Red Hat Enterprise Linux 9 Installation

Lenovo ThinkStation PX, P7, P5



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Overview

The purpose of this document is to provide high-level guidance for users to adequately install a Red Hat Enterprise Linux 9 operating system on the ThinkStation PX, P7, and P5 platforms.

Section 1 – BIOS Setup

Prior to installing any operating system, it is important to make sure BIOS recognizes the storage devices appropriately.

Here are some key items to look for within BIOS setup.

At the Lenovo splash screen, press the function key F1 to enter BIOS setup.



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Select 'System Summary' from the main BIOS setup page.



Scroll down through the list until you see the type of drive(s) you are intending to use. Note, drives may <u>not</u> show up here if drives are part of a RAID array.

hink@totion	Front Fan 2	Operating	
ιιιικοιαιιυι	. Front Fan 3	Operating	
	Rear Fan 1-1	Operating	
	Rear Fan 1-2	Operating	
tart Menu	Flex Bay Fan 1	Operating	
A Main	Flex Bay Fan 2	Operating	
Q Devices	Flex Bay Fan 3	Not Operatin	Ig
T Devices	PSILHDD Fan	Not Operation	g
Advanced	M.2 Drive 1	SAMSUNG M	ZVL22T0HBLB-00BL7
D Power	M.2 Drive 2	None	
ት Security	M.2 Drive 3	None	
1 Startun	MCIO Drive 1-1	None	
	MCIO Drive 1-2	None	
→ Exit	MCIO Drive 2-1	None	
	MCIO Drive 2-2	None	
	PCIe Drive 1	None	
	PCIe Drive 2	None	
Lenovo.	PCIe Drive 3	None	
	PCIe Drive 4	None	
1 Help	↑↓ Select Item	+/- Change Values	F9 Setup Defaults
C Exit	←→ Select Menu	Enter Select > Sub-Menu	F10 Save and Exit

Select 'Devices' -> 'Storage Setup' to make sure the drive is enabled.

ThinkStation	~	
	Storage Setup	
Start Menu	SATA Controller Select whether to enable or disable SATA controller.	Enabled 🗸
Main	SATA Drive 1 Select whether to enable or disable SATA drive 1.	Enabled 🗸
* Advanced	SATA Drive 2 Select whether to enable or disable SATA drive 2.	Enabled 🗸
Power	SATA Drive 3 Select whether to enable or disable SATA drive 3.	Enabled 🗸
🕂 Security	SATA Drive 4 Select whether to enable or disable SATA drive 4.	Enabled 🗸
Exit	M.2 Drive 1 Select whether to enable or disable M.2 Drive 1.	Enabled 🗸
	M.2 Drive 2 Select whether to enable or disable M.2 Drive 2.	Enabled 🗸
Lenovo	M.2 Drive 3 Select whether to enable or disable M.2 Drive 3.	Enabled 🗸
	MCIO Drive 1-1	Enabled 🗸
F1 Help ESC Exit	↑↓ Select Item +/- Change Values <+> Select Menu Enter Select > Sub-Menu	F9 Setup Defaults F10 Save and Exit
	Version 2.21.0052. Copyright (C) 2022 AMI	

For PCIe drives, select 'Devices' -> 'PCI Express Setup' and select the slot for where the drive is physically installed. In this example, the M.2 drive is installed in Slot 1.



Make sure the drive is linking properly.

ThinkStation	÷			
	M.2 Slot1 Con	figuration		
Start Menu	Link Speed Select PCIe link speed.		Auto	~
Main Contract Main Contract C	PCIe Port Link Statu PCIe Port Link Max PCIe Port Link Spee	d	Linked as x4 Max Width x4 Gen 4 (16.0 GT/s)	
Power Security				1
Exit				
Lenovo.				
F1 Help ESC Exit	 ↑↓ Select Item ←> Select Menu 	+/- Change Values Enter Select > Sub-Menu	F9 Setup Defaults F10 Save and Exit	

Here's an example of BIOS not recognizing a PCIe drive.



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Section 2 – RHEL 9 Installation

Here are some step-by-step instructions on how to get a Red Hat Enterprise Linux 9 operating system installed on the ThinkStation PX, P7, and P5 systems.

- 1. Obtain a copy of the RHEL9 installation media. It is recommended to use Fedora Media Writer to make an installation USB with the appropriate RHEL9 iso media.
- 2. Insert the USB memory key into one of the USB ports on the system and power on the system.
- 3. At the Lenovo splash screen, press the function F12 key to enter the BIOS startup menu and select the USB installation media from the list.

ThinkStation	Startup Device N Network 1-[UEFI: PXE I Network 2-[UEFI: PXE I USB CDROM 1-[UEFI: SI	1enu Pv4 Intel(R) Ethernet Connection (15) I2 Pv4 Marvell AOC113C] MI USB DISK 1100]	19-LM]
🚵 Boot Menu 谷 App Menu	Enter Setup		
		\square	
Lenovo			
♣ Select Item Del key to enter Deployment	←→ Select Menu It boot mode Version 2.2:	Enter Select > Sub-Menu	ESC Exit

4. Select the 'Install Red Hat Enterprise Linux 9.0' option from the GRUB boot menu and press 'Enter'.



5. The Red Hat Enterprise Linux Welcome screen should appear. Select the appropriate language from the list of options and 'Continue'.

		A Particle (Halo & Parasa)	
English	English	English (United States) English (United States)	
العربية	Arabic	English (India)	
Français	French	English (Australia)	
Deutsch	German	English (Canada)	
日本語	Japanese	English (Denmark)	
中文	Mandarin Chinese	English (Ireland)	
Русский	Russian	English (New Zealand)	
Español	Spanish	English (Nigeria)	
Afrikaans	Afrikaans	English (Philippines)	
অসমীয়া	Assamese	English (Singapore)	
Asturianu	Asturian	English (South Africa)	
Беларуская	Belarusian	English (Zambia)	
Български	Bulgarian	English (Zimbabwe)	
বাংলা	Bangla	English (Botswana)	
Català	Catalan	English (Antigua & Barbuda)	
Ĉeština	Czech	English (Israel)	
Dansk	Danish		
EXArpsede	Greek		
Esperanto	Esperanto		
Eesti	Estonian		
Euskara	Basque		
فارسى	Persian		
Suomi	Finnish		
Filipino	Filipino		
Furtan	Friulian		
Gaeilge	Irish		
Galego	Galician		
39210	Guiarati		
עברית	Hebrew		
विन्धी	Hindi		
Hrvatski	Croatian		
Maqvar	Hungarian		
Interfinana	Interligence		
Informia	Indenasian		
Italiano	Italian		
dafarmene.	Georgian		
Vanas al al	Kanalda		
Қазақ тілі	Kazakh		

6. Adjust the 'Keyboard', 'Language Support', and 'Time & Date' accordingly by selecting each one. Or, leave the default settings.



7. Select the 'Software Selection' and choose the type of software to install.



8. Select the type of 'Base Environment' as well as each additional software to install.

In this example, 'Workstation' was selected for the 'Base Environment' and

all additional software tools were selected. ALLATION Helpi Backup Client Client tools for connecting to a ba GNOME Applications A set of commonly used GNOME # Headless Management Tools for managing the system wi GNOME Applications incina softwara Host Console internet acre Container Manageme Tools for managing I Development Tools Abasic development erroromment
 Abasic development
 Tools to develop and/or run .NFT apple
 Graphical Administration Tools **Base Environment** Server with GUI Jude network-based servers such as DHCP. Kerberos and NI An integrated, easy-to-manage server with a graphical interface. Tools ling RPMs, such as remisable Scientific Sa ent ematical and scientific computati O Server An integrated, easy-to-manage server. Minimal Install Basic functionality. Workstation Workstation is a user-friendly desktop system for laptops and PCs. Custom Operating System Basic building block for a custom RHEL system. Virtualization Host Minimal virtualization host. Additional software for Selected Environment 🔽 Backup Client Client tools for connecting to a backup server and doing backups. GNOME Applications A set of commonly used GNOME Applications.

- Email, chat, and video conferencing software. Office Suite and Productivity A full-purpose office suite, and other productivity tools. Remote Desktop Clients
 - Smart Card Support Support for using smart card authentication.
 - Legacy UNIX Compatibility

Headless Management

Internet Applications

Compatibility programs for migration from or working with legacy UNIX environments.

Tools for managing the system without an attached graphical console.

- Console Internet Tools
 Console internet access tools, often used by administrators.
- Container Management Tools for managing Linux containers
 Development Tools A basic development environment.
 .NET Development Tools to develop and/or run .NET applications
 Graphical Administration Tools Graphical system administration tools for managing many aspects of a system.
 Network Servers These packages include network-based servers such as DHCP, Kerberos and NIS.
 RPM Development Tools Tools used for building RPMs, such as rpmbuild.
 Scientific Support Tools for mathematical and scientific computations, and parallel computing.
- Security Tools
 - Security tools for integrity and trust verification.
 - System Tools
 - is group is a collection of various tools for the system, such as the client for connecting to SMB shares and tools to monitor network traffi

9. Select 'Installation Destination'.



10. Select the device on where to install the operating system.

1.86 T/B MSUNG M2/L22T0HBLB-00BL7	
nvmeQn1 / 1.86 TIB free allized & Network Disks	Das tell-aralicidat her an
ld active	Das set auslichet norven
	Local Standard Disks
	1.86 TiB
	SAMSUNG MZVL22T0HBLB-00BL7
	nyme0n1 / 186 LiB free

12

11. Select 'Root Password'.



12. Enter a root password in both boxes below and select 'Done' in the upper left.

ROOT PASSWORD		RED H	AT ENTERPRISE UNUX 9.0 INSTALLATION
	Forest accounts source its search and anticologing to reprint of fore a parameter of the rest content. Rest Parameter Content: Content: Rest rest Spit lugar with pressent		
The root accoun	t is used for administering the system. Enter a password f	or the root user.	
Root Password:		۲	
	() ei	mpty password	
Confirm:		۲	
🗹 Lock root ac	count		
Allow root S	SH login with password		

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13. Select 'User Creation'.



14. Fill in the appropriate boxes below and select 'Done' in the upper left.

CREATE USER		RED HAT ENTERPRISE LINUX 9.0 INSTALLATION
	Fed name Liker name Mare that and a domest whit Reprint a constant of the Reprint a constant of	
Full name		
User name		
	Make this user administrator	
	Require a password to use this account	
Password	©	
	empty password	
Confirm password	Ĩ	
	Advanced	

15. Select 'Begin Installation' to start the installation.



16. Once the installation completes, select 'Reboot System' at the bottom right.



17. Select the user icon and log in using the credentials created above.



18. Red Hat Enterprise Linux 9 Desktop screen.



Section 3 – Install Device Drivers

Most of the standard building blocks used in the ThinkStation PX, P7, and P5 platforms are native to the Red Hat Enterprise Linux 9 base kernel. It may be worth installing a proprietary graphics driver to get optimal performance from the graphics card. The next couple of sections provide some step-by-step instructions on how to install a proprietary Nvidia graphics driver in Red Hat Enterprise Linux.

Note, registering the system to the Red Hat subscription will allow for easy Linux updates. Here is a quick step to easily register and subscribe to the Red Hat subscription repositories.

- # subscription-manager register
- # subscription-manager auto-attach

Section 4 – Install Nvidia Proprietary Drivers

Here are some step-by-step instructions on how to install Nvidia proprietary drivers.

- 1. Download the appropriate Nvidia graphics driver.
- 2. Blacklist the Linux Nouveau driver.

nano /etc/modprobe.d/blacklist.conf

- Add the following line, 'blacklist nouveau', and save and exit the file.



3. Update the initramfs file and reboot the system.

dracut --force

reboot now



4. Once the system reboots to the Linux desktop screen, run the following command as superuser from a terminal window to exit X-windows.

init 3

5. Login as root (superuser).



6. Browse to the directory to where the Nvidia driver installation file is located and run the following command. *In this example, it is on the Linux desktop.*

bash NVIDIA*



7. Note the driver should start to install.



8. The driver will ask whether to install NVIDIA's 32-bit compatibility libraries. *In this example, 'yes' was selected.*

compatibilit	y librarie	es?			
Yes				No	
	compatibilit	compatibility librarie	compatibility libraries?	compatibility libraries?	compatibility libraries?

9. Select 'OK' on the following warning message.



10. The driver should continue to install.



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11. Select 'Yes' to update the x-configuration file.



12. Select 'OK' to acknowledge that the x-configuration file has successfully been updated.



13. Run the following command to verify the Nvidia driver has been installed and loaded properly.

nvidia-smi

NUIDI	IA−S M I	515.70	ō	Dr	iver	Vers	ion:	515	5.76	C	JDA Versio	on: 11.7
GPU Fan	Name Temp	Perf	Persi Pwr:U	sten sage	+ ce-MI ∕CapI	Bus	-Id	Men	Disp.A nory-Usage	 	Volatile GPU-Util	Uncorr. EC Compute M MIG M
0 32%	NVIDIA 44C	1 T400 P0	4GB N∕A		====+ ff 31W 	000	00000 0 M i	0:27 iB /	2:00.0 Off 4096MiB	 	0%	N∕ Defaul N∕
Proce GPU	esses: GI ID	CI ID		PID		e 1		ess	name			GPU Memor Usage
No 1	======= cunning	====== proce	esses	==== foun	===== d	====	=====	====		==;		

Revision	History

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Version	Date	Author	Changes/Updates
1.0	5/26/2023	Jason M.	Initial launch release.