BLACKBERRY

BlackBerry Workspaces

On-Premise Solution (Appliance-X) Site Readiness Checklist

Version 4.0

BLACKBERRY

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Introduction

The BlackBerry Workspaces on-premise solution enables organizations to securely share, sync, control, and track files among internal users and with partners and customers through software installed at the customer site.

This document provides a **mandatory checklist** for customers to verify that their site is prepared for the Appliance-X installation. It should be filled by the customer and returned to BlackBerry Professional Services prior to the deployment process. Proper site preparation is essential to ensure a smooth installation.

Prerequisites

The following section lists the prerequisites for BlackBerry Workspaces Appliance-X installation. Note that these prerequisites are the responsibility of the customer.

Virtualization Server

The customer must have an installed Virtualization platform, with capacity available to support the specifications as detailed in *Hardware Requirements*, section 7. Available platforms include, but are not limited to, ESX, ESXi, and Hyper-V. The customer may also choose to install the servers in their private Cloud environment such as Azure or AWS.

Domain Name & Branding

BlackBerry Workspaces installation requires clear identification of the domain name as well as the appropriate authorization certificates. The customer must provide BlackBerry Workspaces with the preferred FQDN (Fully qualified domain name; such as *workspaces.mycompany.com*). This address is branded into the Appliance and serves as the suffix of all URLs used to access the BlackBerry Workspaces services.

Certificates

The BlackBerry Workspaces Virtual Appliance must be provisioned with certificates that correspond to the domain where it is installed. **Since the core value of the product relies on its security, no self-signed certificates may be used, and only approved certificate authorities can sign the certificates.**

Please refer to the included Appendix for detailed SSL certificate requirements.

Mail Relay (SMTP) Identification

The BlackBerry Workspaces application uses email as part of standard operation. Therefore, an SMTP server must be specified for service to function.

NTP Server

Virtual Appliance installation requires precise timing synchronization. Both IP address and Hostname formats are supported.

Third-Party Licensing

As part of BlackBerry Workspaces' installation process, license activation for third party software is required. All licenses should be provided by the customer prior to installation. This software includes:

1. Microsoft products (Windows Server 2016 *and* Microsoft Office 2016 Standard/Pro edition)
2. Red Hat Enterprise Linux 9

App-X Installation Type	Third Party Software Licenses	Amount	Notes
Basic	Microsoft Windows Server 2016	1	
	Microsoft Office 2016 Standard/Pro edition	1	Standard, Professional, or Professional Plus
	Red Hat Enterprise Linux 9.3	1	RHEL Server license
Advanced	Microsoft Windows Server 2016	1+	Number of servers may vary. Consult with your PS Consultant
	Microsoft Office 2016 Standard/Pro	1+	1 license required for each 2016 server installed. Consult with your PS Consultant if there are questions
	Red Hat Enterprise Linux 9.3	4+	Number of servers may vary. Consult with your PS Consultant

Yum and Python Package Repositories

BlackBerry Workspaces must install packages using a yum repository and Python pip repository. To maintain updates, it is highly recommended to allow outbound connections to the Yum repos and pip repo below over TCP 443. Red Hat Satellite Server may also be used in place of Red Hat yum repo. Please consult with your Professional Services Consultant if you cannot allow outbound access to these internet resources.

TCP 443 Outbound:

- cdn.redhat.com
- dl.fedoraproject.org
- pypi.org

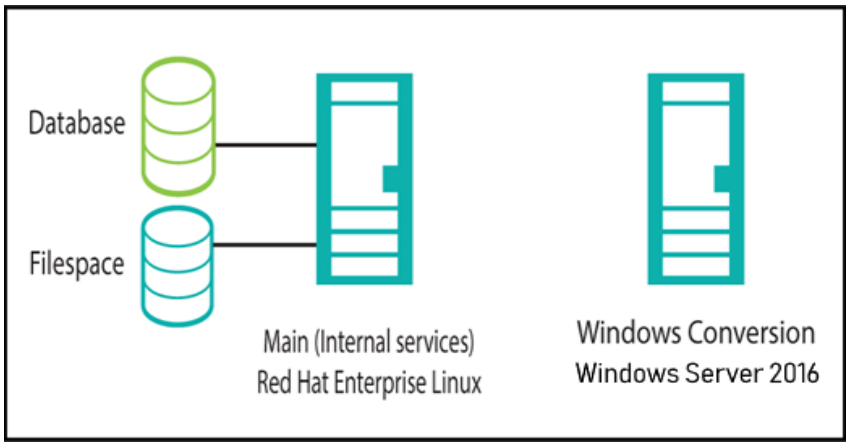
Deployment Configuration

Architecture

The standard BlackBerry Workspaces virtual appliance solution is comprised of 2 virtual machines as detailed below. This deployment model is called *Appliance-X Basic*. For specialized deployments, or deployments which require High Availability, a larger scalable model is available called *Appliance-X Advanced*. Due to the varying nature of Appliance-X Advanced deployments, server count and specifications may vary. Therefore, please ask your Professional Services Consultant if you have any questions.

Appliance-X Basic

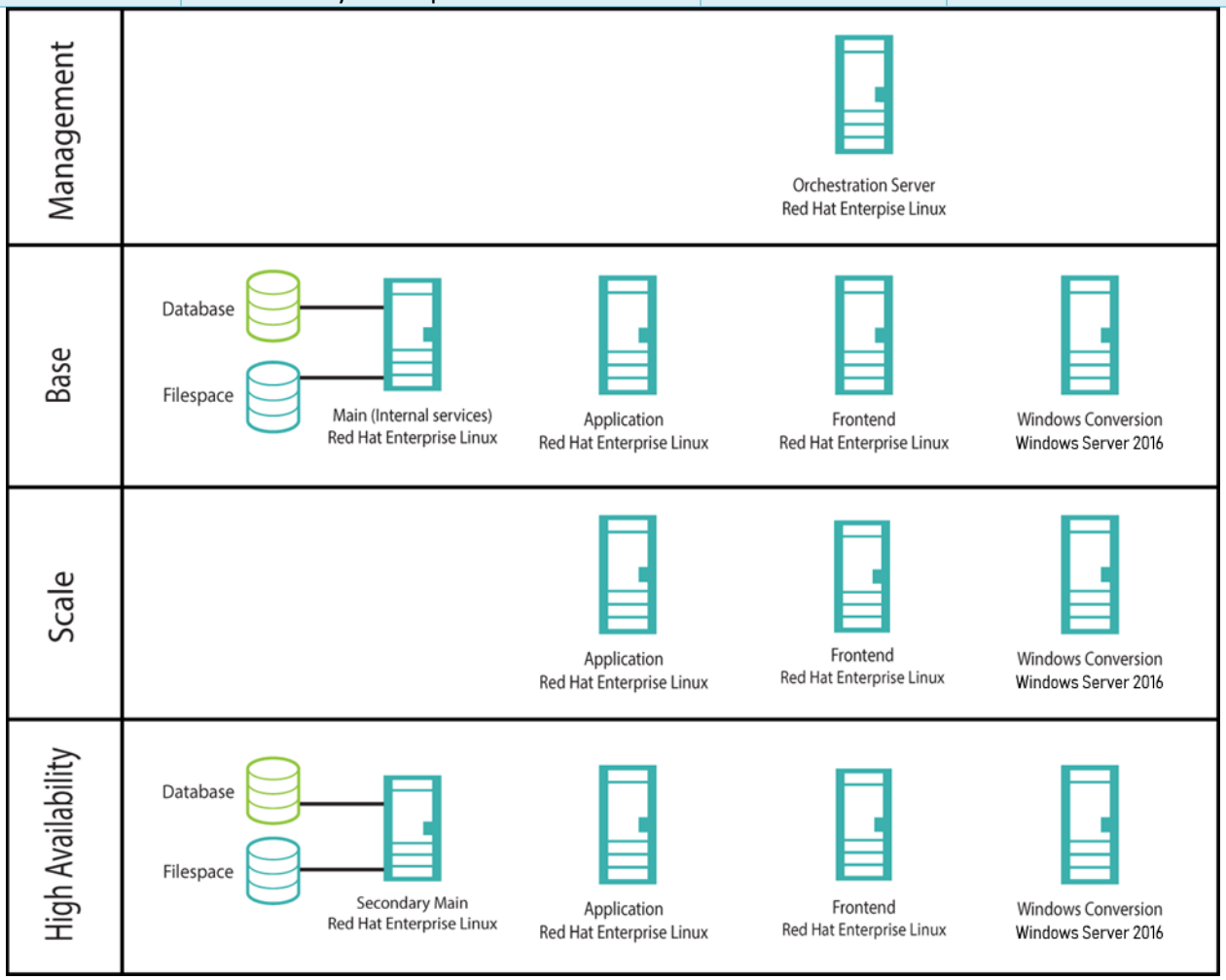
Server Name	Responsibility
Master-Main	Provide all end-user services, including database and file storage
Conversion - Windows	Convert Microsoft Office files to BlackBerry Workspaces secure formats



Appliance-X Advanced

Server name	Responsibility	Add copies of server for scale	Secondary copy of server for high availability
Orchestration	Deployment and configuration management		
Frontend	BlackBerry Workspaces application frontend & load balance end users between application resources. If you add a copy of the server for scale, an external load balancing solution is required.	✓	✓

Main	Internal appliance services, including database and file storage		✓
Application	BlackBerry Workspaces application, including web application and API service	✓	✓
Conversion - Windows	Converts Microsoft Office files to BlackBerry Workspaces secure format	✓	✓



Checklist

1. **Network settings**	**Main RHEL IP:** ___.____.____.____ **Conversion Windows IP:** ___.____.____.____ **Network Mask:**

	___.___.___.___ **Gateway:** ___.___.___.___ **DNS 1:** ___.___.___.___ **DNS 2:** ___.___.___.___
2. **Please enter the name of the organization hosting the service, and the email address of the hosting service administrator.**	Hosting organization name: Click here to enter text. Administrator email address: Click here to enter text.
3. **Please enter the server's desired URL:** **Please note that this domain will require proper SSL certificates**	FQDN: Click here to enter text.
4. **Local server time-zone**	Click here to enter text.
5. **NTP server details**	IP or Hostname: Click here to enter text.
6. **SMTP server details**	Server IP: ___.___.___.___ Port (default 25): Click here to enter text. User (optional): Click here to enter text. Password (optional): Click here to enter text.
7. **How much space will be dedicated to the server for storage of end users' documents?** • **Note: Please plan for 20% overhead to this number for database storage. Example:** • **500 GB for document storage**	Dedicated storage space: Click here to enter text.

• **100 GB for database storage**	
8. **Have you obtained required trusted-signed certificates?**	Yes ☐ No ☐
9. **Have you obtained the required Microsoft license keys? (Windows Server 2016 and Office 2016 Standard or Professional edition)**	Yes ☐ No ☐

Firewall Connectivity Matrix

The firewall connectivity matrix details the access settings required for the BlackBerry Workspaces product. These settings must be configured by the customer to enable BlackBerry Workspaces service.

Appliance-X Basic

Source	Target	Port
Master-Main RHEL Server	SMTP Server	• 25
Master-Main RHEL Server	Conversion Windows Server	• 22 • 4510 • 4511 • 443 • 4431 • 4432 • 4433 • 8082
Master-Main RHEL Server	Red Hat Yum Repository (Internet)	• 443
Master-Main RHEL Server	Pypi.org (Internet)	• 443
Conversion Windows Server	Master-Main RHEL Server	• 4510 • 4511 • 8543 • 8443 • 53 (+UDP) • 4505 • 4506
End User Devices	Master-Main RHEL Server	• 80 • 443
IT Admins	Master-Main RHEL Server	• 5000 • 8081

Source	Target	Ports
Orchestration server	Main server	• 25
Orchestration server	Main server	• 22 • 5666
Orchestration server	Frontend server	• 22 • 5666
Orchestration server	Application server	• 22 • 5666
Orchestration server	Conversion-Windows server	• 22 • 5666 • 4510 • 4511
Main server	External Cloud Storage	• 443
Main server	Orchestration server	• 4505 • 4506 • 8543
Main server	Frontend server	• 3000
Main server	Application server	• 8009 • 8080
Main server	Conversion-Windows server	• 443 • 4431 • 4432 • 8082
Main server	Main server	• 6379
Frontend server	Orchestration server	• 4505 • 4506 • 8543
Frontend server	Application server	• 8009 • 8080
Frontend server	Main server	• 53 (+UDP) • 8443
Frontend server	Conversion-Windows server	• 443 • 4433
Application server	SMTP server	• 25
Application server	Orchestration server	• 4505 • 4506 • 8543
Application server	Main server	• 3306

Source	Target	Ports
		• 8443 • 8081 • 11211 • 2049 • 111 • 53 (+UDP)
Application server	Frontend server	• 3000
Conversion-Windows server	Orchestration server	• 4505 • 4506 • 8543
Conversion-Windows server	Main server	• 8080 • 8443 • 53 (+UDP)
End User Devices	Frontend server	• 443 • 80
IT Admins	Orchestration server	• 5000 • 7767
IT Admins **All Linux Servers**	Main server Red Hat Yum Repository (Internet)	• 8081 • 443
All Linux Servers	Pypi.org (Internet)	• 443

Hardware Requirements

The minimum hardware requirements can be found below. In some situations, it may be recommended to exceed these minimum requirements. Please reference the below server sizes based on the number of registered users in the system.

Server Sizes

Server size	Workspaces Architecture	Number of Users	HA Included	HA Possible
Small	Basic	0 - 500	No	No
Medium I	Advanced	500 – 2,000	No	Yes
Medium II	Advanced	2,000 – 5,000	No	Yes
Medium III	Advanced	5,000 – 25,000	Yes	Yes
Large I	Advanced	50,000 – 100,000	Yes	Yes
Large 2 +	Advanced	100,000 +	Yes	Yes

Small

Server name	Operating System	vCPU	Memory	HDD1	HDD2	HDD3	HDD4
Master-Main	RHEL 9.3	6	16 GB	100 GB	40 GB	Filespace; See Checklist Item #7	DB; 20% of HDD3
Conversion - Windows	Windows Server 2016	4	8 GB	100 GB	100 GB		

Medium I

Server name	Operating System	vCPU	Memory	HDD1	HDD2	HDD3	HDD4
Main1	RHEL 9	2	8 GB	100 GB	40 GB	Filespace on NFS; See Checklist Item #7	DB; 20% of HDD3
Main2	RHEL 9	2	8 GB	100 GB	40 GB	Filespace on NFS; See Checklist Item #7	20% of HDD3
Application1	RHEL 9	2	8 GB	100 GB			
Orchestration	RHEL 9	2	4 GB	100 GB			
Frontend1	RHEL 9	2	4 GB	100 GB			
Conversion1	Windows Server 2016	2	8 GB	100 GB	100 GB		

Medium II

Server name	Operating System	vCPU	Memory	HDD1	HDD2	HDD3	HDD4
Main1	RHEL 9	4	8 GB	100 GB	40 GB	Filespace on NFS; See Checklist Item #7	DB; 20% of HDD3
Main2	RHEL 9	4	8 GB	100 GB	40 GB	Filespace on NFS; See Checklist Item #7	20% of HDD3
Application1	RHEL 9	4	8 GB	100 GB			
Orchestration	RHEL 9	2	4 GB	100 GB			
Frontend1	RHEL 9	2	4 GB	100 GB			
Conversion1	Windows Server 2016	4	8 GB	100 GB	100 GB		

Medium III

Server name	Operating System	vCPU	Memory	HDD1	HDD2	HDD3	HDD4
Main1	RHEL 9	8	16 GB	100 GB	40 GB	Filespace on NFS; See Checklist Item #7	DB; 20% of HDD3
Main2	RHEL 9	8	16 GB	100 GB	40 GB	Filespace on NFS; See Checklist Item #7	20% of HDD3
Application1	RHEL 9	4	8 GB	100 GB			
Application2	RHEL 9	4	8 GB	100 GB			
Application3	RHEL 9	4	8 GB	100 GB			
Orchestration	RHEL 9	2	4 GB	100 GB			
Frontend1	RHEL 9	2	6 GB	100 GB			
Frontend2	RHEL 9	2	6 GB	100 GB			
Conversion1	Windows Server 2016	4	8 GB	100 GB	100 GB		
Conversion2	Windows Server 2016	4	8 GB	100 GB	100 GB		

Large I

Server name	Operating System	vCPU	Memory	HDD1	HDD2	HDD3	HDD4
Main1	RHEL 9	16	16 GB	100 GB	40 GB	Filespace on NFS; See Checklist Item #7	DB; 20% of HDD3
Main2	RHEL 9	16	16 GB	100 GB	40 GB	Filespace on NFS; See Checklist Item #7	20% of HDD3
Application1	RHEL 9	8	16 GB	100 GB			
Application2	RHEL 9	8	16 GB	100 GB			
Application3	RHEL 9	8	16 GB	100 GB			
Orchestration	RHEL 9	2	4 GB	100 GB			
Frontend1	RHEL 9	4	6 GB	100 GB			
Frontend2	RHEL 9	4	6 GB	100 GB			
Conversion1	Windows Server 2016	8	16 GB	100 GB	100 GB		
Conversion2	Windows Server 2016	8	16 GB	100 GB	100 GB		
Conversion3	Windows Server 2016	8	16 GB	100 GB	100 GB		

Large II+

For deployments larger than 100,000 users, consult with your BlackBerry Professional Services representative.

Additional File Storage

In addition to the OS drives, 3 additional disks are required to store end users' uploaded files and database files on "Main" Red Hat servers. Data stored on these drives will remain encrypted at all times. Depending on the deployment option selected, the drive mount points will differ.

Deployment Type	Disk Purpose	Server Location	Mount Point	Size
Basic AppX	Filespace	Master-Main	/opt/watchdox/storage/filespace	Customer Discretion
	Database	Master-Main	/mnt/database	20% of Filespace
	FS Cache	Master-Main	/opt/watchdox/storage/fs_cache	40 GB
Advanced AppX	Filespace	Main	/opt/watchdox/storage/filespace	Customer Discretion
	Database	Main	/mnt/database	20% of Filespace
	FS Cache	Main	/opt/watchdox/storage/fs_cache	40 GB

Note: If more than one Main server exists in the environment, the Filespace should be on NFS storage.

Server Images

Below are operating system prerequisites for the Workspaces deployment.

Servers	Requirements
Red Hat Linux Enterprise	• Static IP for each server on eth0 interface • Red Hat Enterprise Linux version 9.3. No other Red Hat versions are supported at this time. Red Hat server images can be downloaded from Red Hat: https://access.redhat.com/downloads • For instructions on setting up the Red Hat '/' mount, please see "Appendix- Configuring Red Hat '/' during install". • Root account or a user account with SUDO privilege. • If a user account was used instead of root, NOPASSWD configuration must be granted in /etc/sudoers. This does not eliminate the user's password, this removes the repeat password prompt when the user elevates commands via sudo. • SSH service is available and running • SELinux is either disabled or in permissive mode • Base packages that are included with the standard RHEL 9 image. Those required packages can be viewed at KB-64702.
Windows	• Static IP for each server • Windows Server 2016 64-bit is activated • Microsoft Office 2016 64-bit, Standard or Professional is activated • Validate that the C: and D: drives were created (100 GB each) • Create the D:\Temp directory with FULL permission assigned to all users • Set environment variables %TEMP% and %TMP% for system, user, and default user to D:\Temp

	• Ensure the BlackBerry Workspaces Cygwin package is installed. The installer is provided before deployment and includes these packages: alternatives, base-cygwin, base-files, bash, bzip2, ca-certificates, coreutils, csih, curl, cygrunsrv, cygutils, cygwin, dash, diffutils, dos2unix, editrights, file, findutils, gawk, getent, grep, groff, gzip, hostname, ipc-utils, less, libargp, libattr1, libbz2_1, libcom_err2, libcrypt0, libcurl4, libdb5.3, libedit0, libexpat1, libffi6, libgcc1, libgdbm4, libgmp10, libgnutls28, libgssapi_krb5_2, libhogweed2, libiconv2, libidn11, libintl8, libk5crypto3, libkrb5_3, libkrb5support0, liblzma5, libmetalink3, libmpfr4, libncursesw10, libnettle4, libopenldap2_4_2, libopenssl100, libp11-kit0, libpcre1, libpipeline1, libpopt0, libreadline7, libsasl2_3, libssh2_1, libssp0, libstdc++6, libtasn1_6, libwrap0, login, lynx, man-db, mintty, openssh, p11-kit, p11-kit-trust, perl, popt, rebase, rsync, run, sed, tar, terminfo, texinfo, tzcode, unzip, vim, vim-common, vim-minimal, wget, which, windows-default-manifest, xxd, xz, zip, zlib0

Additional Connector Add-Ons

BlackBerry Workspaces supports Connectors that allow the organization to utilize other third-party services to incorporate with Workspaces. The Connectors include services such as SharePoint, Windows File Share, and Single Sign On services via SAML. The following are prerequisites that should be completed prior to installing the Connectors:

UCC (Unified Content Connector)

If the customer will be installing the UCC to support integration with SharePoint on-prem, SharePoint Online, Windows File Share, or One Drive for Business, then an additional Windows server will be required. The prerequisites for this connector are listed below:

Server Size

- OS: Windows Server 2016
- CPU: 4 vCPU
- Memory: 8 GB
- Storage: 100 GB

Port Requirements

Source	Target	Port
Master-Main server (Basic deployment) or Main server (Advanced deployment)	Unified Content Connector	8443

Unified Content Connector	External Repository	Per third-party service requirements (usually 443)
Unified Content Connector	Frontend server (Advanced deployment)	443

Single Sign-On Identity Connector

No additional server is required for Single Sign-on via SAML. The customer is expected to already have a single sign-on service in place prior to the configuration. If you need recommendations for a third-party SAML provider, please contact your BlackBerry Professional Services Consultant for assistance.

Office Online Server

The customer is expected to already have installed a working version of Office Online Server (OOS) or Office Web Apps Server (OWAS). There is no additional server required to connect Workspaces with an existing Office Online environment.

Port Requirements

Source	Target	Port
Master-Main server (Basic deployment and vApp) **or** **Application server (Advanced deployment)**	OWAS or OOS	443 (HTTPS)
OWAS **or** **OOS**	Master-Main server (Basic deployment and vApp) or Application server (Advanced deployment)	443 (HTTPS)
End-user machine	OWAS or OOS	443 (HTTPS)
OWAS **or** **OOS**	End-user machine	443 (HTTPS)

Appendix

SSL Certificates

The BlackBerry Workspaces Virtual Appliance must be provisioned with SSL certificates by an approved certificate authority. The SSL certificate should be generated before the installation. There are many ways to generate a CSR (Certificate Signing Request). BlackBerry recommends the following, which can be performed on almost any Linux server from the Terminal. Once complete, submit the CSR to your Certificate Authority and retain the Private Key:

```
openssl req -new -newkey rsa:2048 -nodes -keyout /tmp/privateKey.key -out
/tmp/CSR.csr
```

The Appliance-X installation requires 3 certificate pieces:

- **SSL Certificate**
    - Definition: The SSL certificate that will be used to secure communication with end users. This certificate should have the site's URL in either the Subject Name or Subject Alternative Name (SAN) attributes. This must be signed by a valid 3rd party, publicly trusted certificate authority (not self-signed or internally signed).
    - Sample:

        -----BEGIN CERTIFICATE-----

        MII/……

        ……

        -----END CERTIFICATE-----

    - Further information: http://technet.microsoft.com/en-us/library/cc778623(v=ws.10).aspx
- **SSL Certificate Private Key**
    - Definition: This is the private key used to decrypt the communication.
    - Sample:

        -----BEGIN PRIVATE KEY

        ….

        -----END PRIVATE KEY-----

    - Further information: http://www.tldp.org/HOWTO/SSL-Certificates-HOWTO/x64.html

- **SSL Intermediate CA Bundle**
    - Definition – a combination of the certificates validating the SSL site certificate. This bundle usually contains 2-3 certificates, including the intermediate and root certificates.
    - Sample:

        -----BEGIN CERTIFICATE-----

        MIIE5T…

        -----END CERTIFICATE-----

        -----BEGIN CERTIFICATE-----

        MerR….

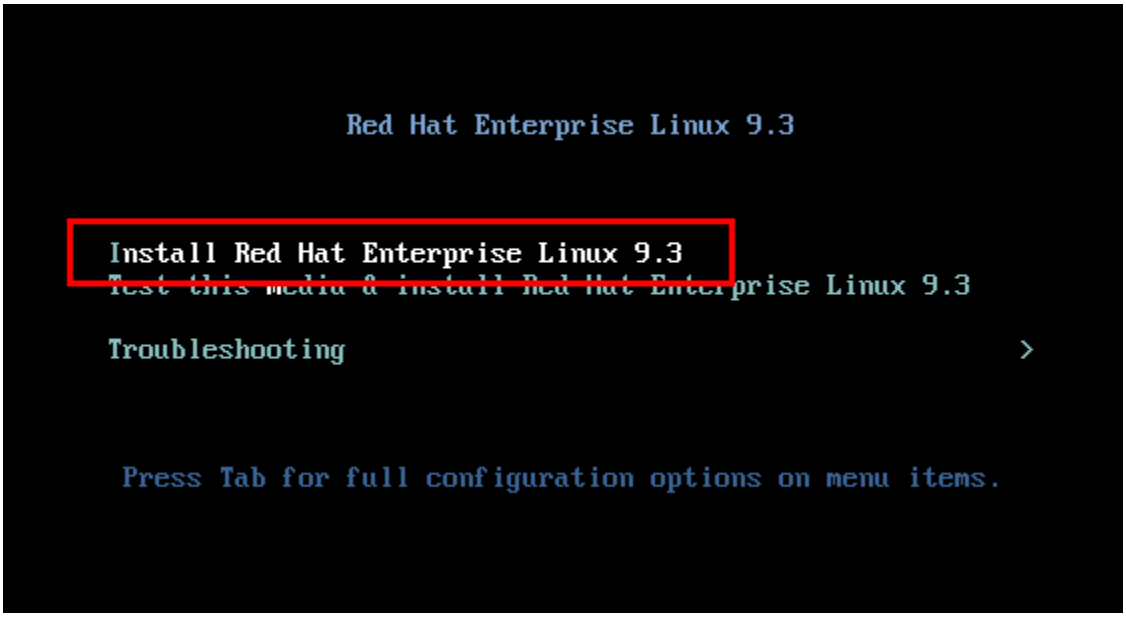
        -----END CERTIFICATE-----

    - Link: http://en.wikipedia.org/wiki/Intermediate_certificate_authorities

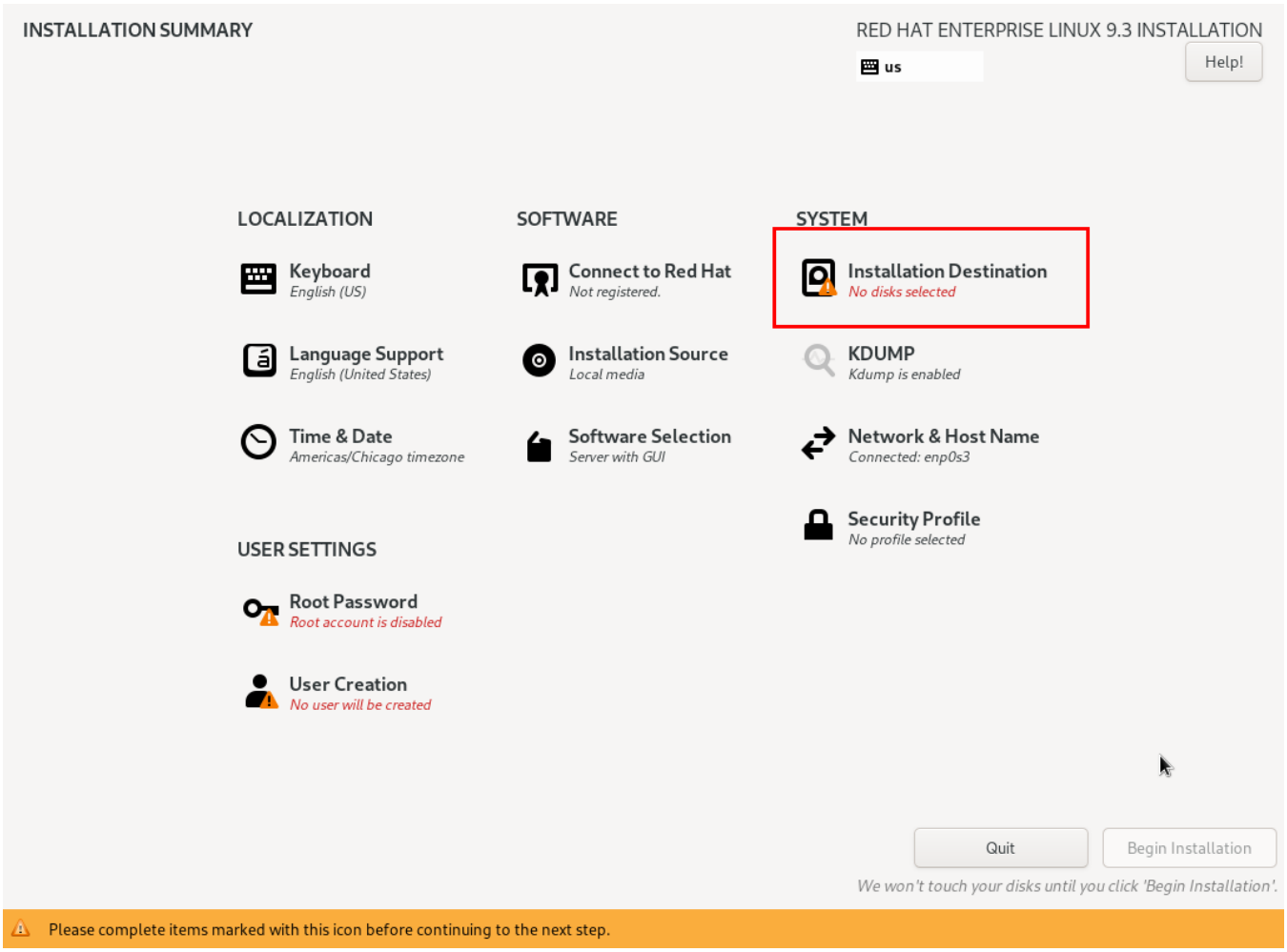
Installing Red Hat from .iso

These basic instructions are recommended for widest compatibility. If custom partitions are used outside of these instructions, additional storage space may be required to satisfy Workspaces logging and installation requirements. Please review with your Professional Services Consultant if you have any questions about deployment.

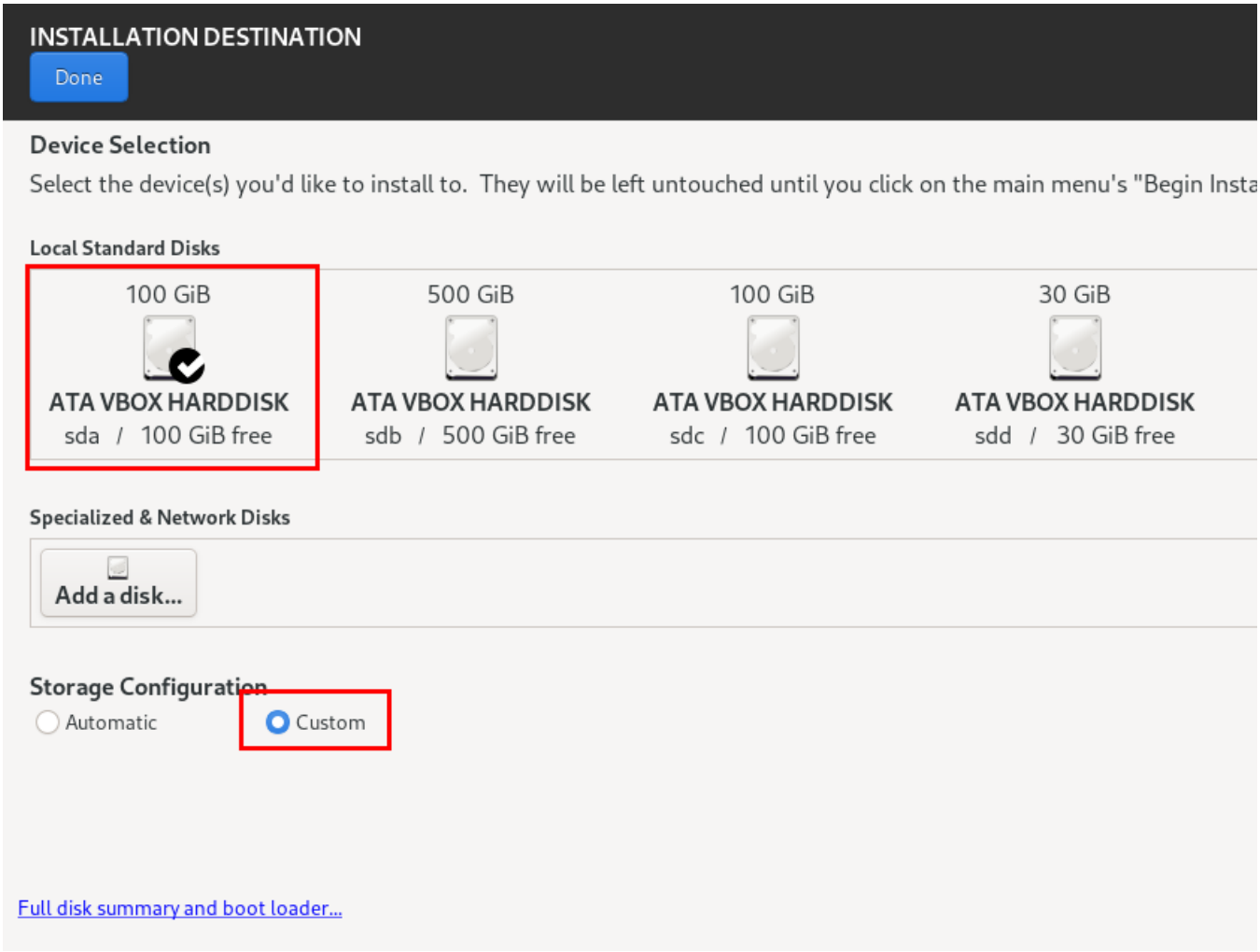
1. From the boot screen, select “Install Red Hat Enterprise Linux”:



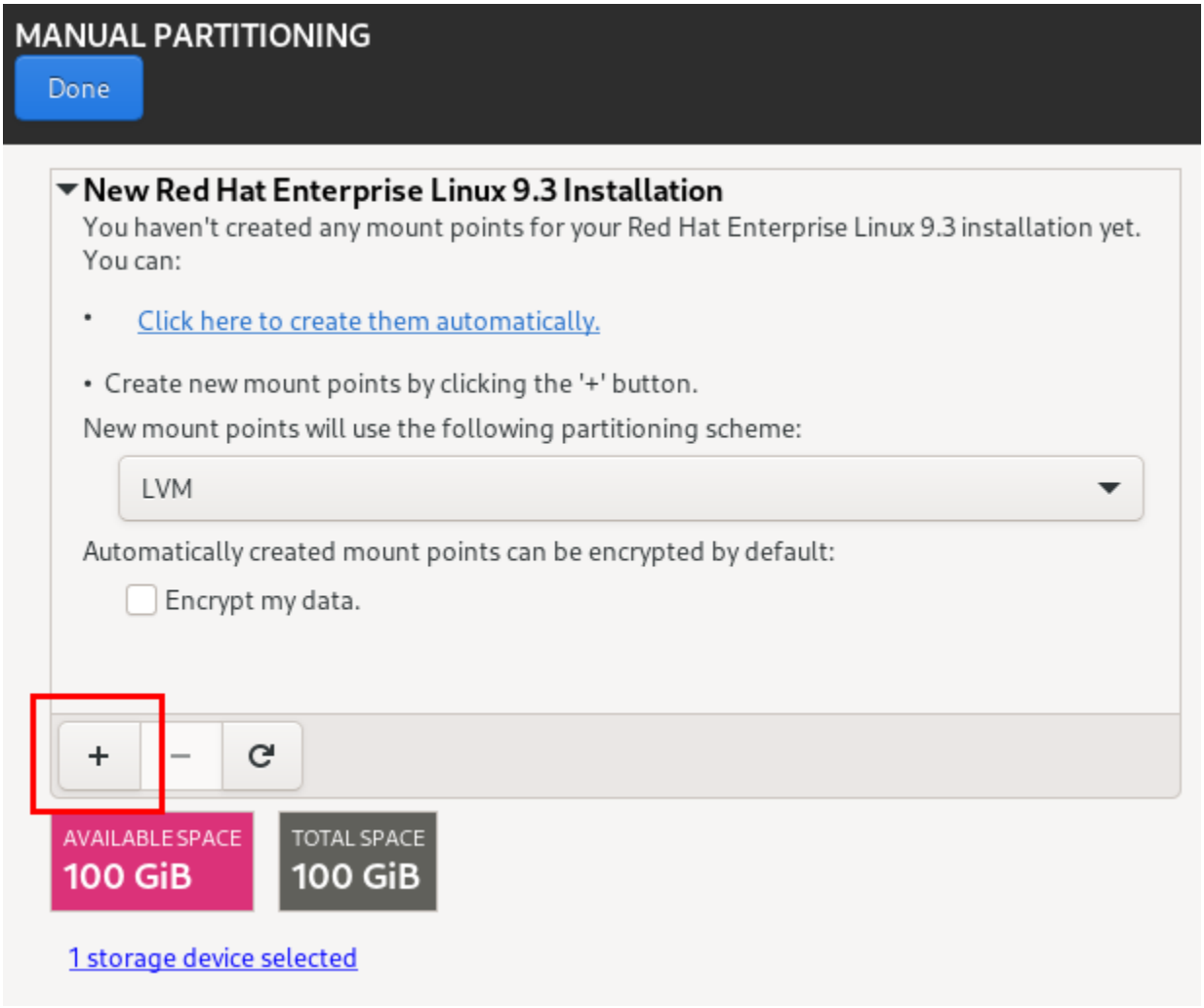
2. Select “Installation Destination”:



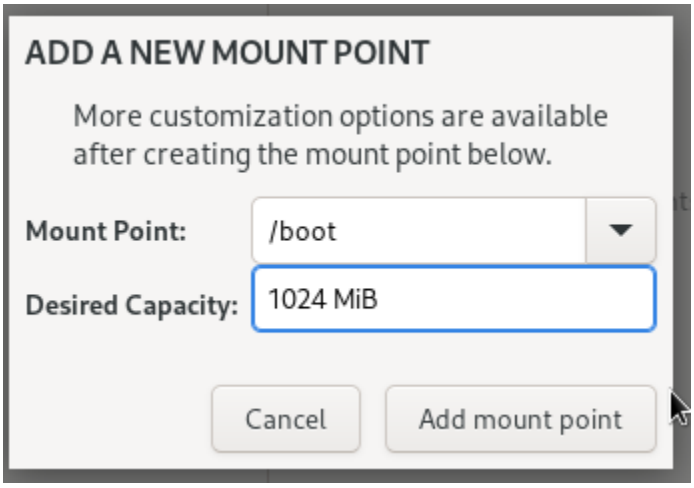
3. Select only the 100 GB hard drive for OS installation. Do not check or select the other hard drives. Choose "Custom" *Storage Configuration*, then click "Done":



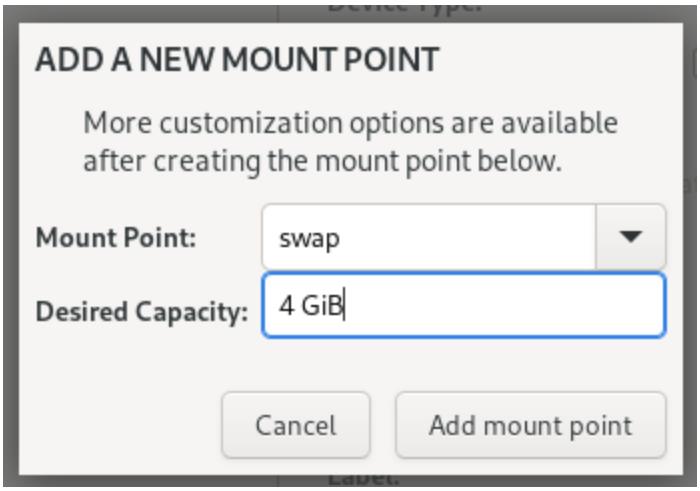
4. Click the “+” button to create a new partition:



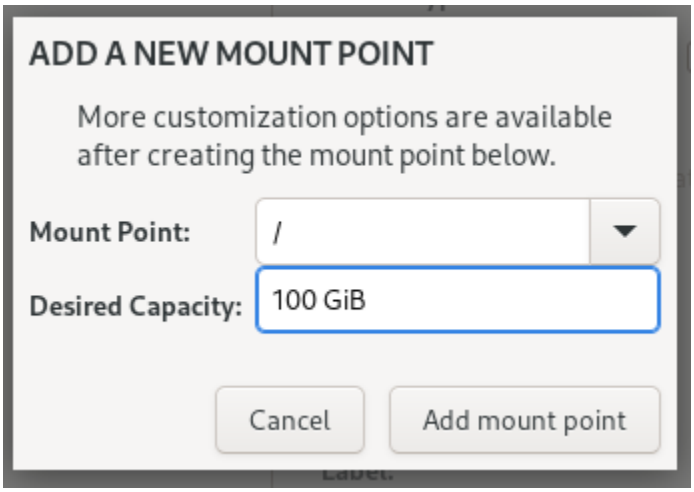
5. Select *Mount Point* = "/boot" and *Desired Capacity* = "1024 MiB". Click "Add mount point":



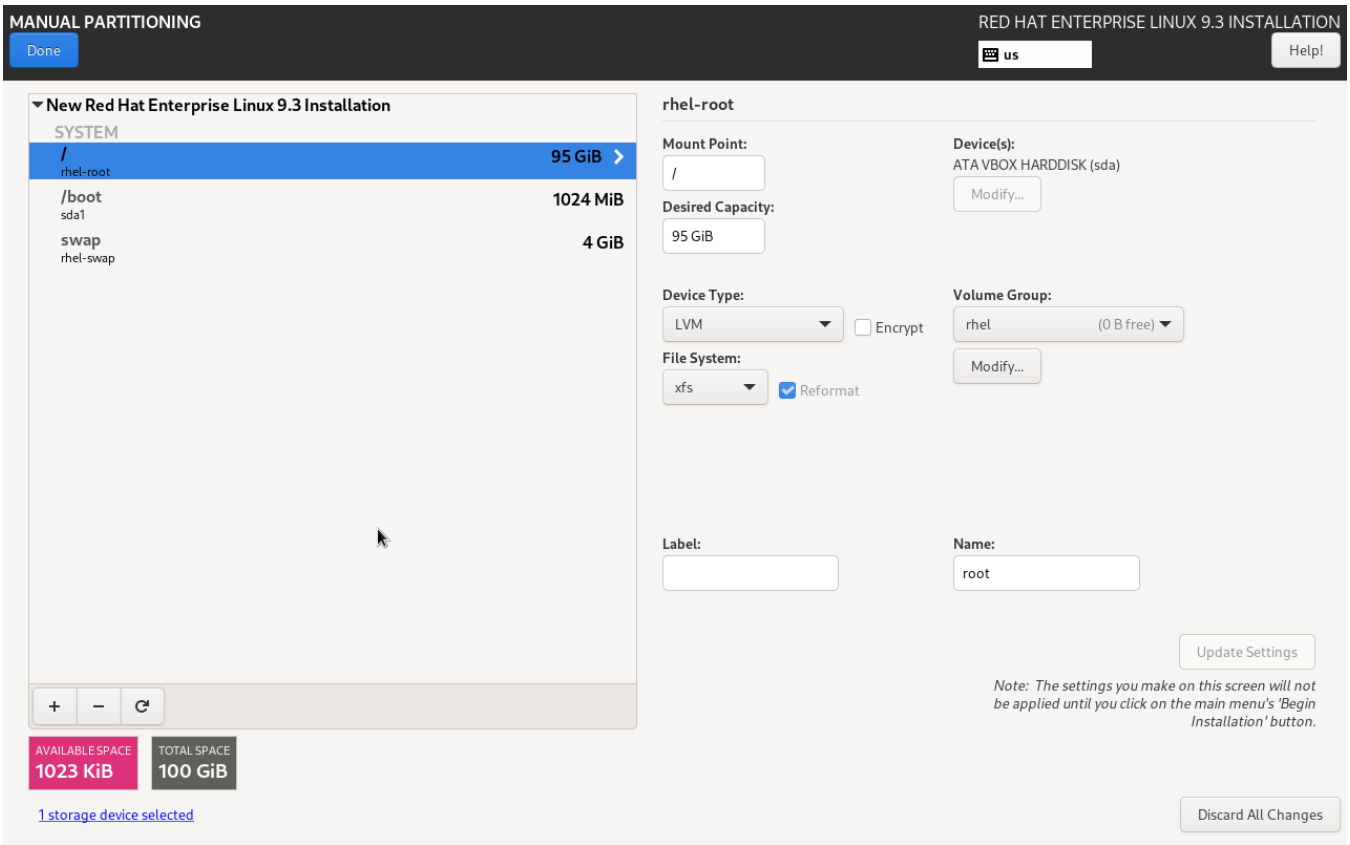
6. Click the "+" again. Select *Mount Point* = "swap" and *Desired Capacity* = "4 GiB". Click "Add mount point":



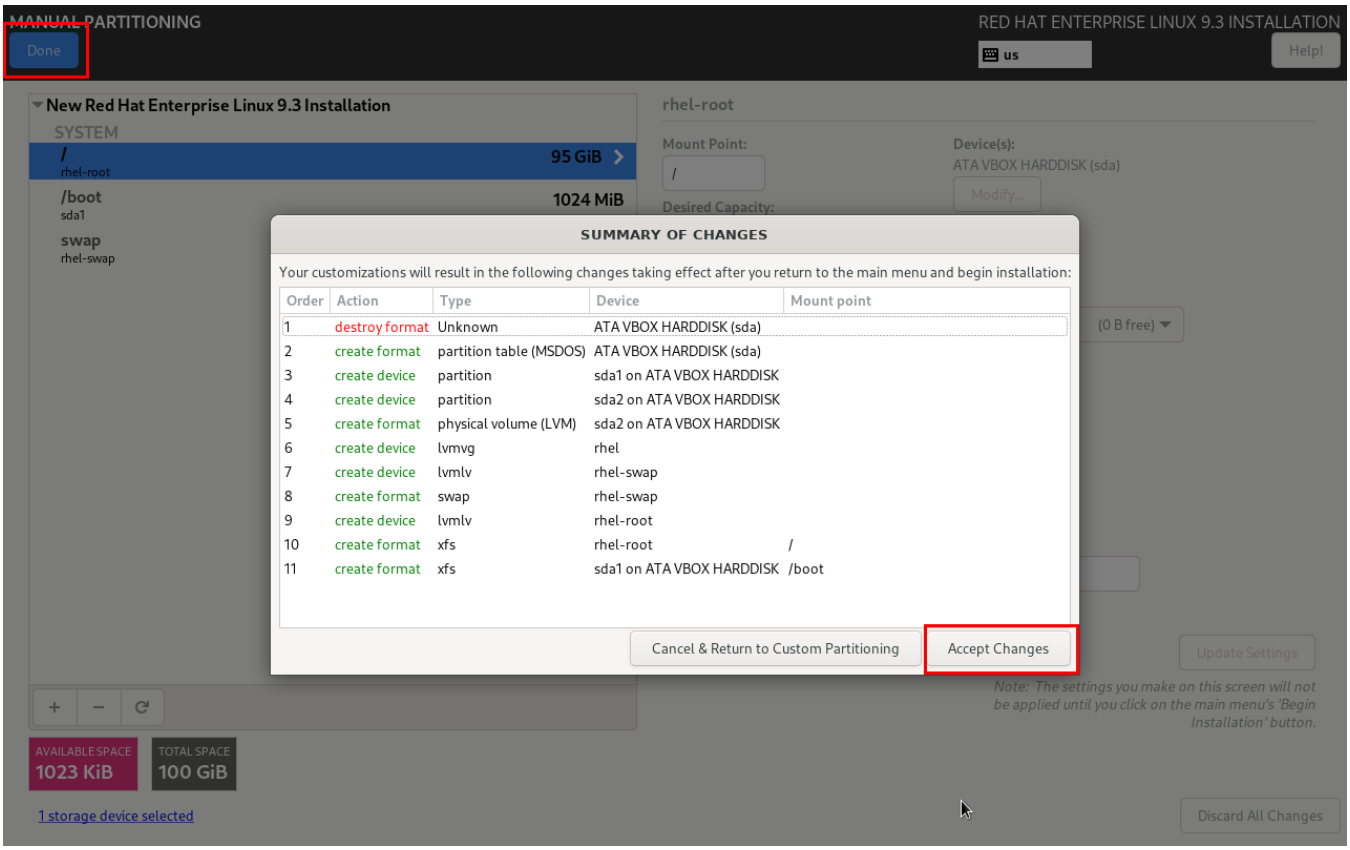
7. Click the "+" again. Select *Mount Point* = "/" and *Desired Capacity* = "100 GiB". Click "Add mount point":



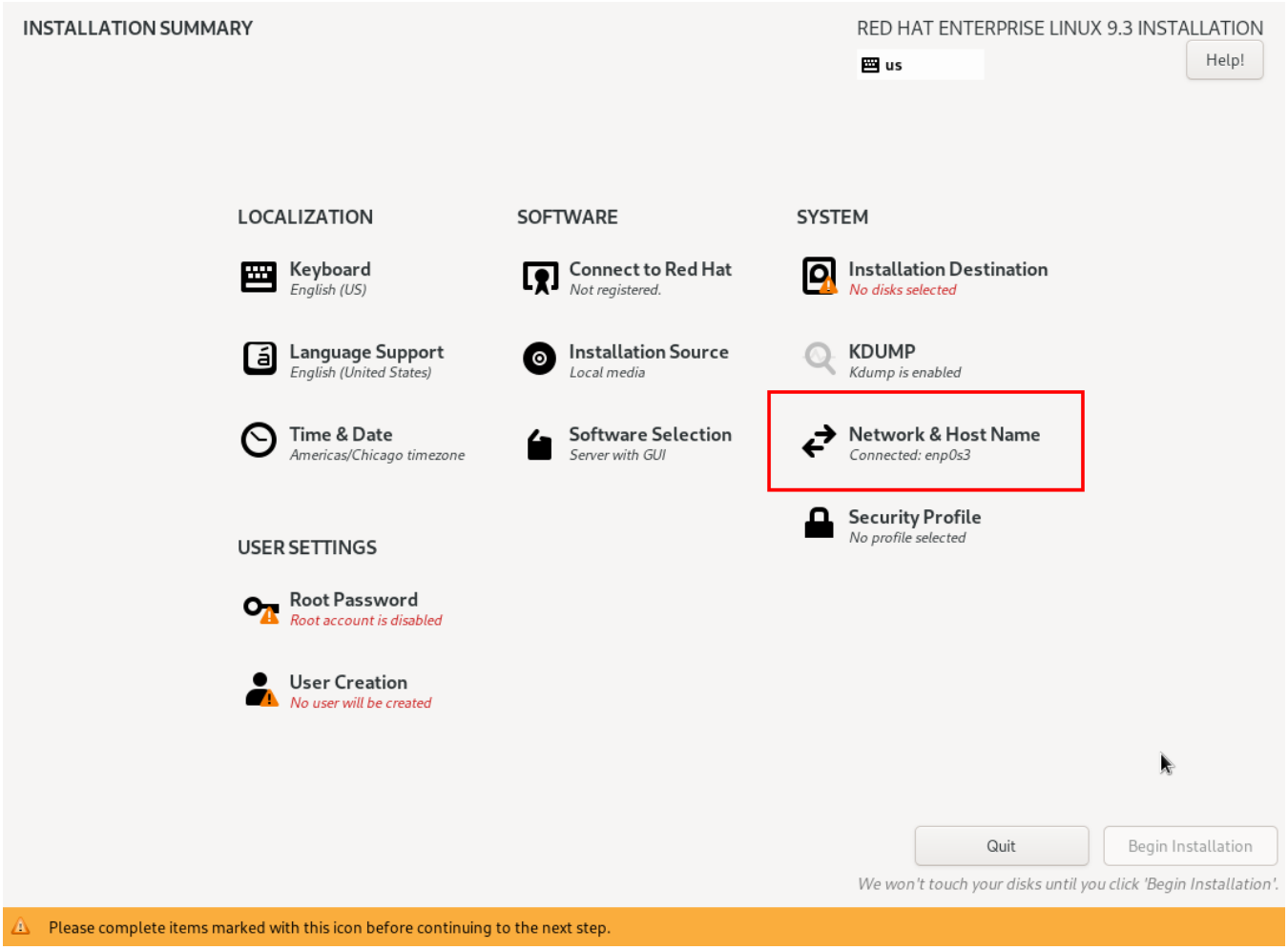
8. The partition table should look like the image below:



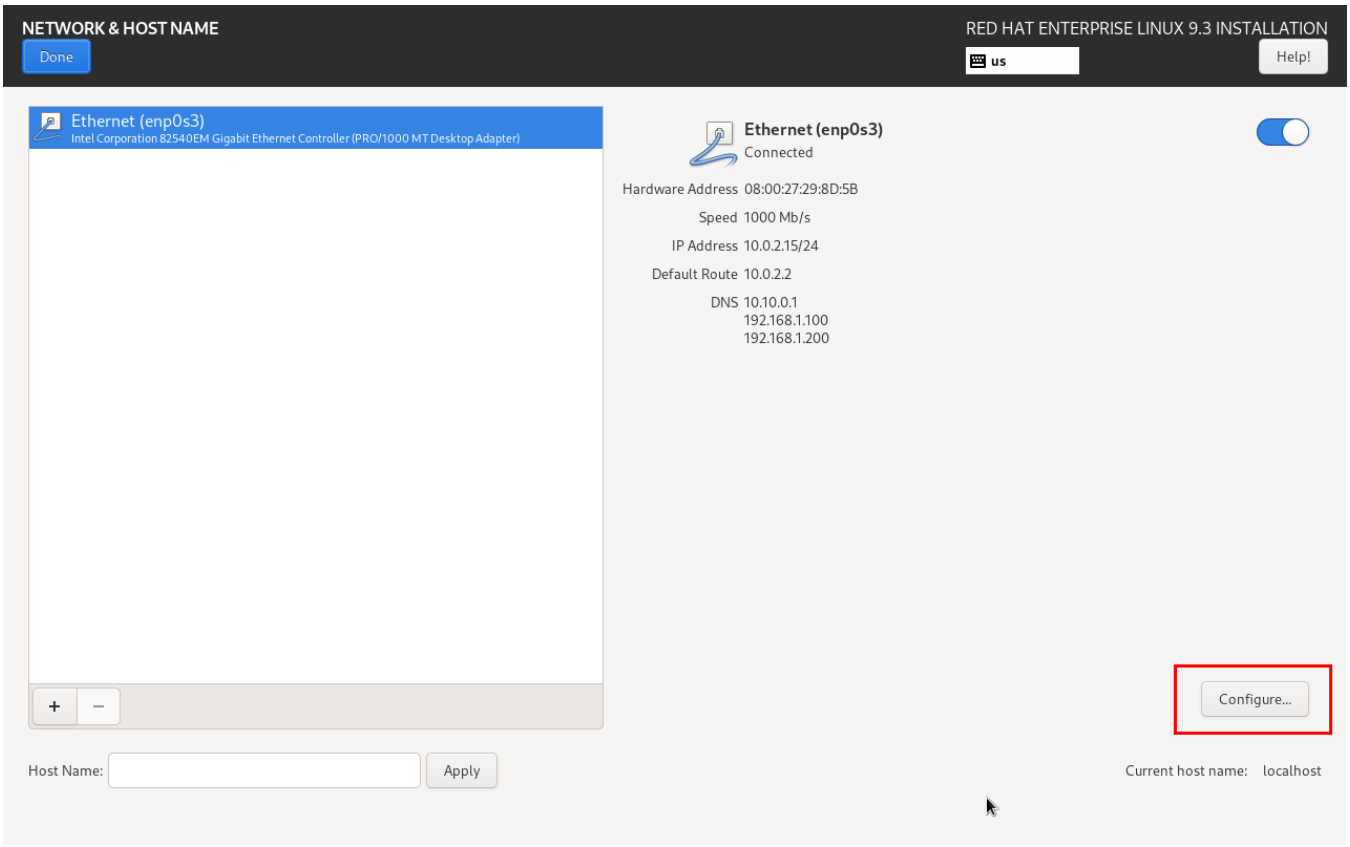
9. Click “Done” in the top left, review the summary of changes, and click “Accept Changes”:



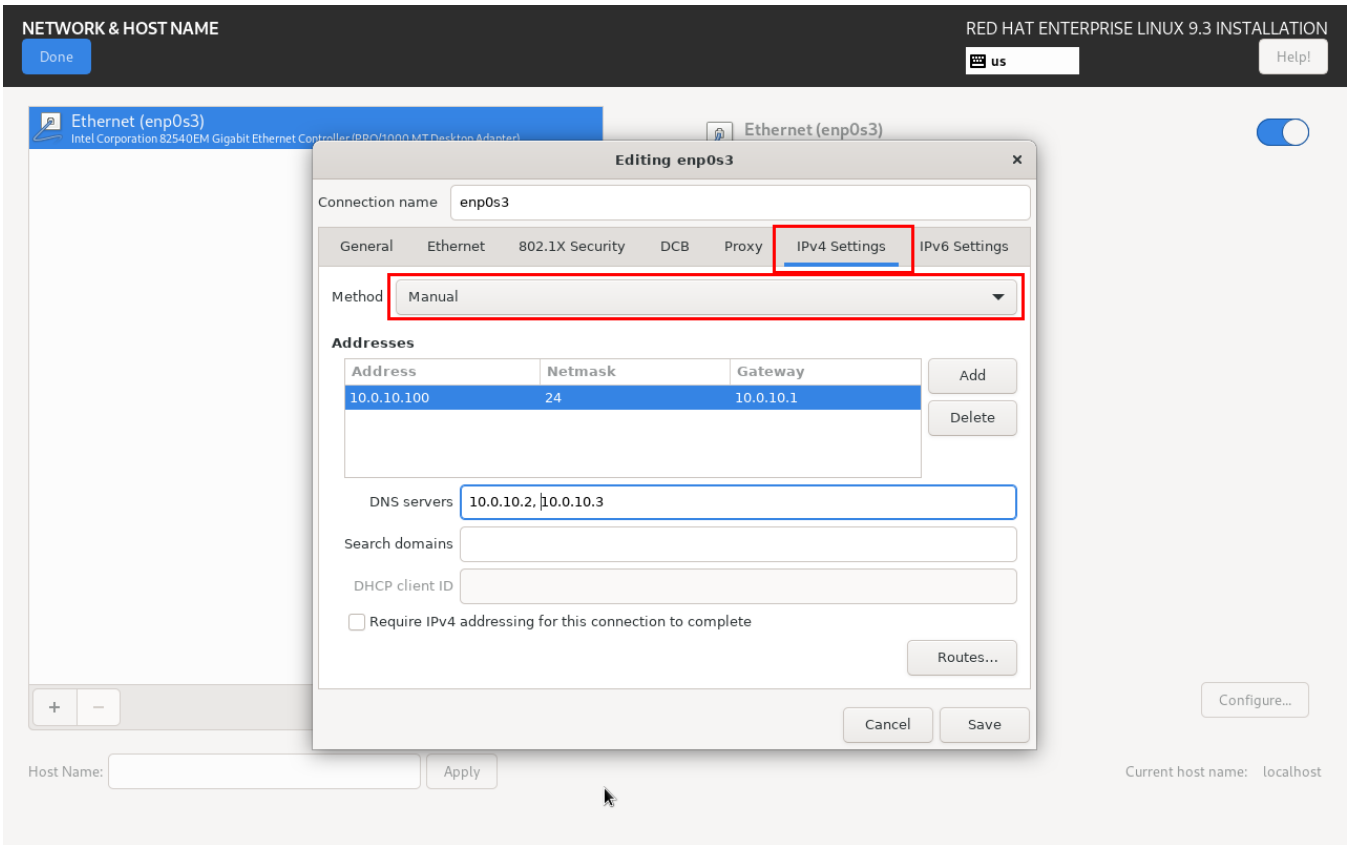
10. Select “Network & Host Name” from the main page:



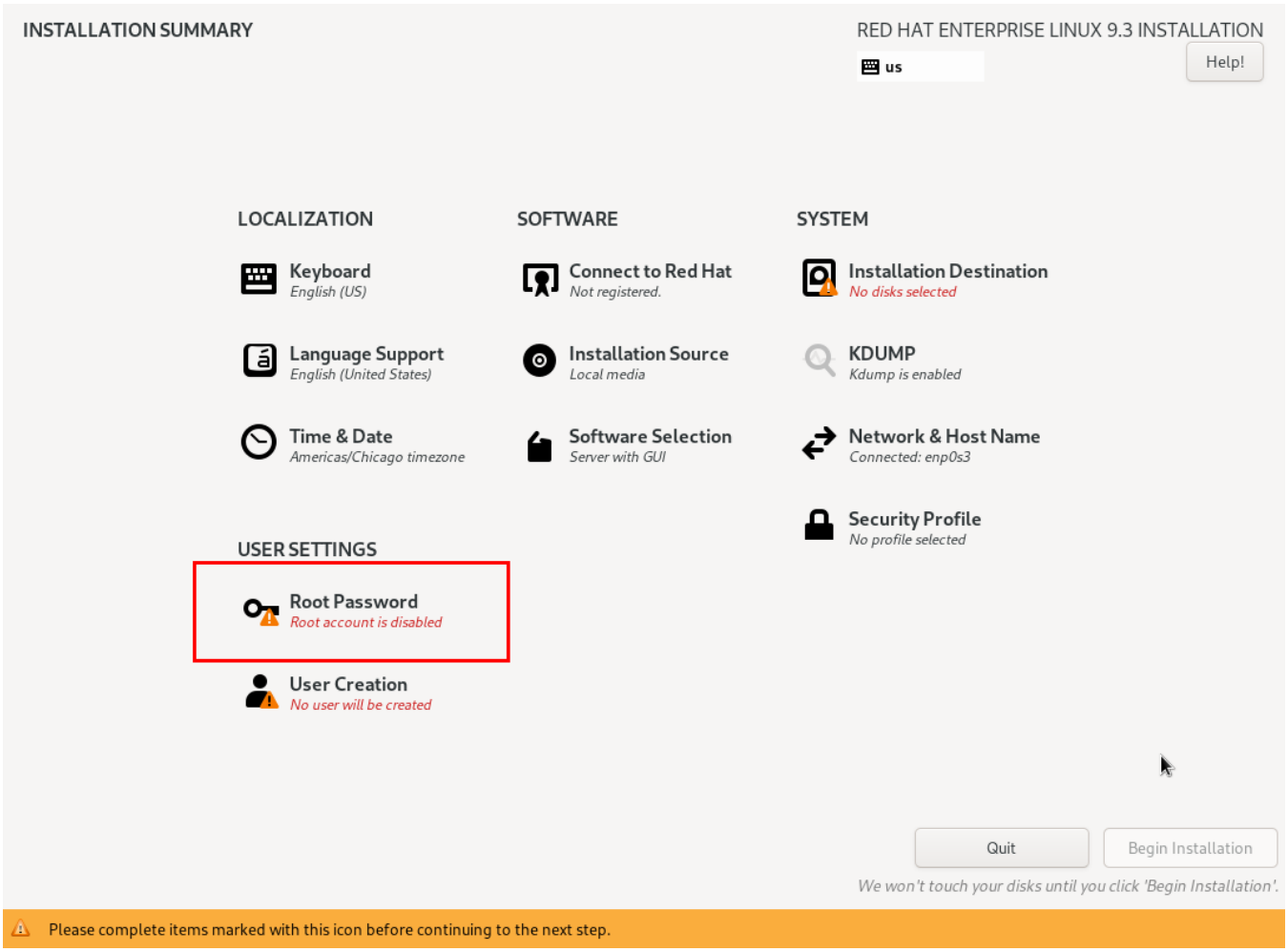
11. Select your network interface and click “Configure…”:



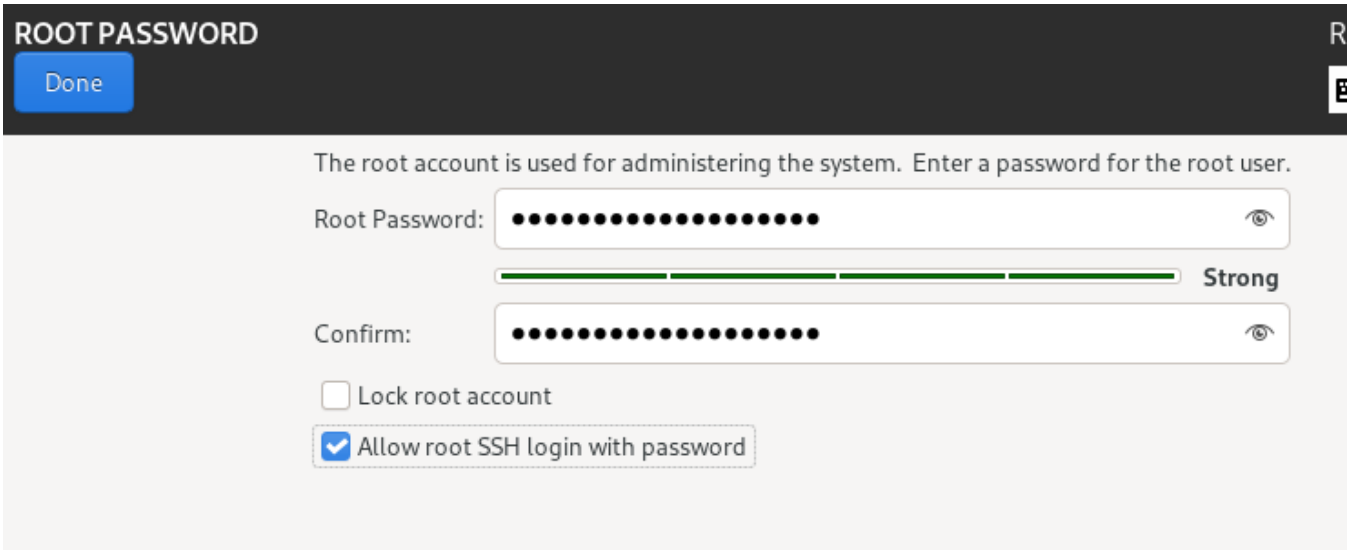
12. Choose “IPv4 Settings” tab and configure the network as required with a static IP address:



13. Click “Save”, then “Done” in the top-left. On the main page, click “Root Password”:



14. Create a strong password. Select the “Allow root SSH login with password” check box:



15. Click “Done” in the top left. Select “Begin Installation” to begin the Red Hat installation.