

SUSE Linux Enterprise Server 15 SP7

Installation Quick Start

This Quick Start guides you step by step through the installation of SUSE® Linux Enterprise Server 15 SP7.

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1 Welcome to SUSE Linux Enterprise Server

Use the following procedures to install the product on all supported hardware platforms. They assume you have successfully booted/IPLed into the installation system. For more detailed installation instructions and deployment strategies, refer to *Book “Deployment Guide”*. For platform-specific preparations required to boot or IPL into the installation system, refer to the following parts of the aforementioned guide:


- *Book “Deployment Guide”, Chapter 2 “Installation on AMD64 and Intel 64”*
- *Book “Deployment Guide”, Chapter 3 “Installation on AArch64”*
- *Book “Deployment Guide”, Chapter 4 “Installation on IBM POWER”*
- *Book “Deployment Guide”, Chapter 5 “Installation on IBM Z and LinuxONE”*

1.1 The Unified Installer

Starting with SUSE Linux Enterprise Server 15, the installation medium only consists of the Unified Installer, a minimal system for installing, updating and registering all SUSE Linux Enterprise base products. During the installation you can add functionality by selecting modules and extensions to be installed on top of the Unified Installer.

1.2 Installing offline or without registration

The default installation medium `SLE-15-SP7-Online-ARCH-GM-media1.iso` is optimized for size and does not contain any modules and extensions. Therefore, the installation requires network access to register your product and retrieve repository data for the modules and extensions.

For installation without registering the system, use the `SLE-15-SP7-Full-ARCH-GM-media1.iso` image from <https://www.suse.com/download/sles/>  and refer to *Book “Deployment Guide”, Chapter 9 “Installation steps”, Section 9.7.3 “Installing without registration”* for instructions.



Tip: Copying the installation media image to a removable flash disk

Use the following command to copy the contents of the installation image to a removable flash disk.

```
> sudo dd if=IMAGE of=FLASH_DISK bs=4M && sync
```

IMAGE needs to be replaced with the path to the *SLE-15-SP7-Online-ARCH-GM-media1.iso* or *SLE-15-SP7-Full-ARCH-GM-media1.iso* image file. *FLASH_DISK* needs to be replaced with the flash device. To identify the device, insert it and run:

```
# grep -Ff <(hwinfo --disk --short) <(hwinfo --usb --short)
disk:
  /dev/sdc          General USB Flash Disk
```

Make sure the size of the device is sufficient for the desired image. You can check the size of the device with:

```
# fdisk -l /dev/sdc | grep -e "^/dev"
/dev/sdc1 *      2048 31490047 31488000  15G 83 Linux
```

In this example, the device has a capacity of 15 GB. The command to use for the *SLE-15-SP7-Full-ARCH-GM-media1.iso* would be:

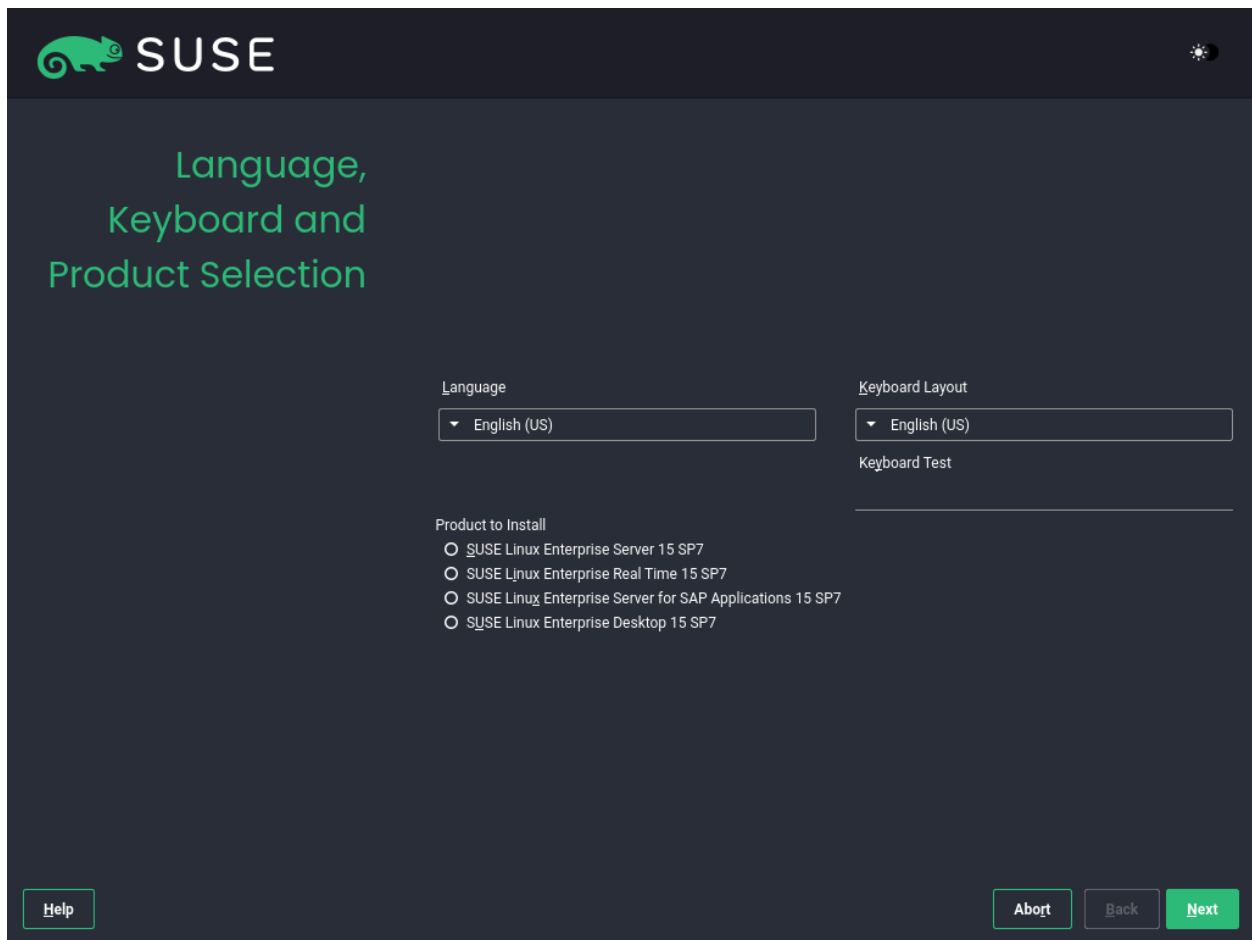
```
dd if=SLE-15-SP7-Full-ARCH-GM-media1.iso of=/dev/sdc bs=4M && sync
```

The device must not be mounted when running the **dd** command. Note that all data on the partition will be erased!

2 The installation procedure

To install SUSE Linux Enterprise Server, boot or IPL into the installer from the Unified Installer medium and start the installation.




2.1 Language, keyboard and product selection



The screenshot shows the SUSE Unified Installer interface for 'Language, Keyboard and Product Selection'. The SUSE logo is in the top left. The title 'Language, Keyboard and Product Selection' is in large green text. Below the title, there are two dropdown menus: 'Language' and 'Keyboard Layout', both set to 'English (US)'. To the right of the 'Keyboard Layout' dropdown is a 'Keyboard Test' text box. Below these, under the heading 'Product to Install', there are four radio button options: 'SUSE Linux Enterprise Server 15 SP7', 'SUSE Linux Enterprise Real Time 15 SP7', 'SUSE Linux Enterprise Server for SAP Applications 15 SP7', and 'SUSE Linux Enterprise Desktop 15 SP7'. At the bottom, there are three buttons: 'Help' on the left, and 'Abort', 'Back', and 'Next' on the right.

The *Language* and *Keyboard Layout* settings are initialized with the language you chose on the boot screen. If you did not change the default, it will be English (US). Change the settings here, if necessary. Use the *Keyboard Test* text box to test the layout.

With the Unified Installer, you can install all SUSE Linux Enterprise base products:


- SUSE Linux Enterprise Server 15 SP7 (covered here)
- SUSE Linux Enterprise Desktop 15 SP7 (for installation instructions, refer to <https://documentation.suse.com/sled/> )
- SUSE Linux Enterprise Real Time 15 SP7 (for installation instructions, refer to <https://documentation.suse.com/sle-rt/> )
- SUSE Linux Enterprise Server for SAP applications 15 SP7 (for installation instructions, refer to <https://documentation.suse.com/sles-sap/> )

Select a product for installation. You need to have a registration code for the respective product. In this document, it is assumed you have chosen SUSE Linux Enterprise Server. Proceed with *Next*.



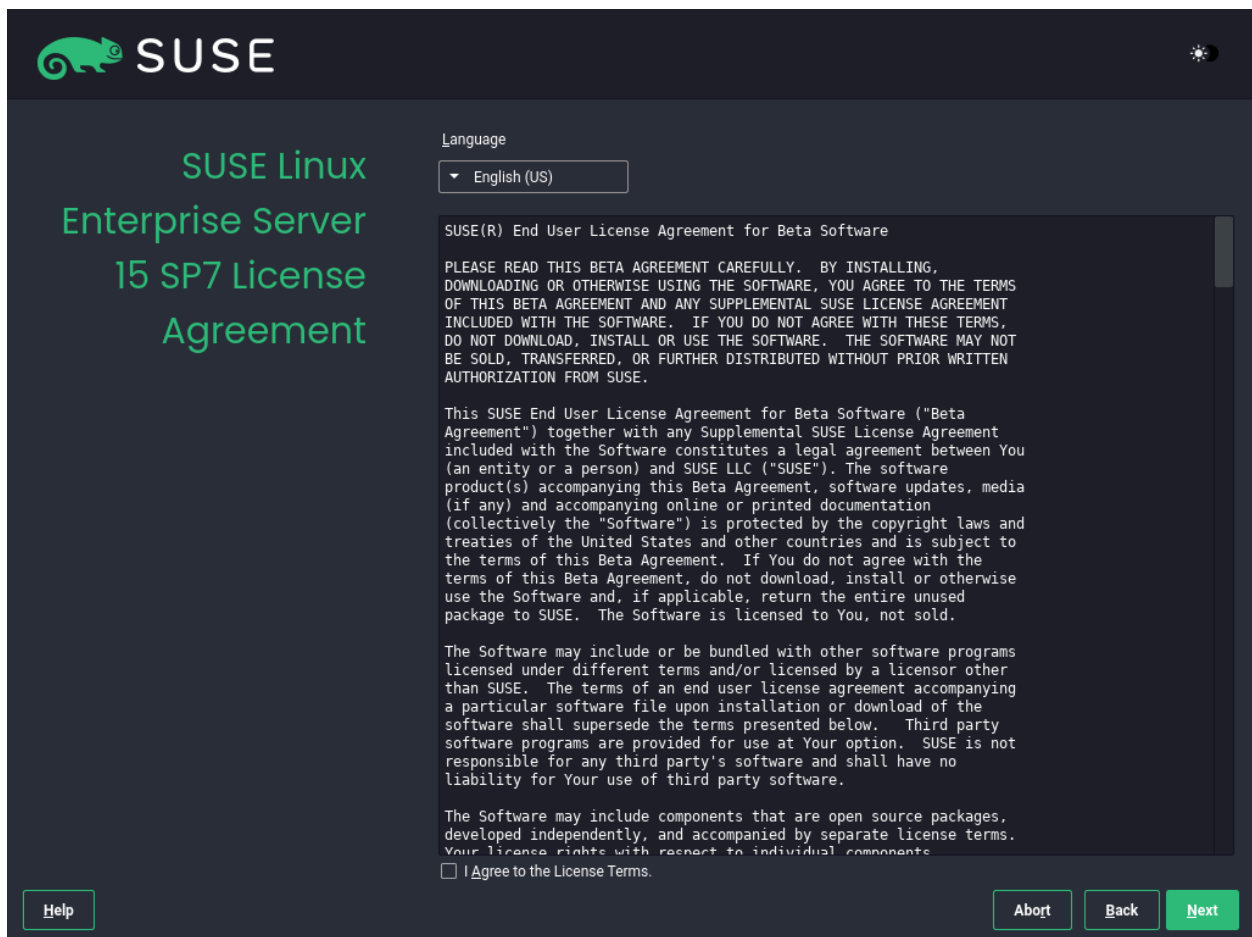
Tip: Light and high-contrast themes

If you have difficulties reading the labels in the installer, you can change the widget colors and theme.

Click the  button or press **Shift + F3** to open a theme selection dialog. Select a theme from the list and *Close* the dialog.

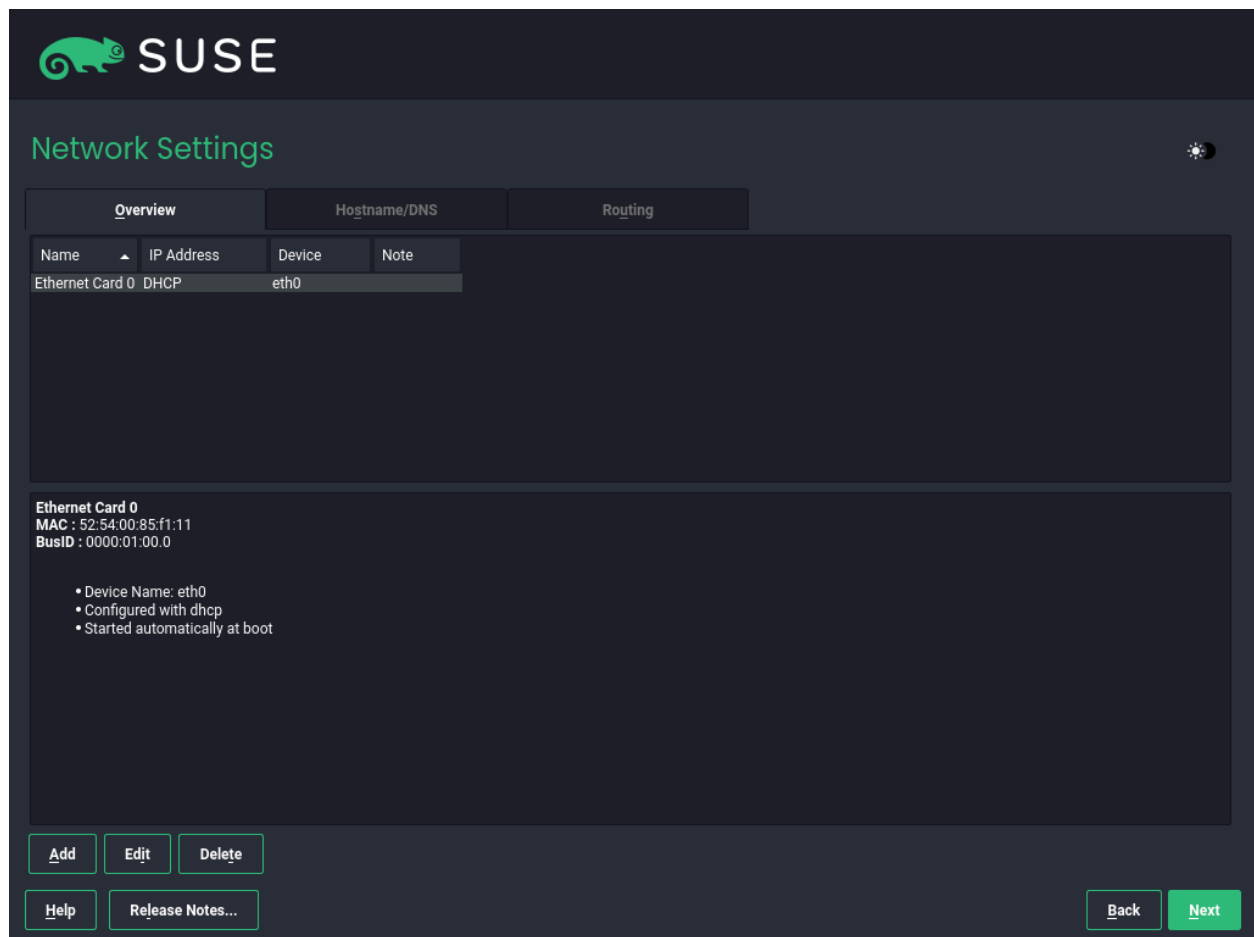
Shift + F4 switches to the color scheme for vision-impaired users. Press the buttons again to switch back to the default scheme.

2.2 License agreement



Read the License Agreement. It is presented in the language you have chosen on the boot screen. Translations are available via the *License Language* drop-down list. You need to accept the agreement by checking *I Agree to the License Terms* to install SUSE Linux Enterprise Server. Proceed with *Next*.

2.3 Network settings



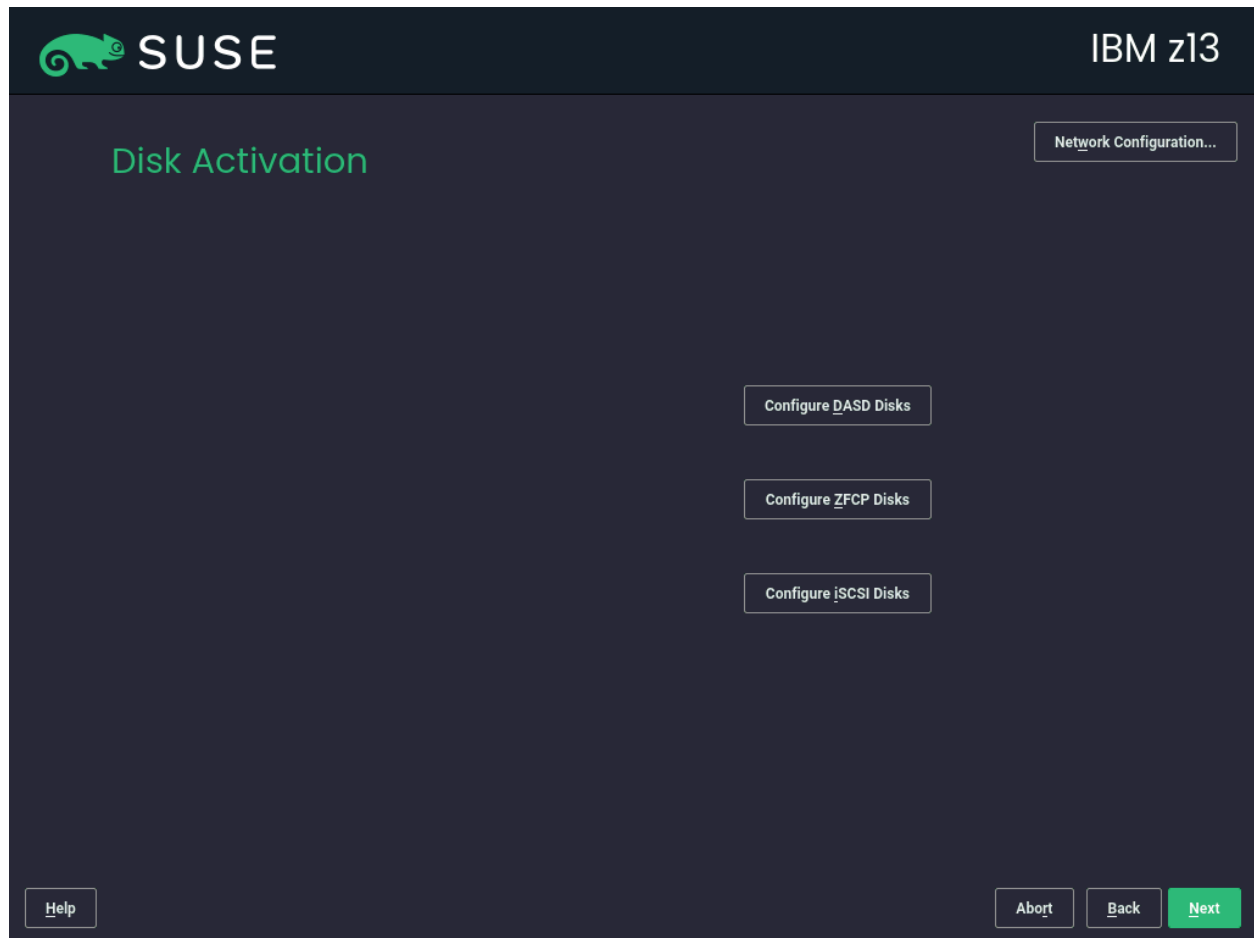
A system analysis is performed, where the installer probes for storage devices and tries to find other installed systems. If the network was automatically configured via DHCP during the start of the installation, you will be taken to the registration step.

If the network is not yet configured, the *Network Settings* dialog opens. Choose a network interface from the list and configure it with *Edit*. Alternatively, *Add* an interface manually. See *Book "Deployment Guide", Chapter 9 "Installation steps", Section 9.6 "Network settings"* and *Book "Administra-*

tion Guide”, Chapter 23 “Basic networking”, Section 23.4 “Configuring a network connection with YaST” for more information. If you prefer to do an installation without network access, skip this step without making any changes and proceed with *Next*.

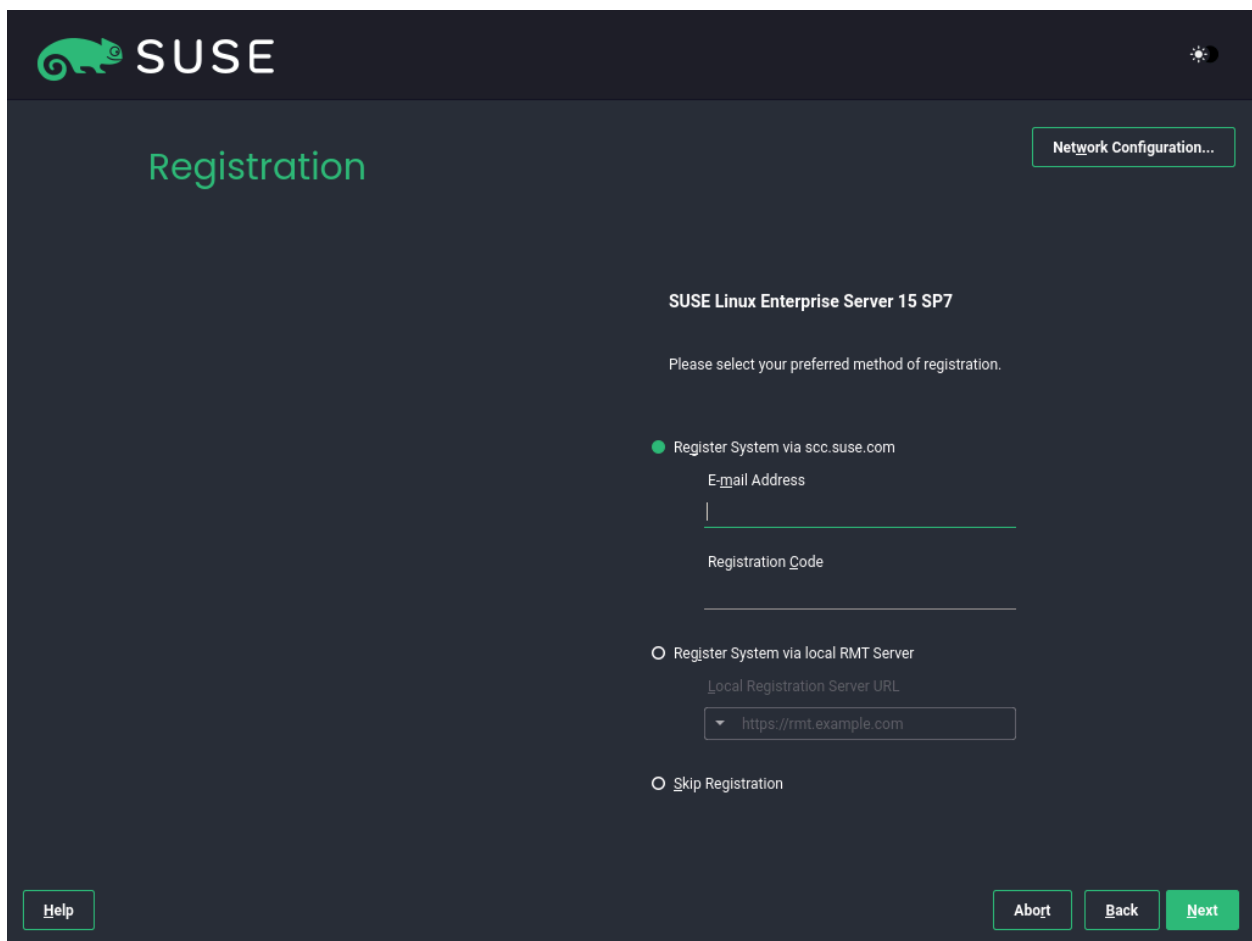
2.4 IBM Z: disk activation

Skip this step if you are not installing on IBM Z hardware.



Configure the attached hard disks. Select DASD, Fibre Channel Attached SCSI Disks (zFCP), or iSCSI for the installation of SUSE Linux Enterprise Server. The DASD and zFCP configuration buttons are only available if the corresponding devices are attached. Proceed with *Next* to set up the selected disk type. For more information, refer to *Book “Deployment Guide”, Chapter 9 “Installation steps”, Section 9.5 “IBM Z: disk activation”*.

2.5 Registration



The image shows the SUSE Linux Enterprise Server 15 SP7 Registration window. At the top left is the SUSE logo. The title 'Registration' is in large green text. A 'Network Configuration...' button is in the top right. The main heading is 'SUSE Linux Enterprise Server 15 SP7'. Below it, a message says 'Please select your preferred method of registration.' There are three radio button options: 'Register System via scc.suse.com' (selected), 'Register System via local RMT Server', and 'Skip Registration'. The first option has input fields for 'E-mail Address' and 'Registration Code'. The second option has a 'Local Registration Server URL' dropdown menu showing 'https://rmt.example.com'. At the bottom left is a 'Help' button, and at the bottom right are 'Abort', 'Back', and 'Next' buttons.

To get technical support and product updates, you need to register and activate SUSE Linux Enterprise Server with the SUSE Customer Center or a local registration server. Registering your product at this stage also grants you immediate access to the update repository. This enables you to install the system with the latest updates and patches available.

When registering, repositories and dependencies for modules and extensions are loaded from the registration server.

Register system via scc.suse.com

To register with the SUSE Customer Center, enter the *E-mail Address* associated with your SUSE Customer Center account and the *Registration Code* for SUSE Linux Enterprise Server. Proceed with *Next*.

Register system via local RMT server

If your organization provides a local registration server, you may alternatively register there. Activate *Register System via local RMT Server* and either choose a URL from the drop-down list or type in an address. Proceed with *Next*.

Skip registration

If you are offline or want to skip registration, activate *Skip Registration*. Accept the warning with *OK* and proceed with *Next*.



Important: Skipping the registration

Your system and extensions need to be registered in order to retrieve updates and to be eligible for support. Skipping the registration is only possible when installing from the SLE-15-SP7-Full-ARCH-GM-medial.iso image.

If you do not register during the installation, you can do so at any time later from the running system. To do so, run *YaST > Product Registration* or the command-line tool SUSE-Connect.



Tip: Installing product patches at installation time

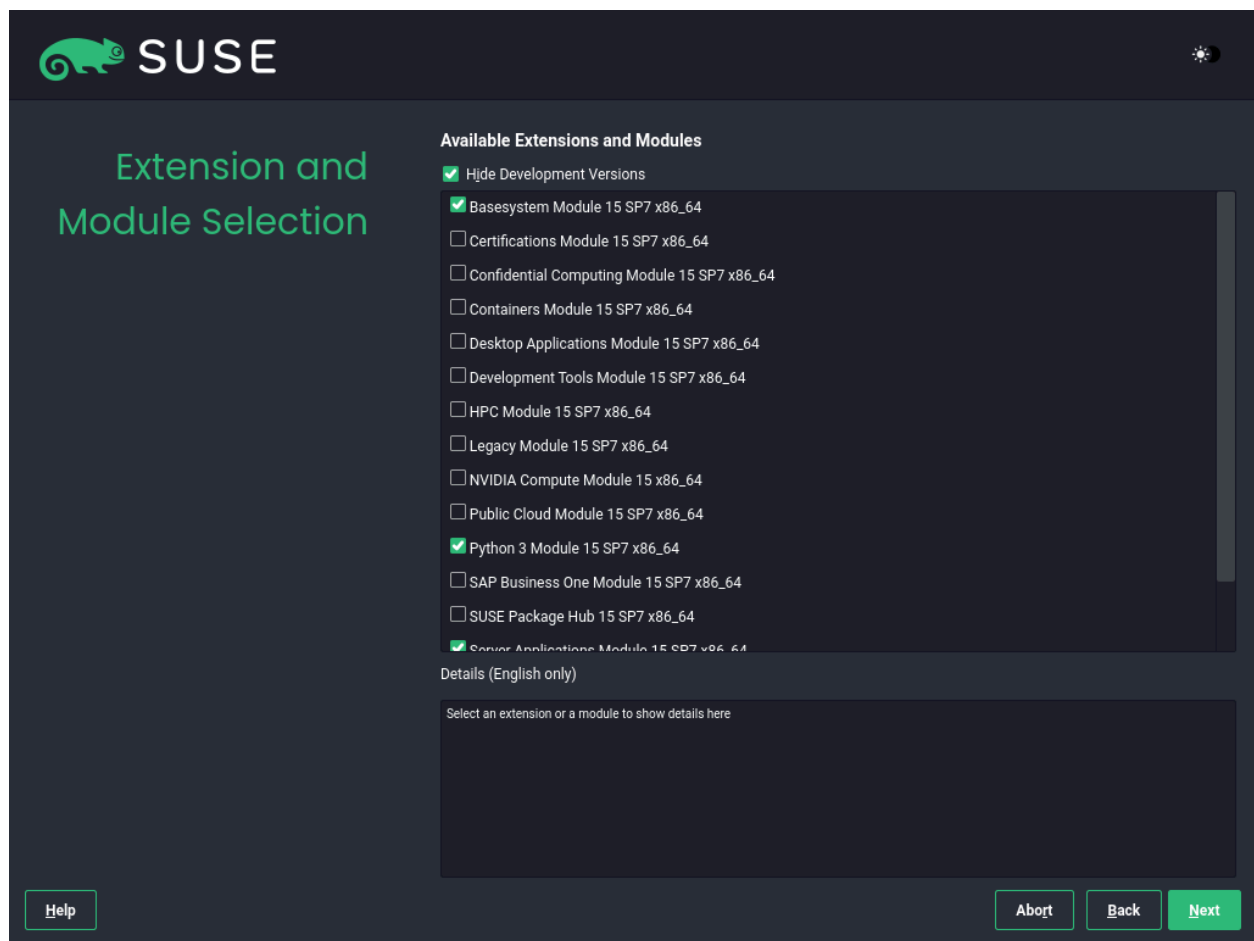
After SUSE Linux Enterprise Server has been successfully registered, you are asked whether to install the latest available online updates during the installation. If choosing *Yes*, the system will be installed with the most current packages without having to apply the updates after installation. Activating this option is recommended.



Note: Firewall settings for receiving updates

If your system is behind a firewall that blocks outgoing traffic, make sure to allow connections to <https://scc.suse.com/> and <https://updates.suse.com> on ports 80 and 443 in order to receive updates. For more information, such as IP addresses and proxy server configuration, refer to <https://www.suse.com/support/kb/doc/?id=000021034> ↗.

2.6 Extension and module selection



After the system is successfully registered, the installer lists modules and extensions that are available for SUSE Linux Enterprise Server. Modules are components that allow you to customize the product according to your needs. They are included in your SUSE Linux Enterprise Server subscription. Extensions add functionality to your product. They must be purchased separately. The availability of certain modules or extensions depends on the product selected in the first step of the installation. For a description of the modules and their lifecycles, select a module to see the accompanying text. More detailed information is available in the [Modules and Extensions Quick Start \(https://documentation.suse.com/sles-15/html/SLES-all/article-modules.html\)](https://documentation.suse.com/sles-15/html/SLES-all/article-modules.html).

The selection of modules indirectly affects the scope of the installation, because it defines which software sources (repositories) are available for installation and in the running system.

The following modules and extensions are available for SUSE Linux Enterprise Server:

Basesystem Module

This module adds a basic system on top of the Unified Installer. It is required by all other modules and extensions. The scope of an installation that only contains the base system is comparable to the installation pattern *minimal system* of previous SUSE Linux Enterprise Server versions. This module is selected for installation by default and should not be de-selected.

Dependencies: None

Certifications Module

Contains the FIPS certification packages.

Dependencies: Server Applications

Confidential Computing Technical Preview

Contains packages related to confidential computing.

Dependencies: Basesystem

Containers Module

Contains support and tools for containers.

Dependencies: Basesystem

Desktop Applications Module

Adds a graphical user interface and essential desktop applications to the system.

Dependencies: Basesystem

Development Tools Module

Contains compilers (including gcc) and libraries required for compiling and debugging applications. Replaces the former Software Development Kit (SDK).

Dependencies: Basesystem, Desktop Applications

High Performance Computing (HPC) Module

Provides specific tools commonly used for high performance, numerically intensive workloads.

Dependencies: Basesystem

Legacy Module


Helps you with migrating applications from earlier versions of SUSE Linux Enterprise Server and other systems to SLES 15 SP7, by providing packages which are discontinued on SUSE Linux Enterprise. Packages in this module are selected based on the requirement for migration and the level of complexity of configuration.

This module is recommended when migrating from a previous product version.

Dependencies: Basesystem, Server Applications

NVIDIA Compute Module

Contains the NVIDIA CUDA (Compute Unified Device Architecture) drivers.

The software in this module is provided by NVIDIA under the [CUDA End User License Agreement \(http://docs.nvidia.com/cuda/eula/\)](http://docs.nvidia.com/cuda/eula/)  and is not supported by SUSE.

Dependencies: Basesystem

Public Cloud Module

Contains all tools required to create images for deploying SUSE Linux Enterprise Server in cloud environments such as Amazon Web Services (AWS), Microsoft Azure, Google Compute Platform, or OpenStack.

Dependencies: Basesystem, Server Applications

Python 3 Module

This module contains the most recent version of the selected Python 3 packages.

Dependencies: Basesystem

SAP Business One Server

This module contains packages and system configuration specific to SAP Business One Server. It is maintained and supported by the SUSE Linux Enterprise Server product subscription.

Dependencies: Basesystem, Server Applications, Desktop Applications, Development Tools

Server Applications Module

Adds server functionality by providing network services such as DHCP server, name server, or Web server. This module is selected for installation by default; deselecting it is not recommended.

Dependencies: Basesystem

SUSE Linux Enterprise High Availability

Adds clustering support for mission critical setups to SUSE Linux Enterprise Server. This extension requires a separate license key.

Dependencies: Basesystem, Server Applications

SUSE Linux Enterprise Live Patching

Adds support for performing critical patching without having to shut down the system. This extension requires a separate license key.

Dependencies: Basesystem, Server Applications

SUSE Linux Enterprise Workstation Extension

Extends the functionality of SUSE Linux Enterprise Server with packages from SUSE Linux Enterprise Desktop, like additional desktop applications (office suite, e-mail client, graphical editor, etc.) and libraries. It allows to combine both products to create a fully featured workstation. This extension requires a separate license key.

Dependencies: Basesystem, Desktop Applications

SUSE Package Hub

Provides access to packages for SUSE Linux Enterprise Server maintained by the openSUSE community. These packages are delivered without L3 support and do not interfere with the supportability of SUSE Linux Enterprise Server. For more information, refer to <https://packagehub.suse.com/>.

Dependencies: Basesystem

Transactional Server Module

Adds support for transactional updates. Updates are either applied to the system all together in a single transaction, or not. This happens without influencing the running system. If an update fails, or if the successful update is deemed to be incompatible or otherwise incorrect, it can be discarded to immediately return the system to its previous functioning state.

Dependencies: Basesystem

Web and Scripting Module

Contains packages intended for a running Web server.

Dependencies: Basesystem, Server Applications

Some modules depend on the installation of other modules. Therefore, when selecting a module, other modules may be selected automatically to fulfill dependencies.

Depending on the product, the registration server can mark modules and extensions as recommended. Recommended modules and extensions are preselected for registration and installation. To avoid installing these recommendations, deselect them manually.

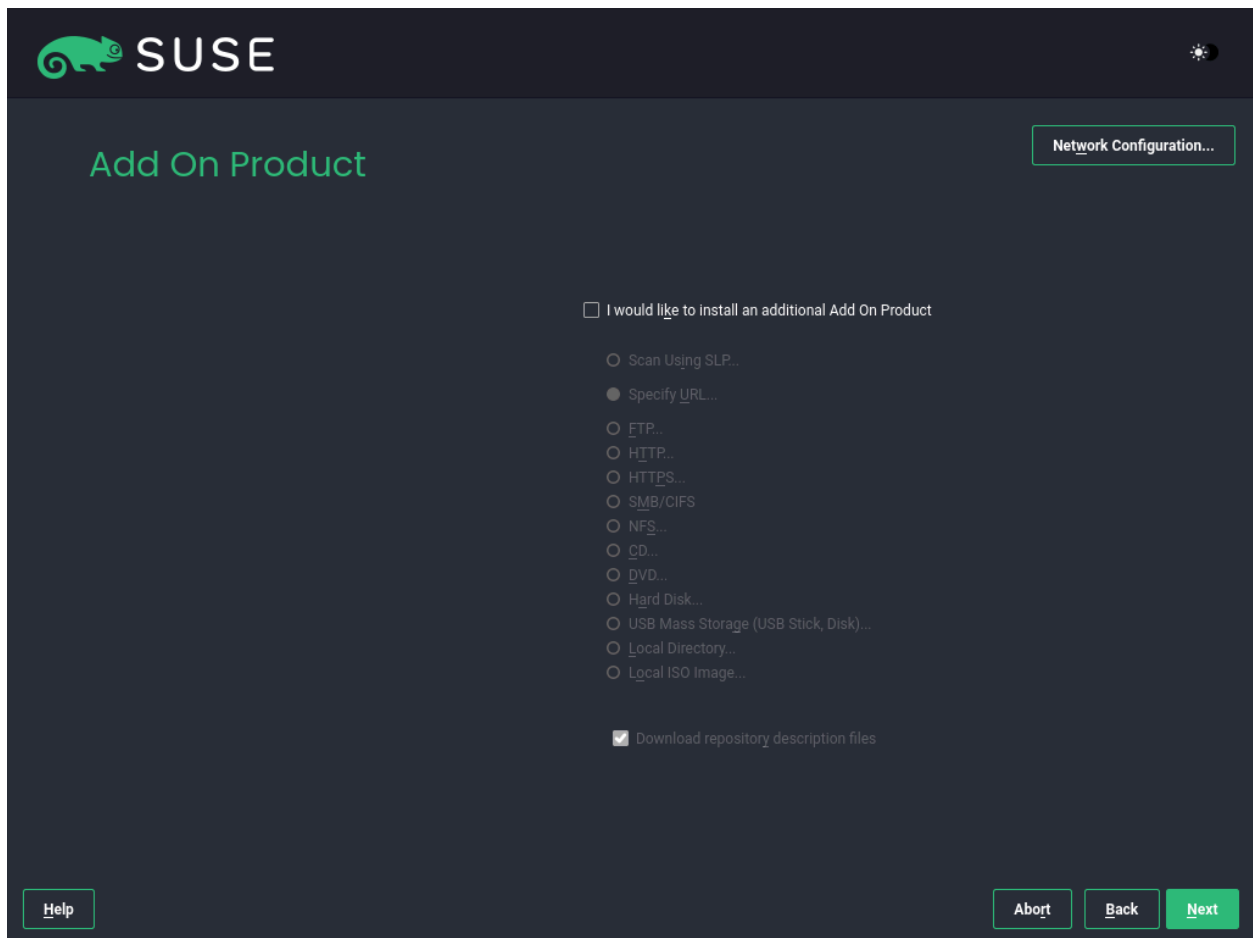
Select the modules and extensions you want to install and proceed with *Next*. In case you have chosen one or more extensions, you will be prompted to provide the respective registration codes. Depending on your choice, it may also be necessary to accept additional license agreements.



Important: Default modules for offline installation

When performing an offline installation from the SLE-15-SP7-Full-ARCH-GM-media1.iso, only the *Basesystem Module* is selected by default. To install the complete default package set of SUSE Linux Enterprise Server, additionally select the *Server Applications Module*.


2.7 Add-on product



The *Add-On Product* dialog allows you to add additional software sources (called “repositories”) to SUSE Linux Enterprise Server that are not provided by the SUSE Customer Center. Add-on products may include third-party products and drivers as well as additional software for your system.



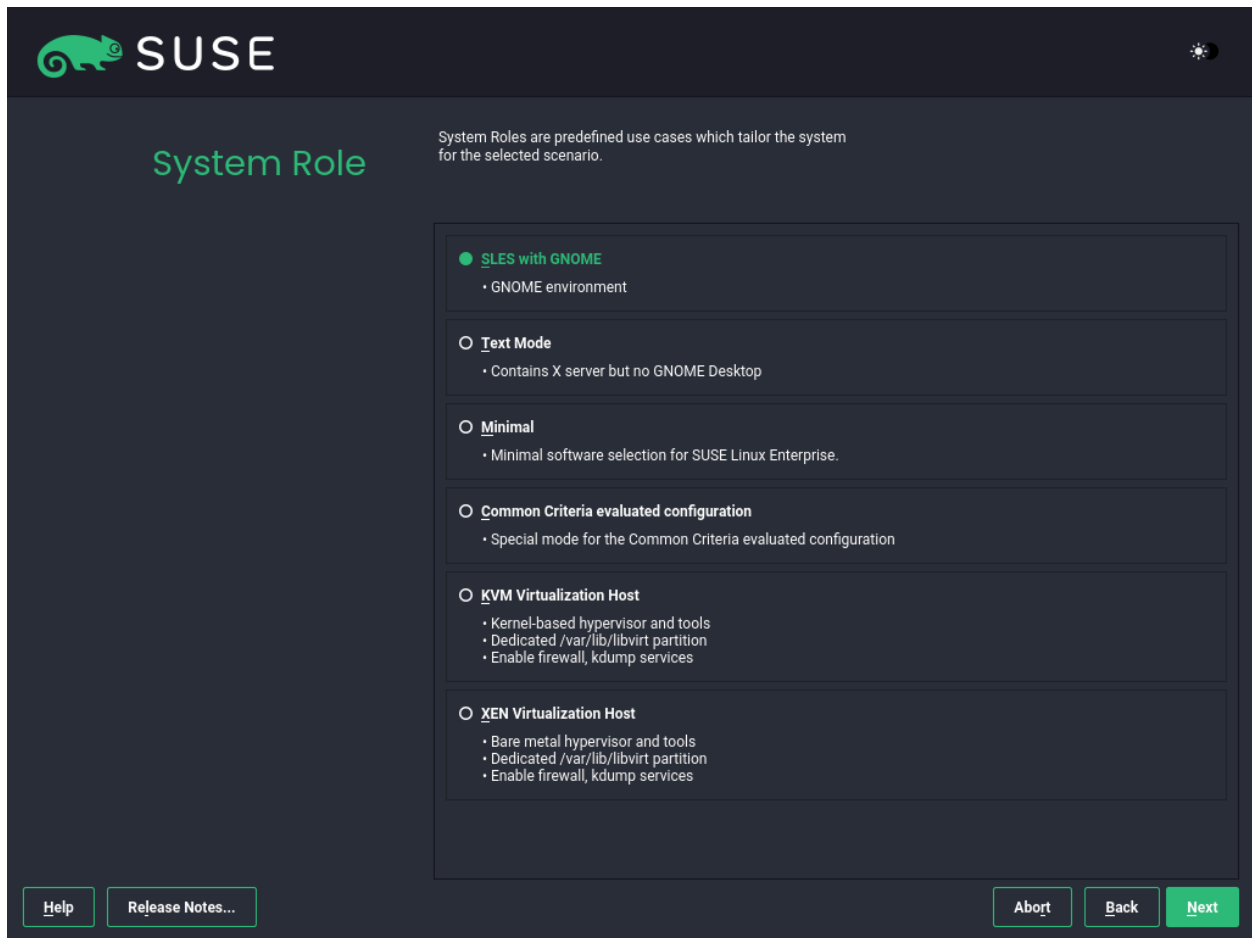
Tip: Adding drivers during the installation

You can also add driver update repositories via the *Add-On Product* dialog. Driver updates for SUSE Linux Enterprise are provided at <https://drivers.suse.com/> . These drivers have been created via the SUSE SolidDriver Program.

If you want to skip this step, proceed with *Next*. Otherwise, activate *I would like to install an additional Add On Product*. Specify a media type, a local path, or a network resource hosting the repository and follow the on-screen instructions.

Check *Download Repository Description Files* to download the files describing the repository now. If deactivated, they will be downloaded after the installation has started. Proceed with *Next* and insert a medium if required. Depending on the content of the product, it may be necessary to accept additional license agreements. Proceed with *Next*. If you have chosen an add-on product requiring a registration key, you will be asked to enter it before proceeding to the next step.

2.8 System role



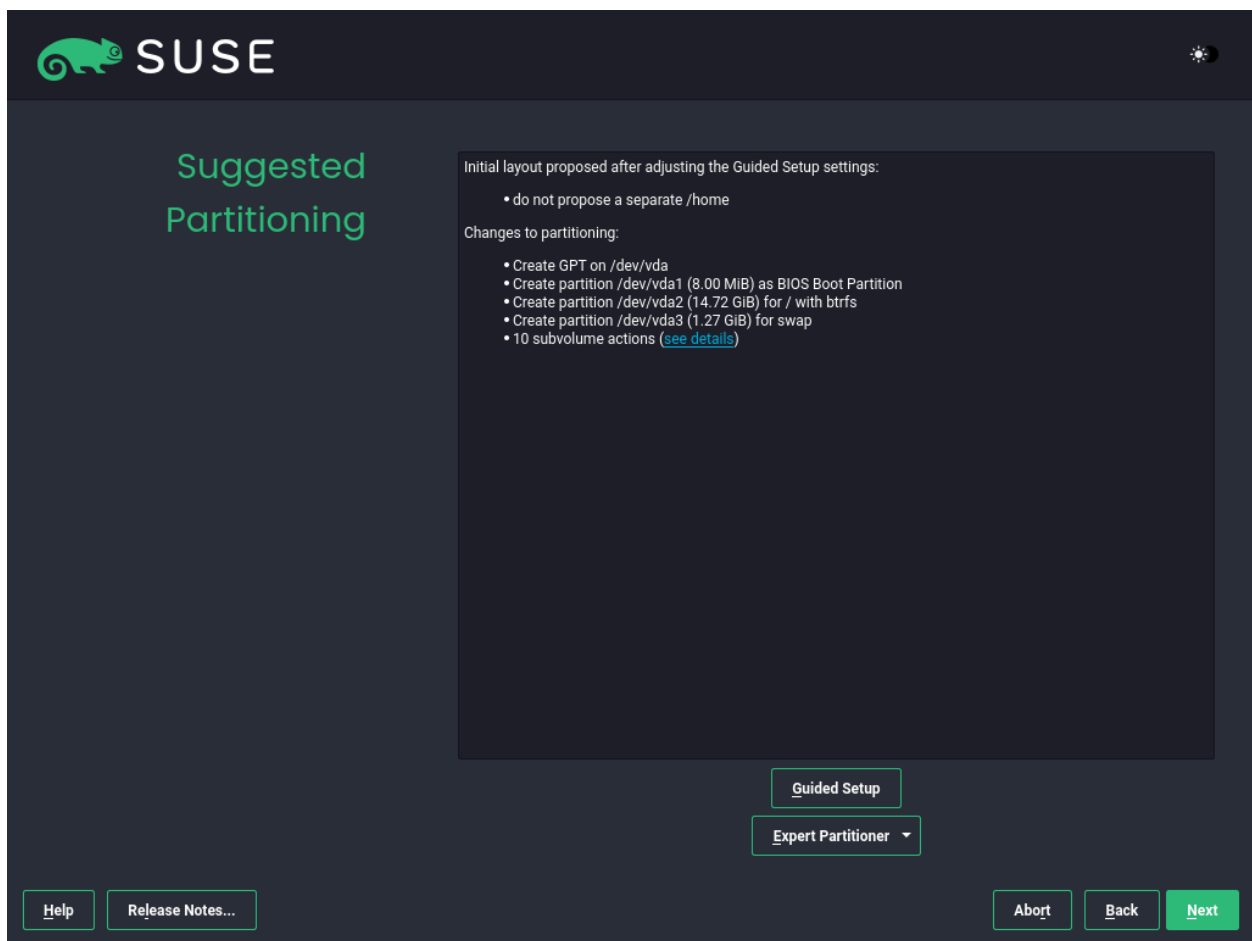
The availability of system roles depends on your selection of modules and extensions. System roles define, for example, the set of software patterns that is going to be preselected for the installation. Refer to the description on screen to make your choice. Select a role and proceed with *Next*. If from the enabled modules only one role or no role is suitable for the respective base product, the *System Role* dialog is omitted.



Tip: Release notes

From this point on, the Release Notes can be viewed from any screen during the installation process by selecting *Release Notes*.

2.9 Suggested partitioning



Review the partition setup proposed by the system. If necessary, change it. You have the following options:

Guided setup

Starts a wizard which lets you refine the partitioning proposal. The options available here depend on your system setup. If it contains more than a single hard disk, you may choose which disk(s) to use and where to place the root partition. If the disk(s) already contain partitions, decide whether to remove or resize them.

In subsequent steps, you may also add LVM support and disk encryption. You can change the file system for the root partition and decide whether or not to have a separate home partition.

Expert partitioner

Opens the *Expert Partitioner* described in Book “*Deployment Guide*”, Chapter 11 “*Expert Partitioner*”, Section 11.1 “*Using the Expert Partitioner*”. This gives you full control over the partitioning setup and lets you create a custom setup. This option is intended for experts.



Warning: Disk space units

Note that for partitioning purposes, disk space is measured in binary units, rather than in decimal units. For example, if you enter sizes of 1GB, 1GiB or 1G, they all signify 1 GiB (Gibibyte), as opposed to 1 GB (Gigabyte).

Binary

1 GiB = 1 073 741 824 bytes.

Decimal

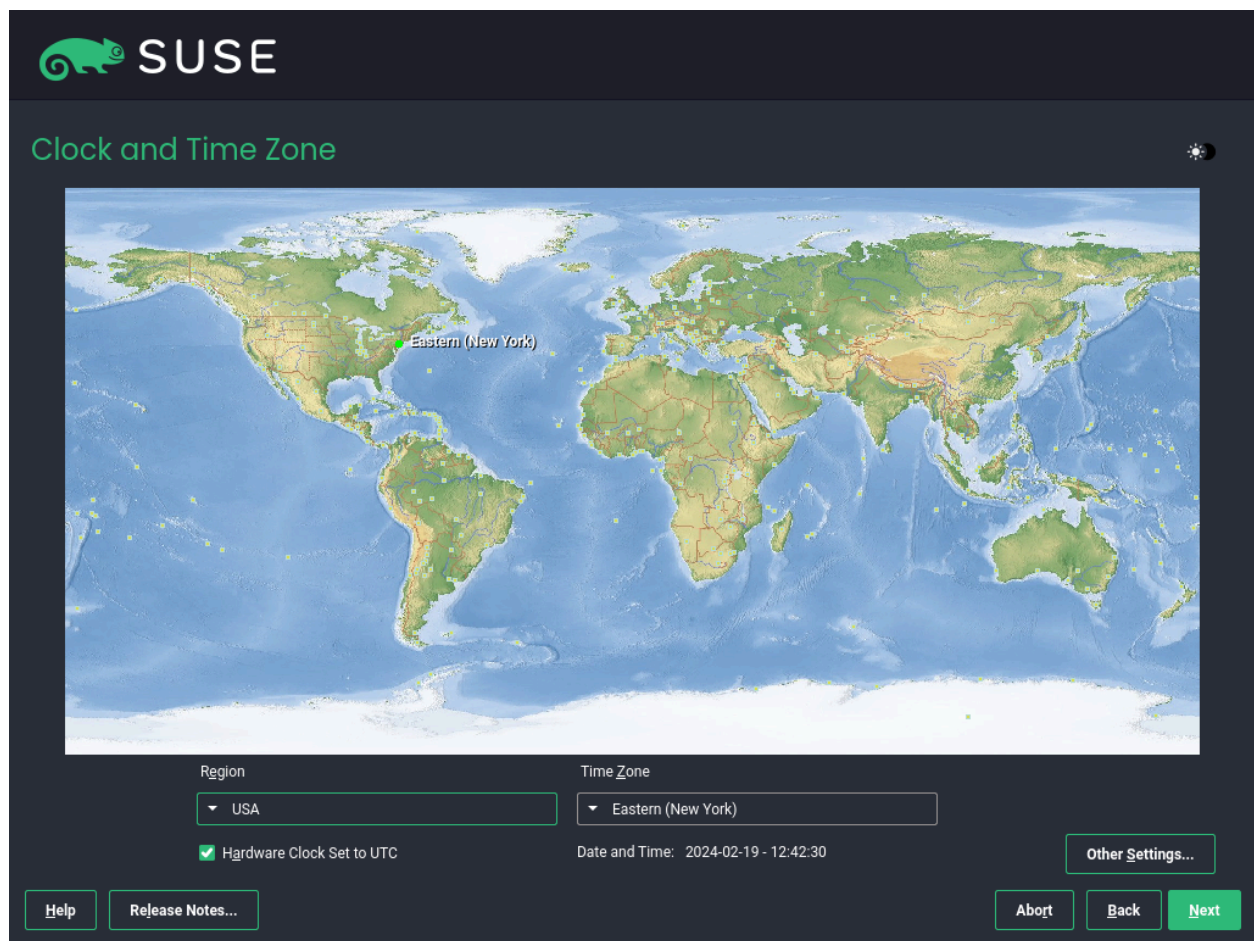
1 GB = 1 000 000 000 bytes.

Difference

1 GiB \approx 1.07 GB.

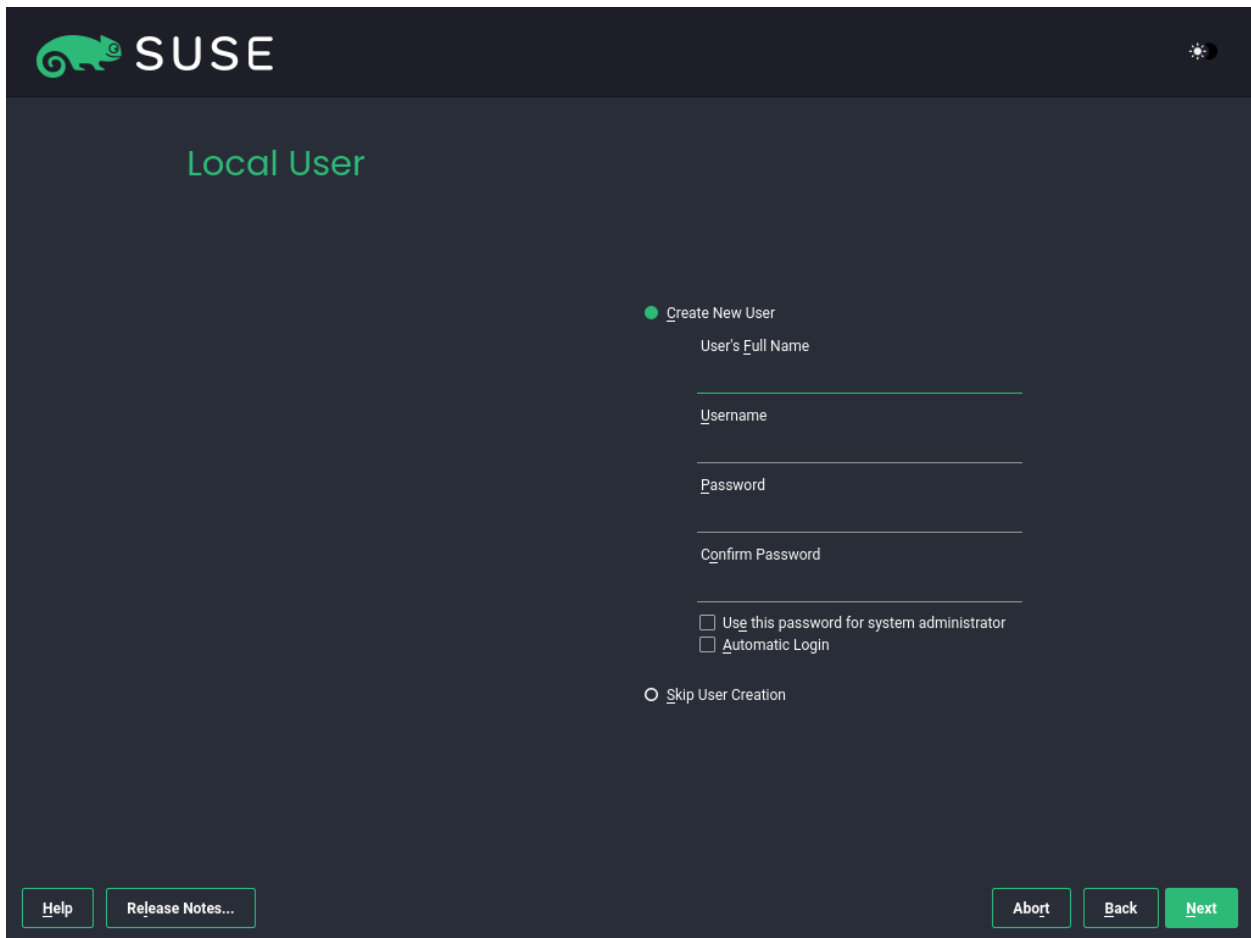
To accept the proposed setup without any changes, choose *Next* to proceed.

2.10 Clock and time zone



Select the clock and time zone to use in your system. To manually adjust the time or to configure an NTP server for time synchronization, choose *Other Settings*. See Book “*Deployment Guide*”, Chapter 9 “*Installation steps*”, Section 9.12 “*Clock and time zone*” for detailed information. Proceed with *Next*.

2.11 Local user



SUSE

Local User

☒ Create New User

User's Full Name

Username

Password

Confirm Password

☐ Use this password for system administrator

☐ Automatic Login

☐ Skip User Creation

Help Release Notes... Abort Back Next

To create a local user, type the first and last name in the *User's Full Name* field, the login name in the *Username* field, and the password in the *Password* field.

The password should be at least eight characters long and should contain both uppercase and lowercase letters and numbers. The maximum length for passwords is 72 characters, and passwords are case-sensitive.

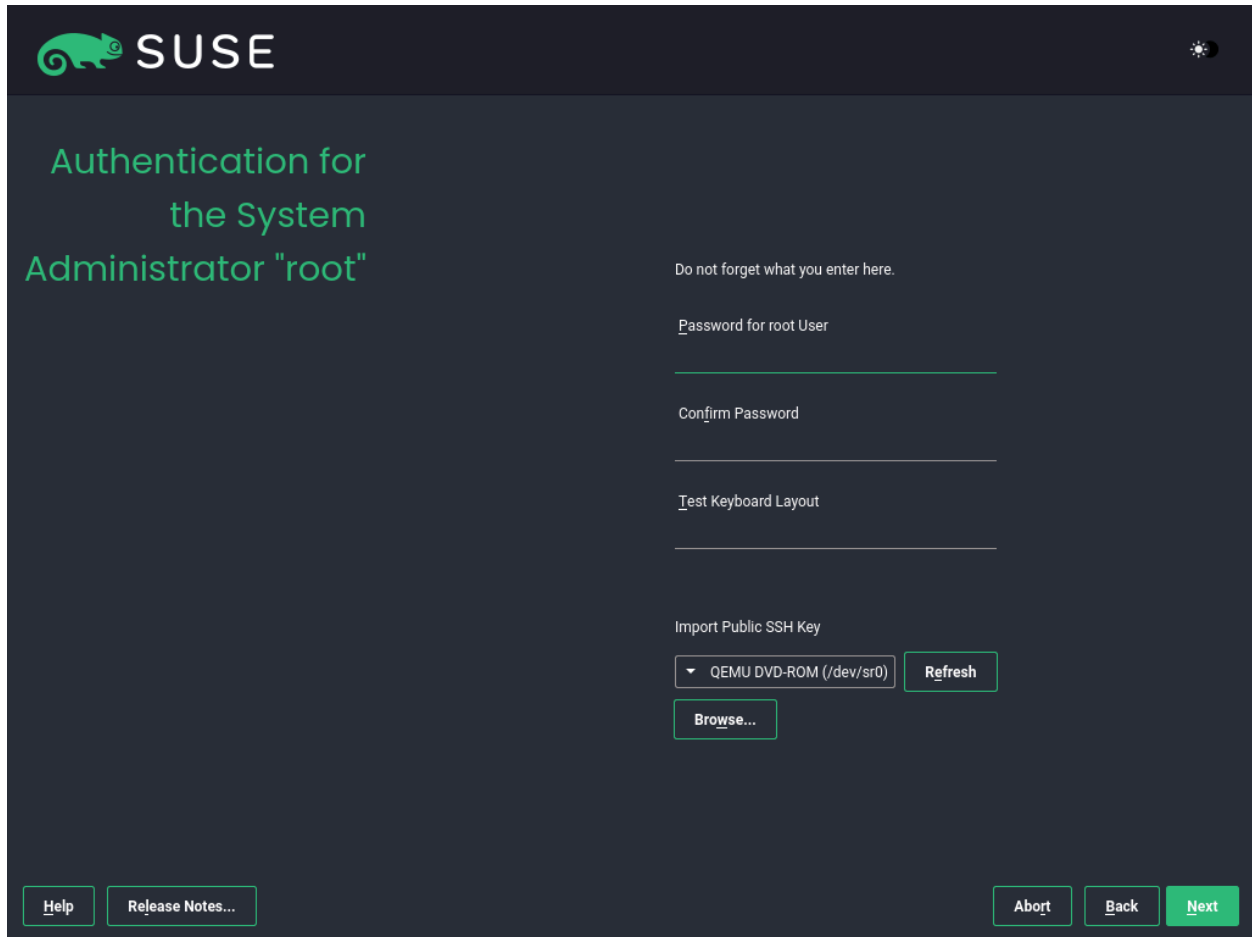
For security reasons, it is also strongly recommended *not* to enable the *Automatic Login*. You should also *not Use this Password for the System Administrator* but rather provide a separate root password in the next installation step.

If you install on a system where a previous Linux installation was found, you may *Import User Data from a Previous Installation*. Click *Choose User* for a list of available user accounts. Select one or more users.

In an environment where users are centrally managed (for example, by NIS or LDAP), you can skip the creation of local users. Select *Skip User Creation* in this case.

Proceed with *Next*.

2.12 Authentication for the system administrator “root”



The screenshot shows the SUSE logo at the top left. The main heading is "Authentication for the System Administrator 'root'". Below this, there is a warning: "Do not forget what you enter here." followed by three input fields: "Password for root User", "Confirm Password", and "Test Keyboard Layout". Below these fields is a section for "Import Public SSH Key" with a dropdown menu showing "QEMU DVD-ROM (/dev/sr0)", a "Refresh" button, and a "Browse..." button. At the bottom, there are four buttons: "Help", "Release Notes...", "Abort", and "Next".

Type a password for the system administrator (called the root user) or provide a public SSH key. If you want, you can use both.

Because the root user is equipped with extensive permissions, the password should be chosen carefully. You should never forget the root password! After you entered it here, the password cannot be retrieved.



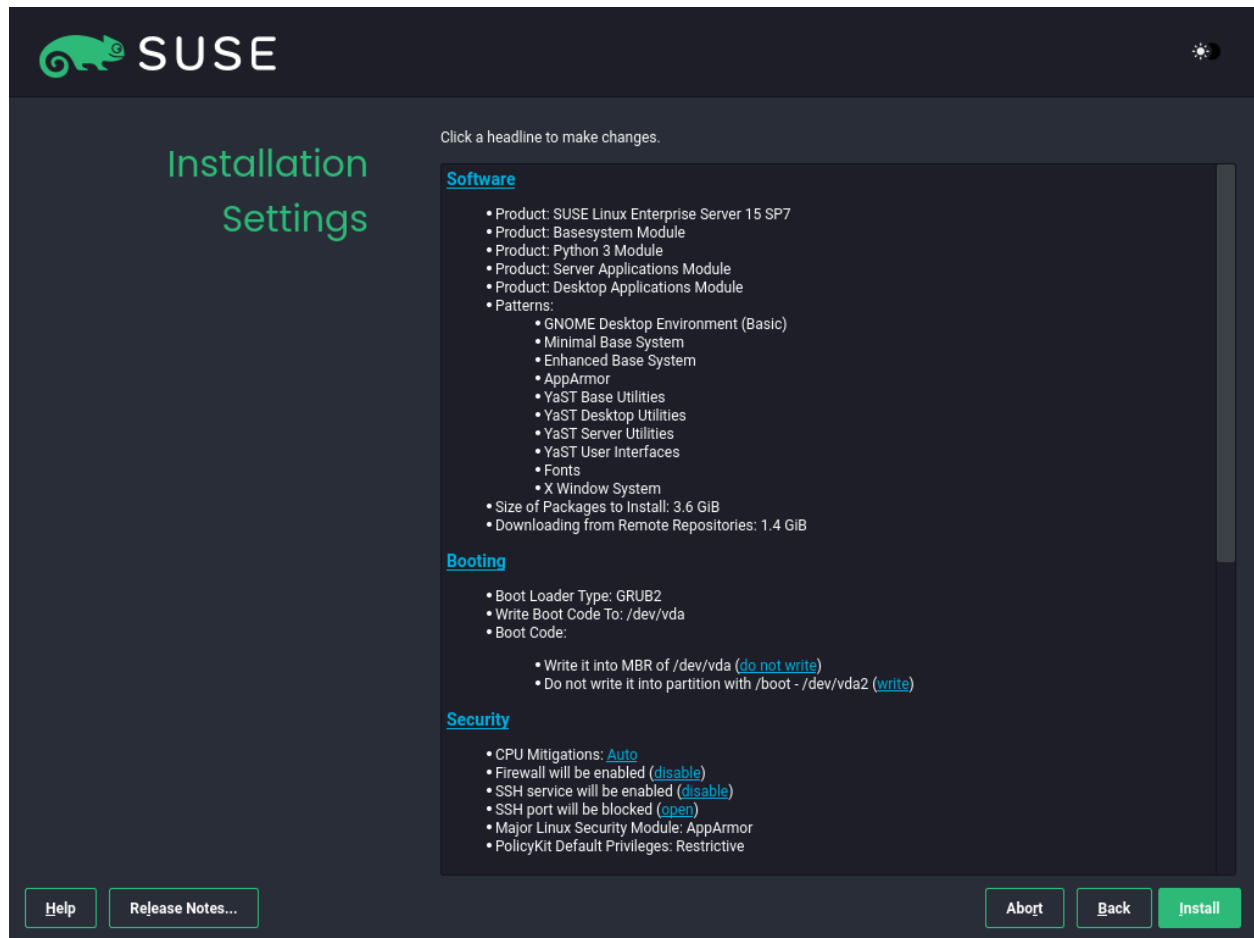
Tip: Passwords and keyboard layout

It is recommended to only use US ASCII characters. In case of a system error or when you need to start your system in rescue mode, the keyboard may not be localized.

If you want to access the system remotely via SSH using a public key, import a key from a removable media or an existing partition. See Book “*Deployment Guide*”, Chapter 9 “*Installation steps*”, Section 9.14 “*Authentication for the system administrator root*” for more information.

Proceed with *Next*.

2.13 Installation settings



Use the *Installation Settings* screen to review and—if necessary—change several proposed installation settings. The current configuration is listed for each setting. To change it, click the headline. Some settings, such as firewall or SSH, can be changed directly by clicking the respective links.



Important: Remote access

Changes you can make here can also be made later at any time from the installed system. However, if you need remote access right after the installation, you may need to open the SSH port in the *Security* settings.

Software

The scope of the installation is defined by the modules and extensions you have chosen for this installation. However, depending on your selection, not all packages available in a module are selected for installation.

Clicking *Software* opens the *Software Selection and System Tasks* screen, where you can change the software selection by selecting or deselecting patterns. Each pattern contains several software packages needed for specific functions (for example, *KVM Host Server*). For a more detailed selection based on software packages to install, select *Details* to switch to the *YaST Software Manager*. See Book “*Administration Guide*”, Chapter 8 “*Installing or removing software*” for more information.

Booting

This section shows the boot loader configuration. Changing the defaults is only recommended if really needed. Refer to Book “*Administration Guide*”, Chapter 18 “*The boot loader GRUB 2*” for details.

Security

The *CPU Mitigations* refer to kernel boot command-line parameters for software mitigations that have been deployed to prevent CPU side-channel attacks. Click the selected entry to choose a different option. For details, see Book “*Administration Guide*”, Chapter 18 “*The boot loader GRUB 2*” *CPU Mitigations*.

By default, the *Firewall* is enabled on all configured network interfaces. To completely disable `firewalld`, click *disable* (not recommended). Refer to Book “*Security and Hardening Guide*”, Chapter 23 “*Masquerading and firewalls*” for configuration details.



Note: Firewall settings for receiving updates

If your system is behind a firewall that blocks outgoing traffic, make sure to allow connections to <https://scc.suse.com/> and <https://updates.suse.com> on ports 80 and 443 in order to receive updates. For more information, such as IP addresses and proxy server configuration, refer to <https://www.suse.com/support/kb/doc/?id=000021034>.

The *SSH service* is enabled by default, but its port (22) is closed in the firewall. Click *open* to open the port or *disable* to disable the service. Note that if SSH is disabled, remote logins will not be possible. Refer to Book “*Security and Hardening Guide*”, Chapter 22 “*Securing network operations with OpenSSH*” for more information.

The default *Major Linux Security Module* is *AppArmor*. To disable it, select *None* as module in the *Security* settings.

Security Policies

Click to *enable* the Defense Information Systems Agency STIG security policy. If any installation settings are incompatible with the policy, you will be prompted to modify them accordingly. Some settings can be adjusted automatically, others require user input.

Enabling a security profile enables a full SCAP remediation on first boot. You can also perform a *scan only* or *do nothing* and manually remediate the system later with OpenSCAP. For more information, refer to Book “*Deployment Guide*”, Chapter 9 “*Installation steps*”, Section 9.15.4 “*Security Profiles*”.

Network configuration

Displays the current network configuration. By default, **wicked** is used for server installations and NetworkManager for desktop workloads. Click *Network Configuration* to change the settings. For details, see Book “*Administration Guide*”, Chapter 23 “*Basic networking*”, Section 23.4 “*Configuring a network connection with YaST*”.



Important: Support for NetworkManager

SUSE only supports NetworkManager for desktop workloads with SLED or the Workstation extension. All server certifications are done with **wicked** as the network configuration tool, and using NetworkManager may invalidate them. NetworkManager is not supported by SUSE for server workloads.

Kdump

Kdump saves the memory image (“core dump”) to the file system in case the kernel crashes. This enables you to find the cause of the crash by debugging the dump file. Kdump is preconfigured and enabled by default. See Book “*System Analysis and Tuning Guide*”, Chapter 20 “*Kexec and Kdump*”, Section 20.7 “*Basic Kdump configuration*” for more information.

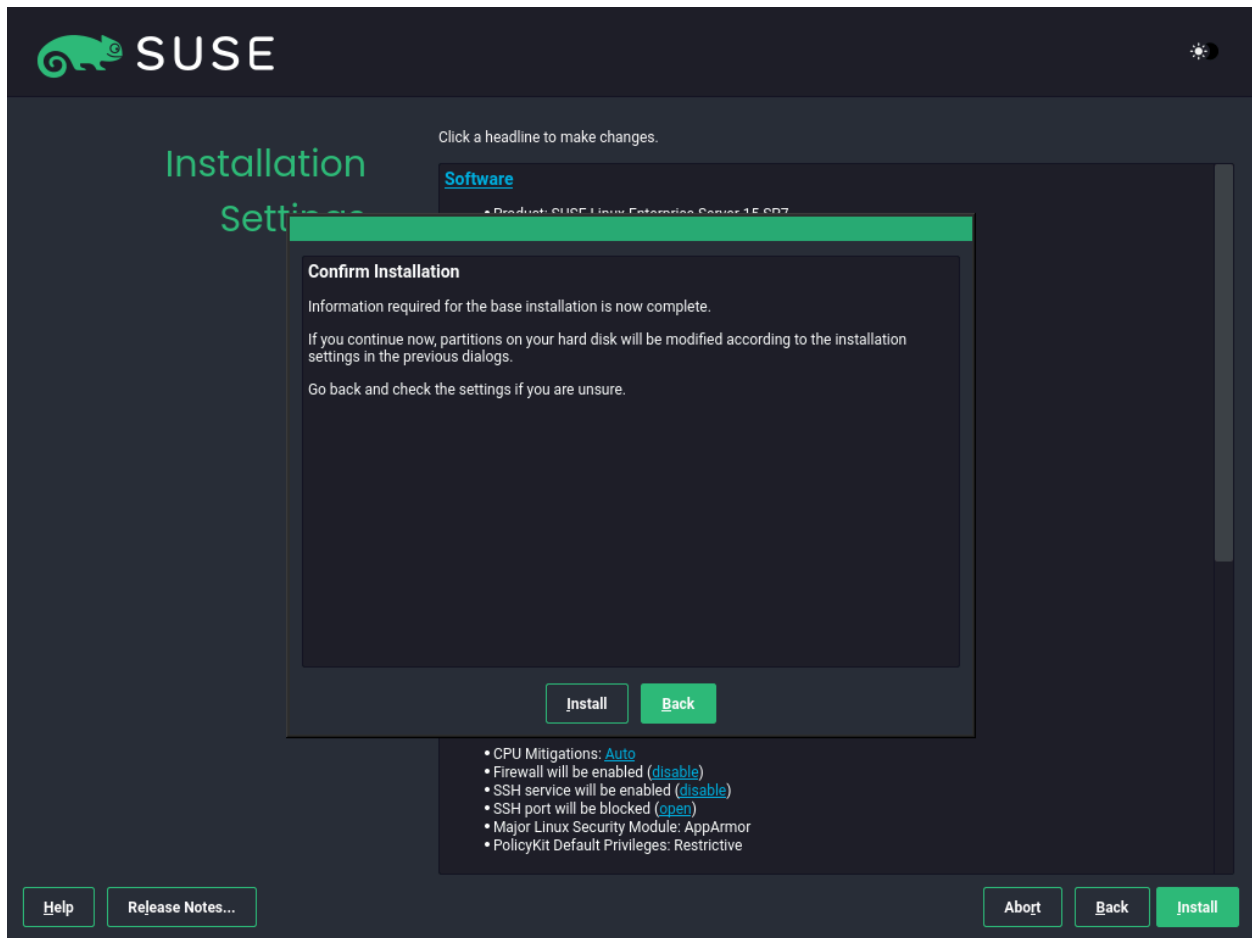
Default systemd target

If you have installed the desktop applications module, the system boots into the *graphical* target, with network, multiuser and display manager support. Switch to *multi-user* if you do not need to log in via display manager.

System

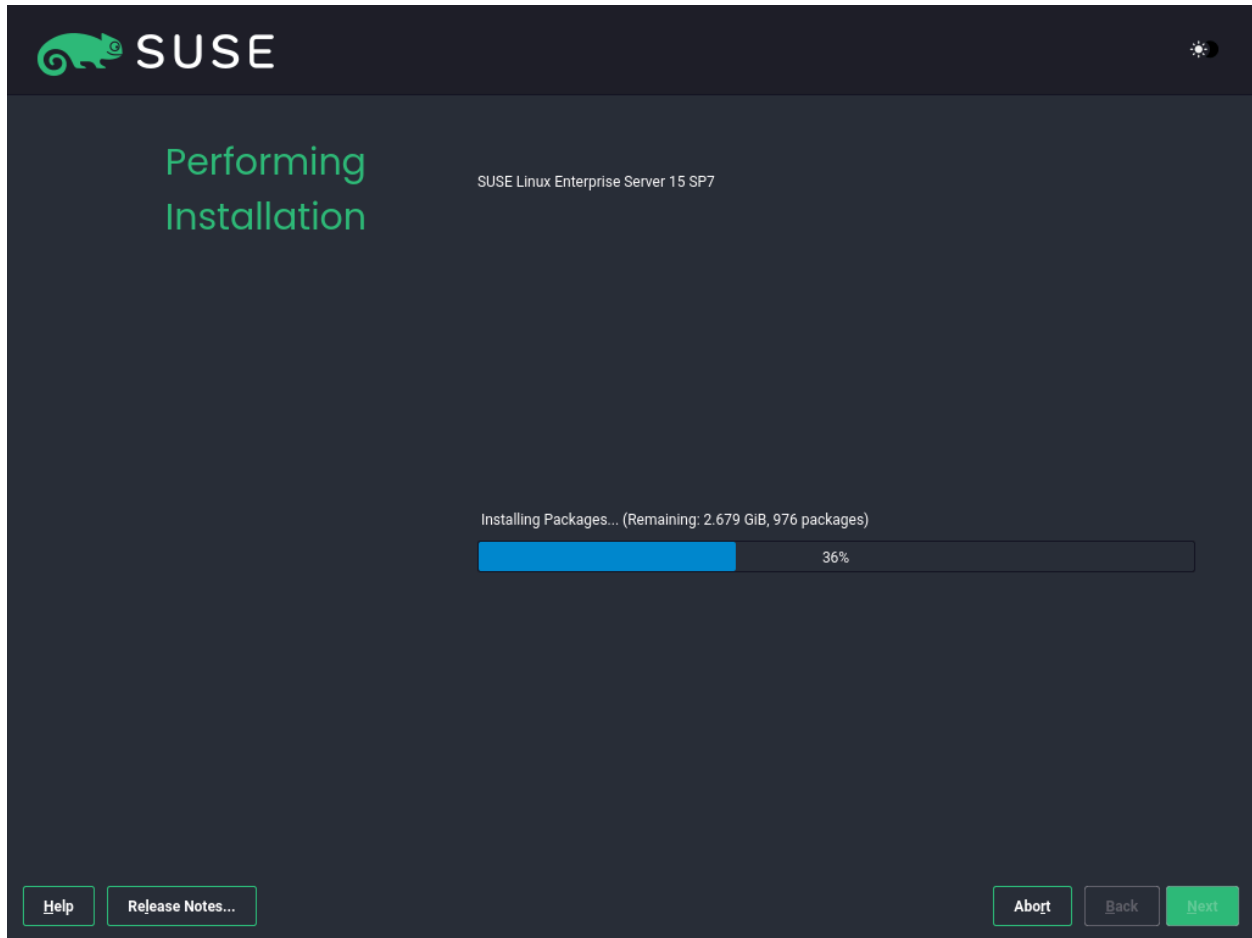
View detailed hardware information by clicking *System*. In the resulting screen you can also change *Kernel Settings*—see Book “*Deployment Guide*”, Chapter 9 “*Installation steps*”, Section 9.15.10 “*System*” for more information.

2.14 Start the installation



After you have finalized the system configuration on the *Installation Settings* screen, click *Install*. Depending on your software selection, you may need to agree to license agreements before the installation confirmation screen pops up. Up to this point, no changes have been made to your system. After you click *Install* a second time, the installation process starts.

2.15 The installation process



During the installation, the progress is shown. After the installation routine has finished, the computer is rebooted into the installed system.

3 Legal notice

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