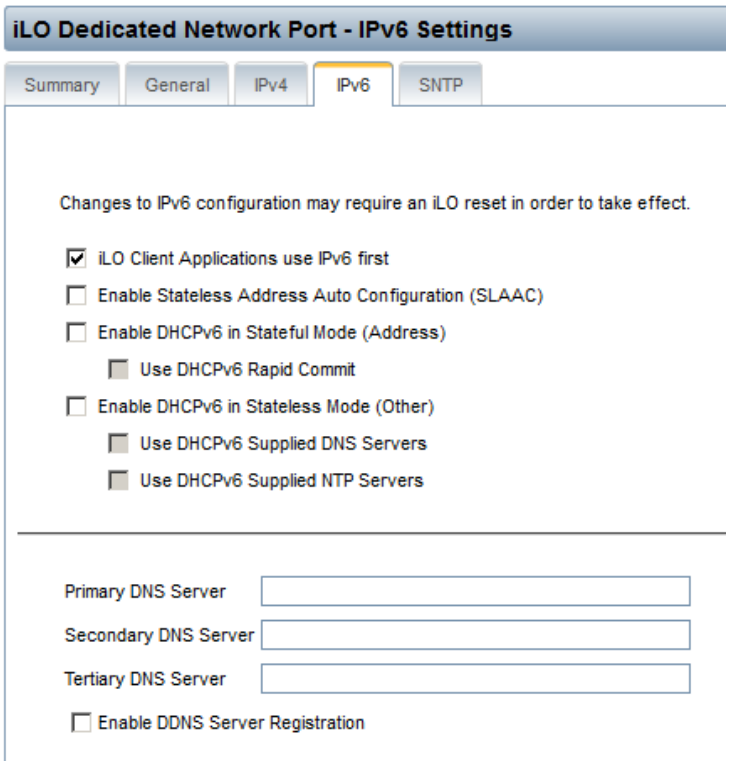

Figure 31 - Update IPv6 DNS and DHCP settings

4. Update the Static IPv6 Address and Default gateway. Then press the **Submit** button.

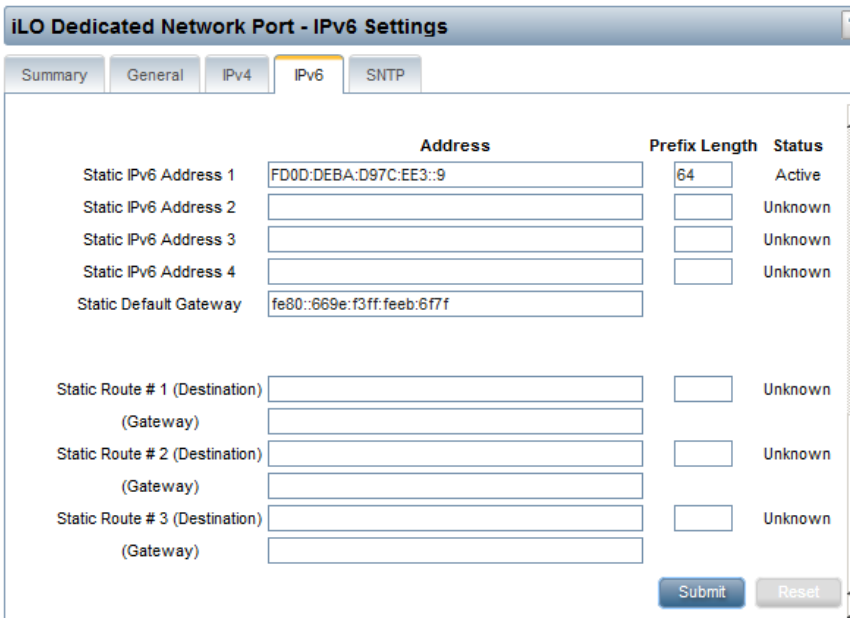

Figure 32 - Set IPv6 Address and Default Gateway

5. Press the **Reset** button that is enabled after the settings from the previous step are verified. A pop-up will ask to authorize a reset.

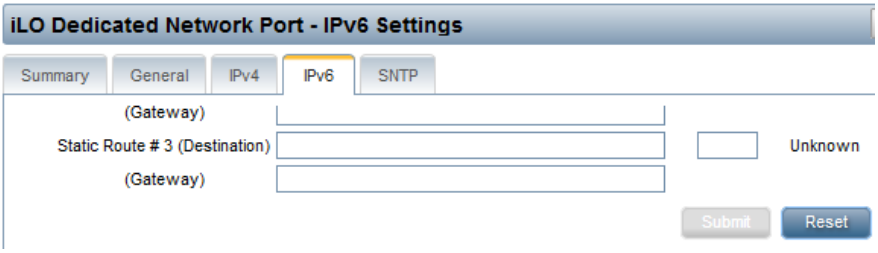

Figure 33 - Reset the ILO

6. Wait 30 seconds for the iLO to reset, then login with the new IPv6 address to verify.

F.2 ILOM Configuration Procedure

In configuring the ILOM, it will be necessary to make some changes in the BIOS and others in the web GUI after the BIOS settings are completed. See the sections below detailing both procedures.

F.2.1 ILOM BIOS Settings

This procedure lists how to either use DHCP or to statically set the IP address of the ILOM using a keyboard and monitor. If you would like to configure the IP address using the local serial management connection, see Reference [2].

1. Reboot the server.
2. Press F2 when prompted to enter the BIOS configuration menu.

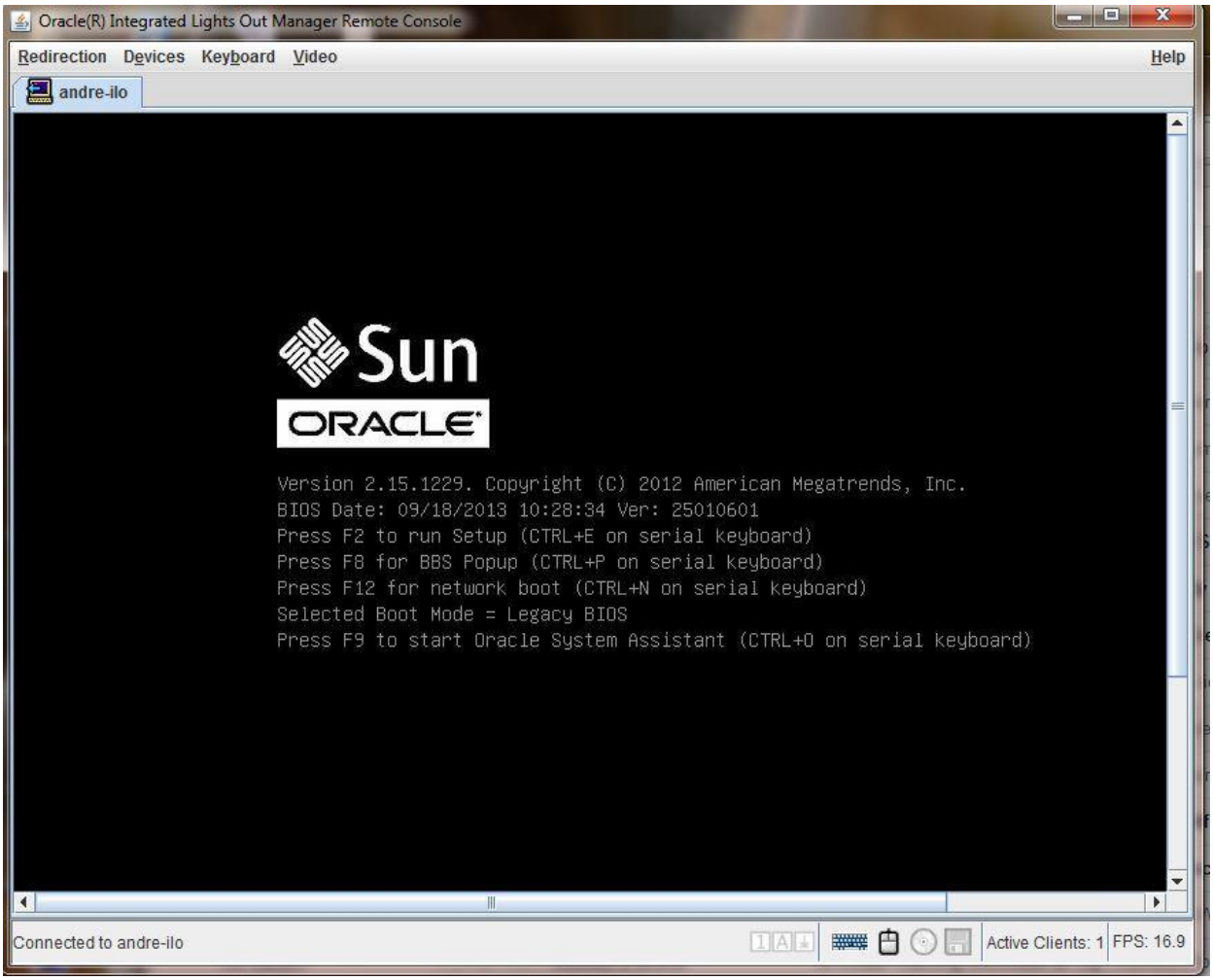

Figure 34 - Enter the BIOS Configuration Menu

3. This should take you to the Main Menu.

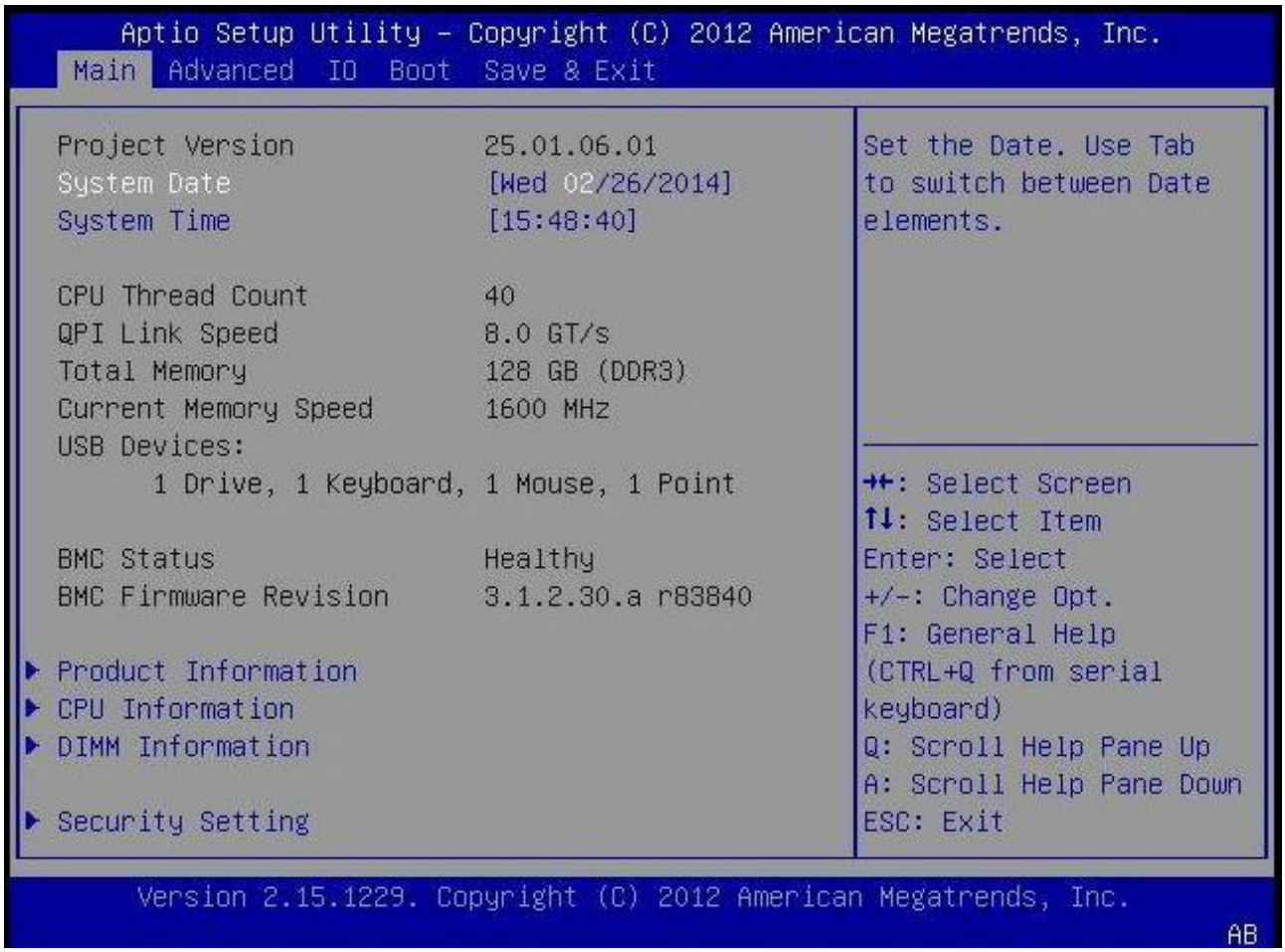

Figure 35 - Main BIOS Menu

4. Use the arrow keys to navigate through the menu and select the Advanced tab.

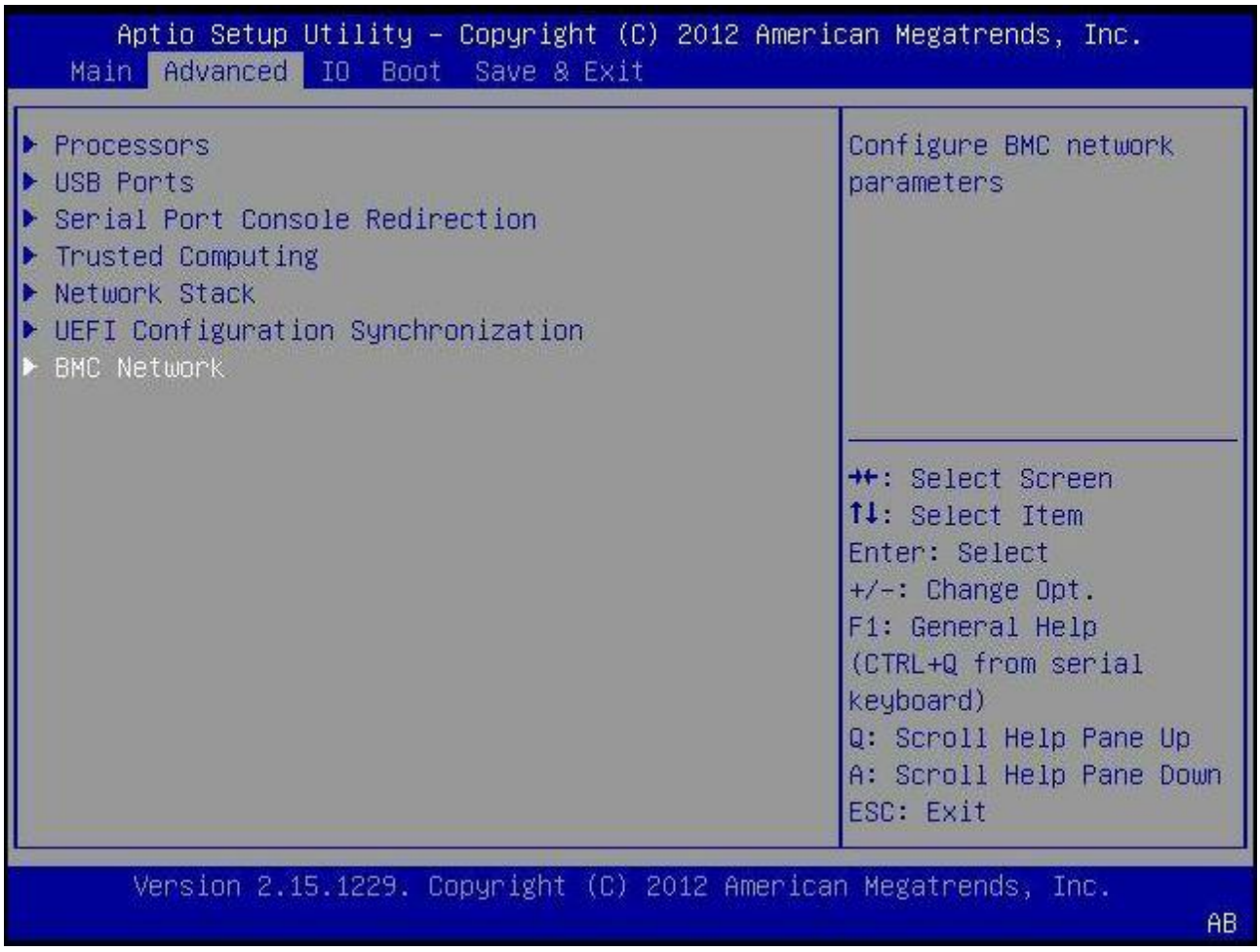

Figure 36 - Advanced BIOS Settings

5. Use the arrow keys to navigate through the menu and select the 'BMC Network' menu to open the BMC Network menu.

   Note: If only the IPv6 address is to be configured for the iLOM, skip to Step 12 below.

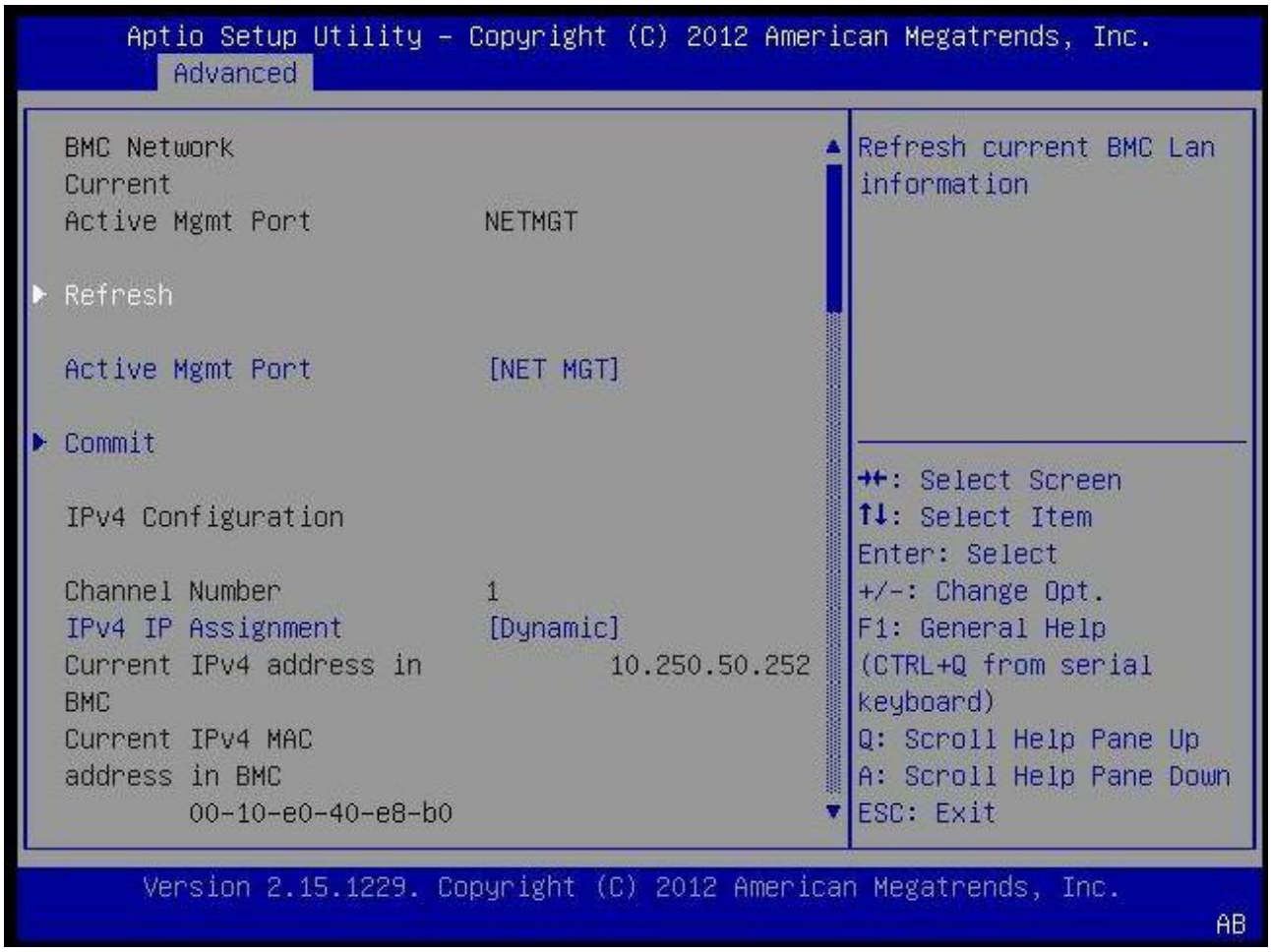

Figure 37 - BMC Network Menu

6. Use the arrow keys to navigate through the menu to highlight "IPv4 IP Assignment" and hit enter.
   Note: You may need to scroll down past current IPv4 Configuration.

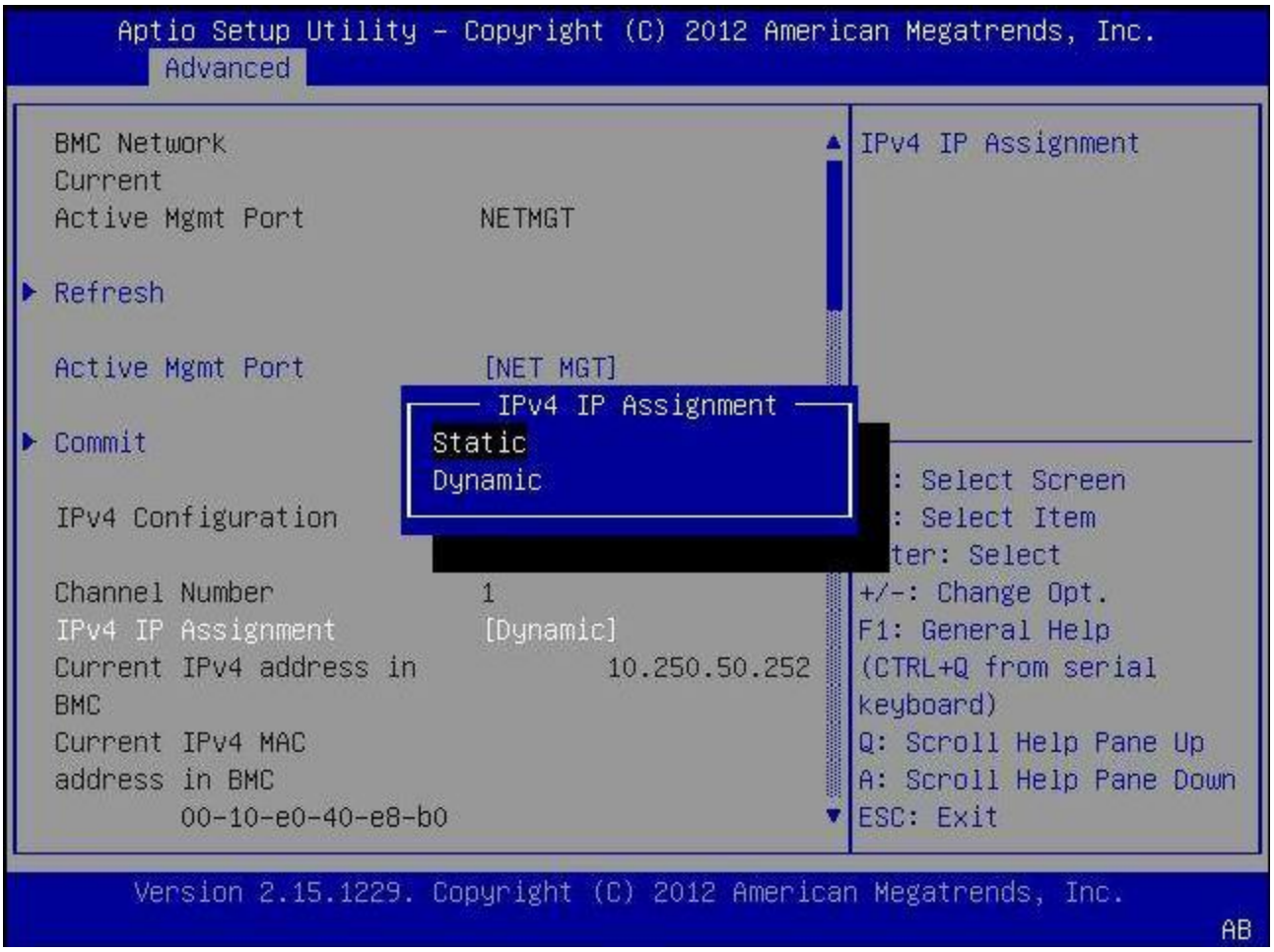

Figure 38 - Set IPv4 Type to Static

7. Use the arrow keys to highlight either "Dynamic" to use DHCP to get the IP address or "Static" to statically assign the IP address then hit enter.
   Note: If DHCP is to be used, skip to step 11 below.

8. Use the arrow keys to navigate down to highlight "IPv4 address" and hit enter to enter the IPv4 address.

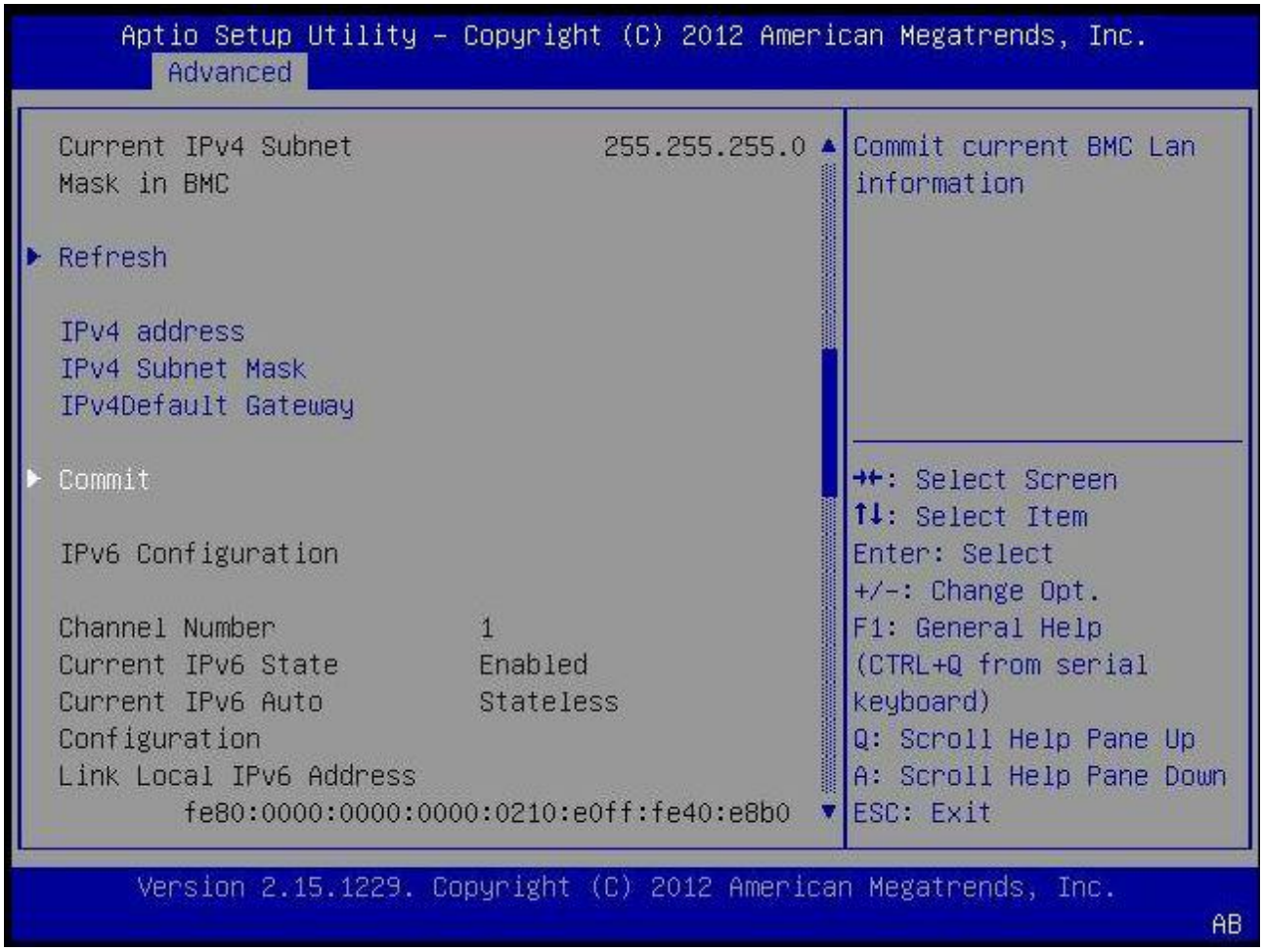

Figure 39 - Highlight IPv4 Address Option

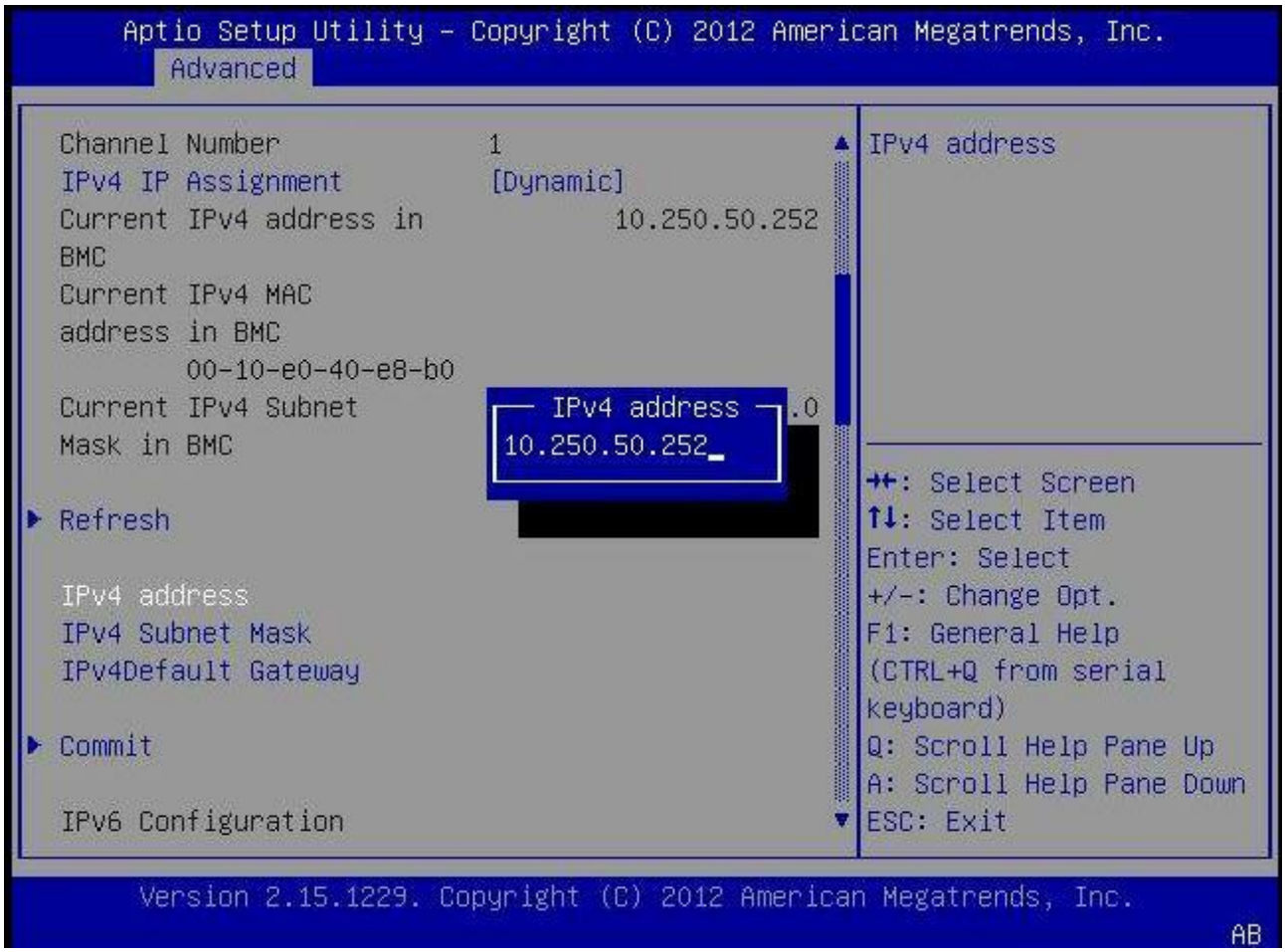

Figure 40 - Enter IPv4 Address

9. Enter the IP address and hit enter.
10. Do the same for "IPv4 Subnet Mask" and "IPV4 Default Gateway".
11. Use the arrow keys to navigate down to highlight the "Commit" BELOW the IPv4 fields you just configured as shown at the bottom of Figure 40. If you select a different "Commit" the information you just entered will not be saved. Once you hit enter to Commit, wait a brief moment for the information you entered to be saved. There will not be any visual feedback that Commit was done.

    Note: If only the IPv4 address is to be configured for the iLOM, skip to Step 16 below.

12. Page down to the IPv6 configuration settings, set IPv6 State to Enabled and hit Enter.

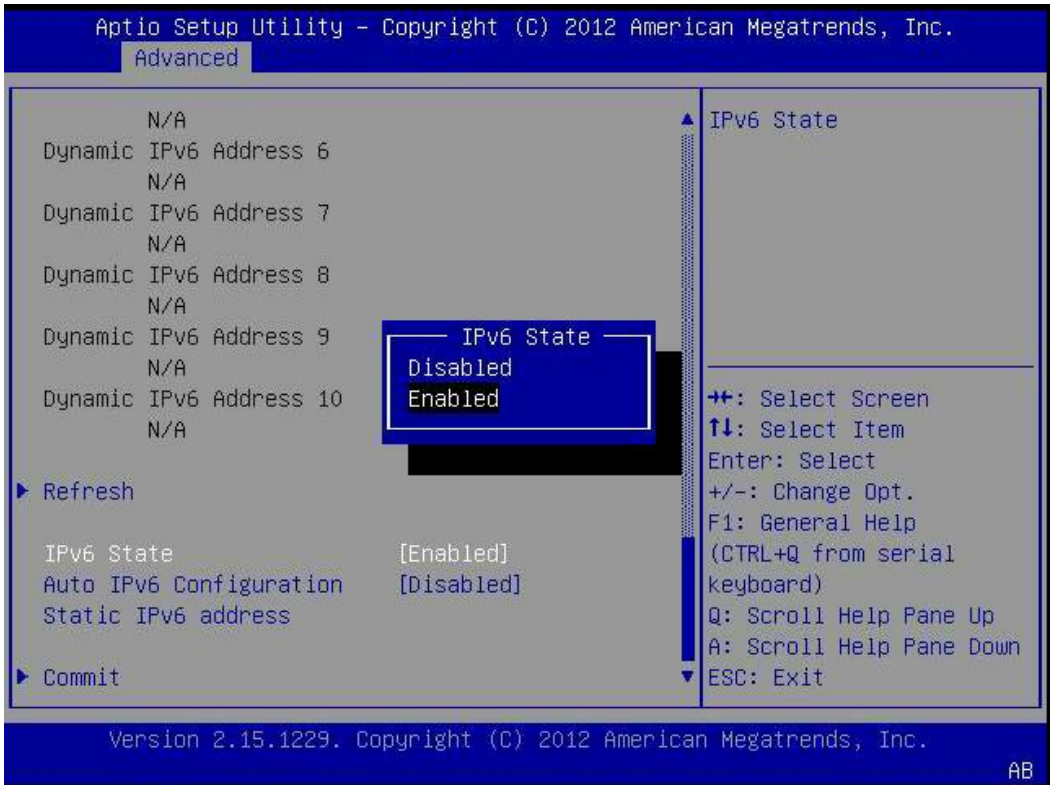

Figure 41 - Enable ILOM IPv6 State

13. Navigate to Auto IPv6 Configuration, set Auto IPv6 Configuration to Disabled and hit Enter.

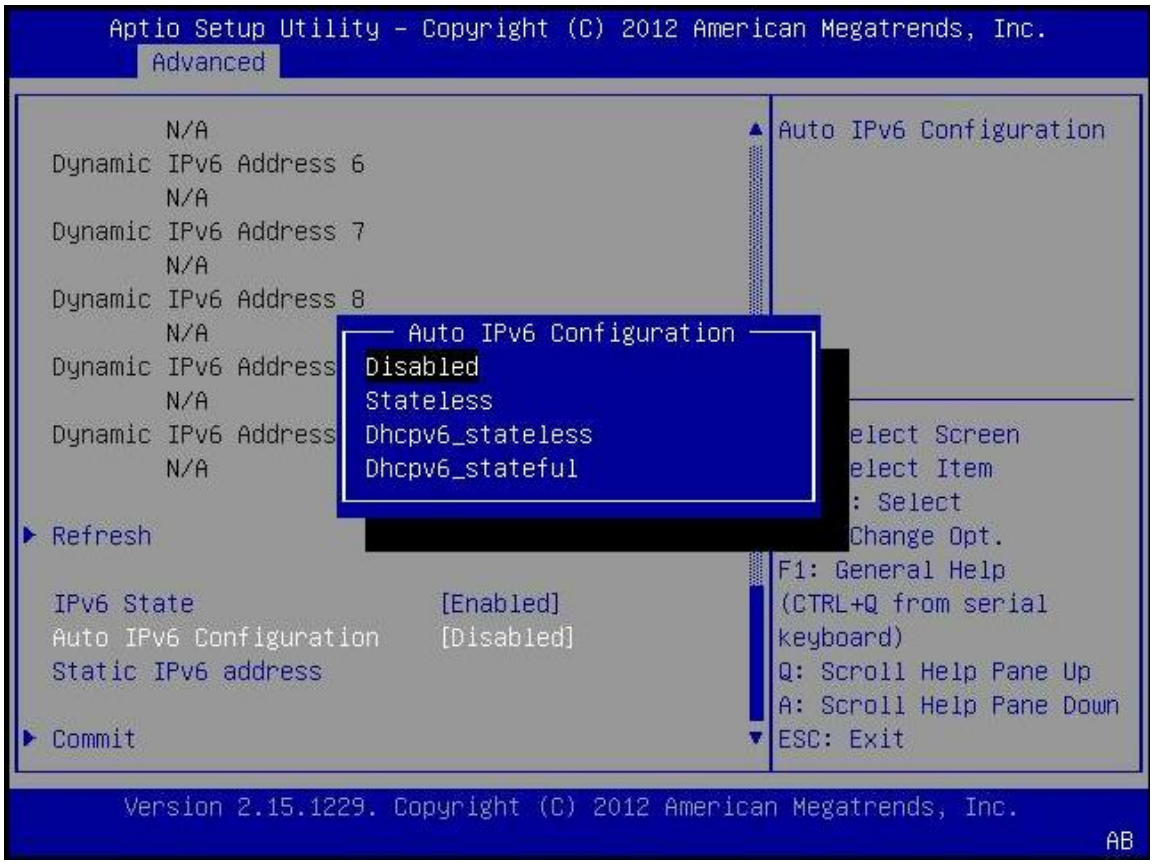

Figure 42 - Disable IPv6 Auto-Configuration

14. Highlight the Static IPv6 address option, press Enter, input the IPv6 address and press Enter.

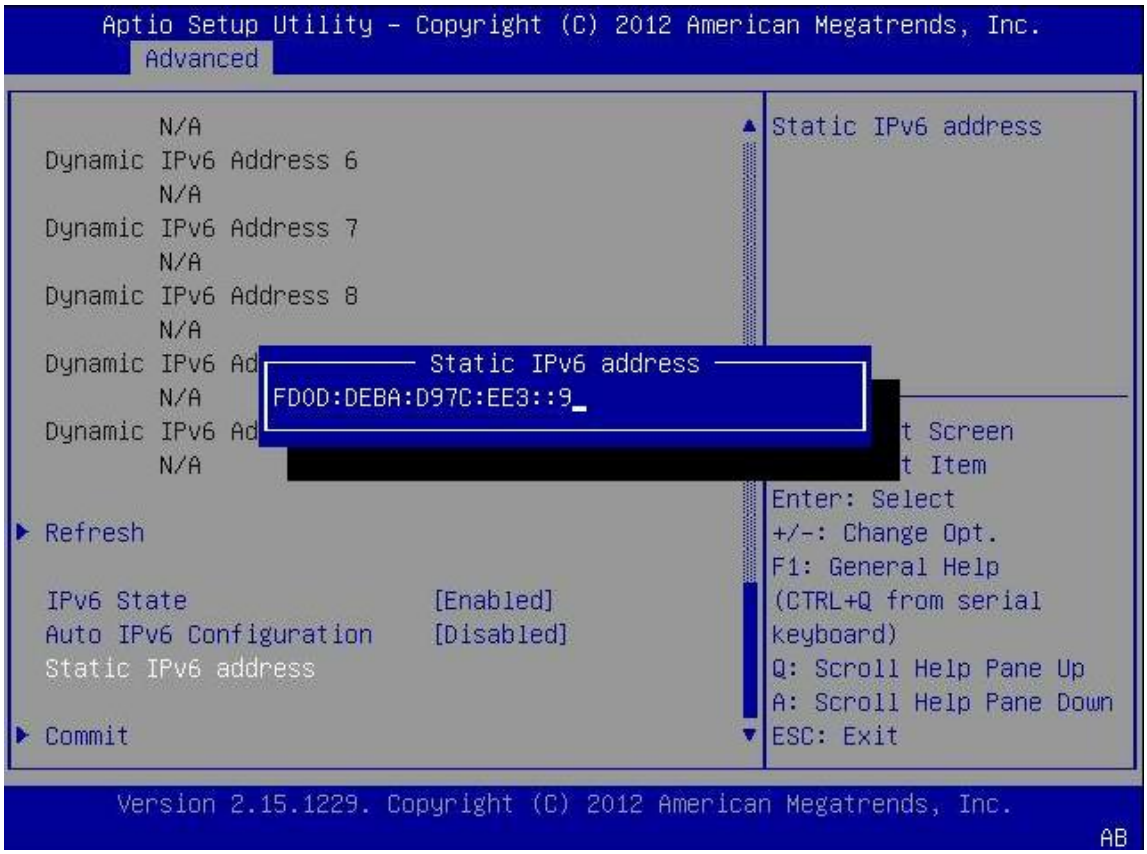

Figure 43 - Enter the Static IPv6 Address

15. Use the arrow keys to navigate down to highlight the "Commit" BELOW the IPv6 field that was just configured. If you select a different "Commit" the information you just entered will not be saved. Once you hit enter to Commit, wait a moment for the information you entered to be saved. There will not be any visual feedback that Commit was done.
16. Exit the "BMC Network" menu by hitting the escape key.

17. Use the arrow keys to navigate through the menu and select the "Save & Exit" tab.

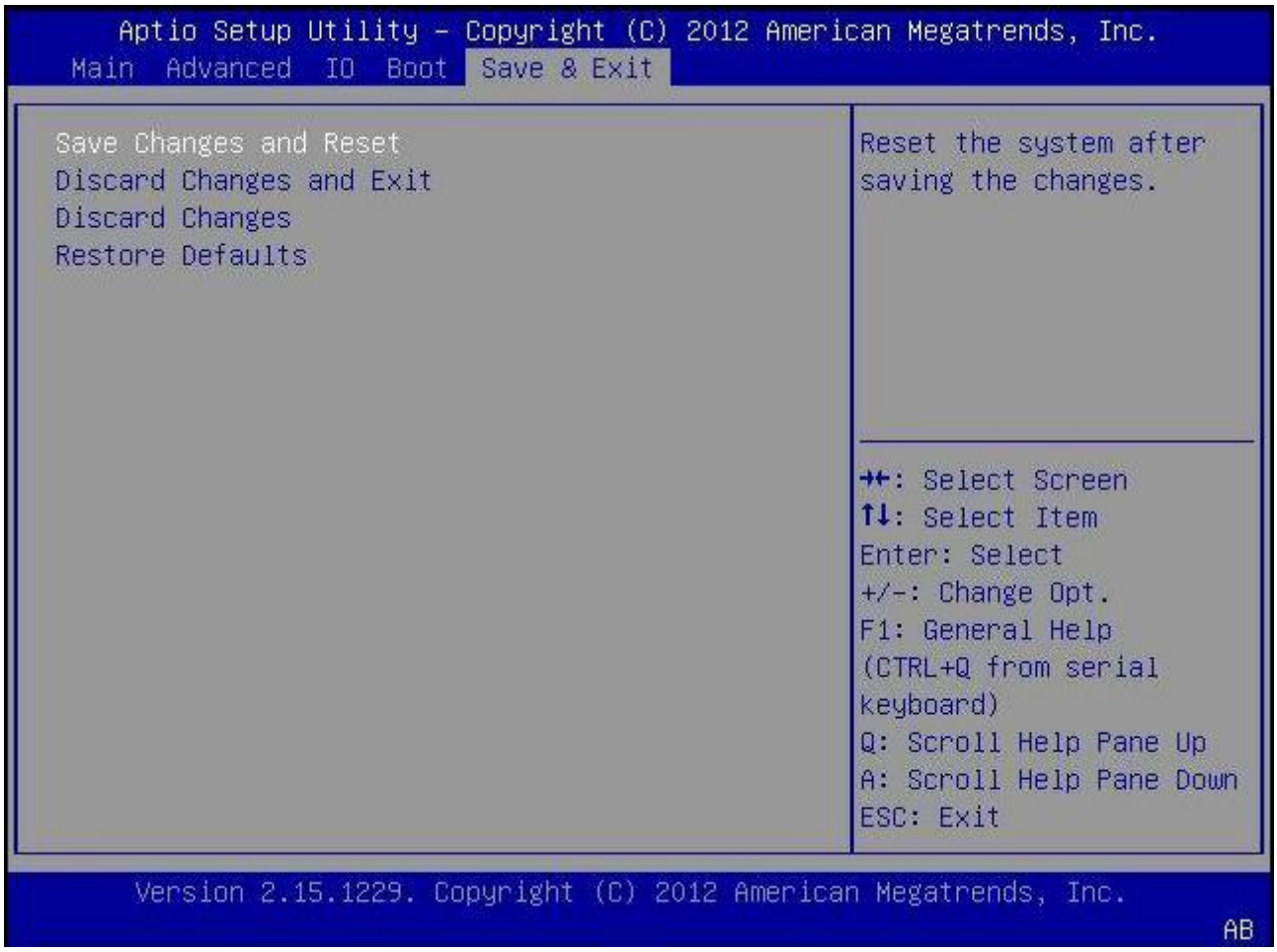

Figure 44 - Save Changes

18. Use the arrow keys to navigate down to highlight the "Save Changes and Reset" option. When asked select "yes" to confirm "Save configuration and reset?"
19. Server should reboot.
20. To configure additional user accounts in the ILOM, see Reference [2]

F.2.2 ILOM Web GUI Settings

Once the ILOM has been setup and is accessible via the Web GUI interface, the power settings should be updated. The steps for applying this setting are listed below.

1. Log in to the ILOM Web GUI
2. Select System Management->Policy

3. On the page, select the "Set host power to last power state on boot" option as seen in .

Figure 45 - ILOM Power Policy

4. To apply the power policy, click on the Actions drop down menu and then "Enable". Confirm the selection by clicking "OK" in the popup.

Appendix G. Locate Product Documentation on the Oracle Help Center Site

Oracle customer documentation is available on the web at the Oracle Help Center (OHC)) site, http://docs.oracle.com. You do not have to register to access these documents. Viewing these files requires Adobe Acrobat Reader, which can be downloaded at www.adobe.com.

1. Access the Oracle Help Center site at http://docs.oracle.com.
2. Click **Industries** in the navigation bar..
3. Under the "Communications" subheading, click the Oracle Communications documentation link.
   The "Oracle Communications Documentation" page appears. Most products covered by these documentation sets will appear under the heading "Network Session Delivery and Control Infrastructure" or "Platforms."
4. Click on your Product and then the Release Number. .
   A list of the entire documentation set for the selected product and release appears.
5. To download a file to your location, right-click the PDF link, select **Save target as** (or similar command based on your browser), and save to a local folder.