

# Installing SUSE Linux Enterprise Server Manually Using Agama On IBM Z

## WHAT?

This article describes how to install SUSE Linux Enterprise Server using Agama. The information presented here applies to installation of the products on both bare metal and virtual machines.

## WHY?

Read this article to understand the process of installing SUSE Linux Enterprise Server using Agama.

## EFFORT

You may need 15 minutes to read this article.

## GOAL

Learn how to manually install SUSE Linux Enterprise Server using Agama.

## REQUIREMENTS

A bare metal server or a virtual machine. For server installations without

- any desktop environment, SUSE recommends a minimum of 1 CPU, 2 GB memory and 32 GB storage (which includes storage for Btrfs snapshots in the root partition, swap space, and storage for software packages).

An active registration code for the product you want to install. You can

- generate a registration code for the product and activate its subscription for your organization at the SUSE Customer Center.



## Note: Optional registration

Certain images that are signed with the developer's key may allow you to skip registration before or while installation. Besides, certain images may contain all installable packages for your operating system that you can use as an offline package repository. In such cases, you may not need an active registration code before installation. However, if you use software packages from the official online repositories, SUSE recommends registering your product with the SUSE Customer Center.

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# 1 Introduction to Agama

This section provides a short overview of Agama, which is the default installer for SUSE Linux Enterprise Server 16.0 and later versions.

## 1.1 What is Agama?

Agama is a flexible and powerful open source installer developed by SUSE. You can use it to perform manual or automated installation of supported SUSE Linux Enterprise Server versions on a variety of machine architectures. The Agama-based installation method provides an intuitive interface for *ready-to-use* images for different use cases and workloads. In combination with Cockpit and Ansible, it substitutes YaST in SUSE Linux Enterprise Server.

# 2 Installing SUSE Linux Enterprise Server using Agama

This section describes how to install SUSE Linux Enterprise Server using the Agama-based ISO image file.

## 2.1 Introduction

The following sections describe the Agama-based manual installation procedure for SUSE Linux Enterprise Server. The information applies to installation on both bare metal and virtual machines.

## 2.2 Requirements

- An Agama-based ISO image file for supported versions of SUSE Linux Enterprise Server. You can download it from the SUSE Customer Center and verify its checksum to ensure its integrity.



## Note: Available images for products

The Agama-based installation image is available for SUSE Linux Enterprise Server 16.0 and later versions.

## 2.3 Manually installing SUSE Linux Enterprise Server for s390x using Agama

To manually install SUSE Linux Enterprise Server using Agama, perform the following steps:

### PROCEDURE 1: MANUAL INSTALLATION OF SUSE LINUX ENTERPRISE USING AGAMA

1. Download SLES-Online-16.0-s390x-Beta4.install.iso and mount it:

```
> sudo mkdir -p /srv/ftp/agama
> sudo mount -o loop SLES-Online-16.0-s390x-Beta4.install.iso /srv/ftp/agama
```

2. *(Optional)* For installation in an air-gapped environment or without registration, download SLES-16.0-Full-s390x-Beta4.install.iso and mount it.

```
> sudo mkdir -p /srv/ftp/agama-offline
> sudo mount -o loop SLES-16.0-Full-s390x-Beta4.install.iso /srv/ftp/agama-offline
```

3. Use the following parmfile to start the installation:

### EXAMPLE 1: EXAMPLE PARMFILE

```
cio_ignore=all,!condev,!0.0.0160①
rd.zdev=dasd,0.0.0160②
rd.zdev=qeth,0.0.0800:0.0.0801:0.0.0802,layer2=1,portno=0③
ip=192.168.3.100④ ::192.168.3.254:24⑤ ::enc800:none
ip=192.168.3.100::192.168.3.254:24:SLE16-Beta2:enc800:none
hostname=jupiter⑥ nameserver=192.168.1.116⑦
root=live:ftp://192.168.3.105/agama/LiveOS/squashfs.img⑧
live.password=linux⑨
```

- ① Only expose the devices that the machine should be aware of
- ② Activation of a DASD device
- ③ Activation of a qeth device

- ④ IP configuration. The different parameters are separated by colons (:). You can omit unneeded parameters by leaving them out, meaning you get two or more subsequent colons. For a complete configuration reference, refer to [man 7 dracut.cmdline](#).

If no IP configuration is specified, it will be assigned with DHCP and the IP address will be displayed on the console after boot.



## Important: Multiple network interfaces

If your system has more than one network interface, IP configurations may be swapped after the installation, leaving the system unreachable.

To prevent this from happening, either bind each IP configuration to a particular interface by interface name or MAC address. If you use a MAC address, make sure to format it as `00-11-22-33-44-55` instead of `00:11:22:33:44:55`



## Tip

As the console is hard to read on `x3270`, configuring the network in the parmfile is recommended.

- ⑤ IP address of the gateway for the system
- ⑥ Host name of the system. You can also set the host name in the `ip` parameter, however it is transient whereas `hostname` gets written to `/etc/hostname`.
- ⑦ IP address of the DNS server for the system
- ⑧ URI of the installer ISO mounted in [Step 1](#). For installation in an LPAR, use the ISO file directly as in:

```
root=live:ftp://192.168.3.105/agama/SLES-Online-16.0-s390x-Beta4.install.iso
```

- ⑨ Password for the system administrator `root`. If you do not set a password, a random password will be generated and displayed on the console after boot. As the console is hard to read on `x3270`, setting a `root` password in the parmfile is recommended.

Adjust your parmfile accordingly:

- For installation in an air-gapped environment or without registration, add the `agama.install_url` to the parmfile to install from SLES-16.0-Full-s390x-Beta4.install.iso mounted in [Step 2](#):

```
agama.install_url=ftp://192.168.3.105/agama-offline/install
```

- If you are using a VLAN, add the `vlan` parameter. Make sure to specify the virtual device instead of the underlying physical device.

```
ip=192.168.3.100::192.168.3.254:24::enc800.2174:none  
hostname=jupiter nameserver=192.168.1.116 vlan=enc800.2174:enc800
```



## Tip: `ifcfg` vs `ip` syntax

Earlier versions of SUSE Linux Enterprise used `linuxrc` using the interface configuration (`ifcfg`) files, whereas SUSE Linux Enterprise 16 uses `dracut` with `ip` syntax for NetworkManager. While Agama supports translating some options, it is recommended to use the new and more powerful syntax.

TABLE 1: `ifcfg` VS `ip`

<code>ifcfg</code>	<code>dracut</code>
<code>ifcfg=*=dhcp</code>	<code>ip=dhcp</code>
<code>ifcfg=eth0=dhcp</code>	<code>ip=eth0:dhcp</code>
<code>ifcfg=eth0.10=192.168.0.100/24,192.168.0.1 vlan=eth0.10:eth0</code>	<code>ip=192.168.0.100::192.168.0.1:24::eth0.10</code>
<code>ifcfg="eth0=192.168.0.33/24 10.0.0.100/24,192.168.0.1,192.168.0.1 10.0.0.1,example.com"</code>	<code>ip=192.168.0.33::192.168.0.1:24::eth0 nameserver=192.168.0.1 nameserver=10.0.0.1 ip=10.0.0.100::24::eth0</code>

For a complete list of `dracut` options, refer to [`man 7 dracut.cmdline`](#).

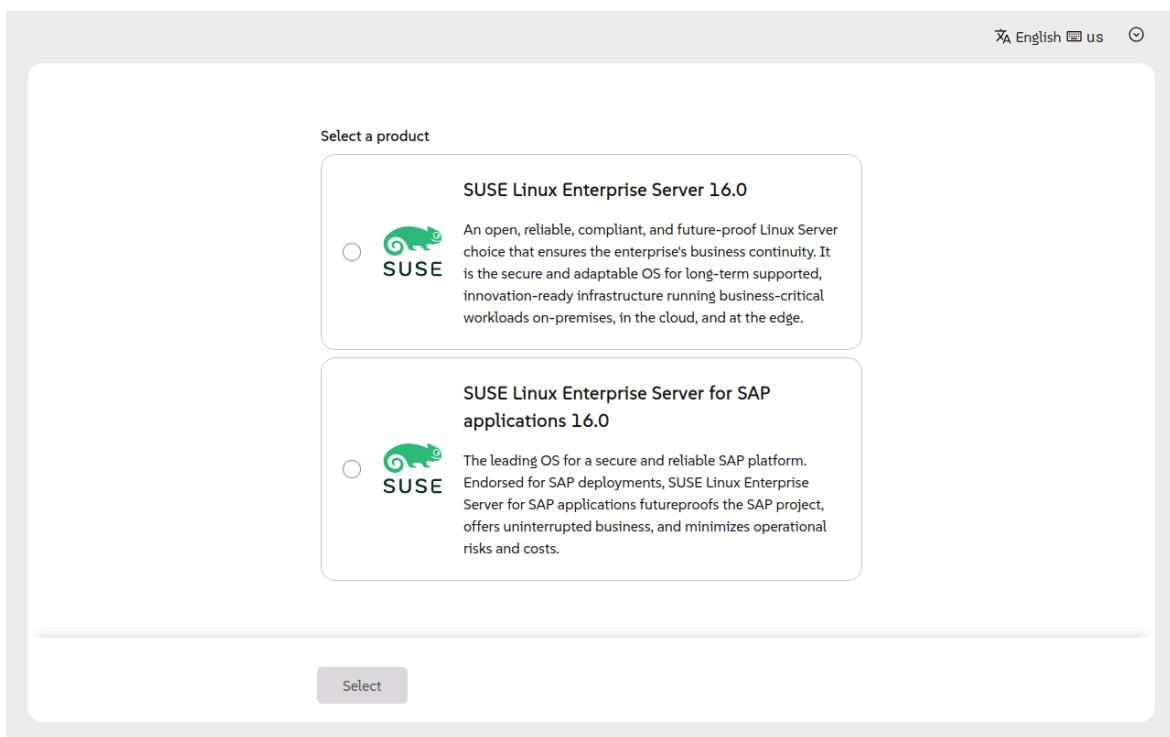


## Note: DASD alias devices

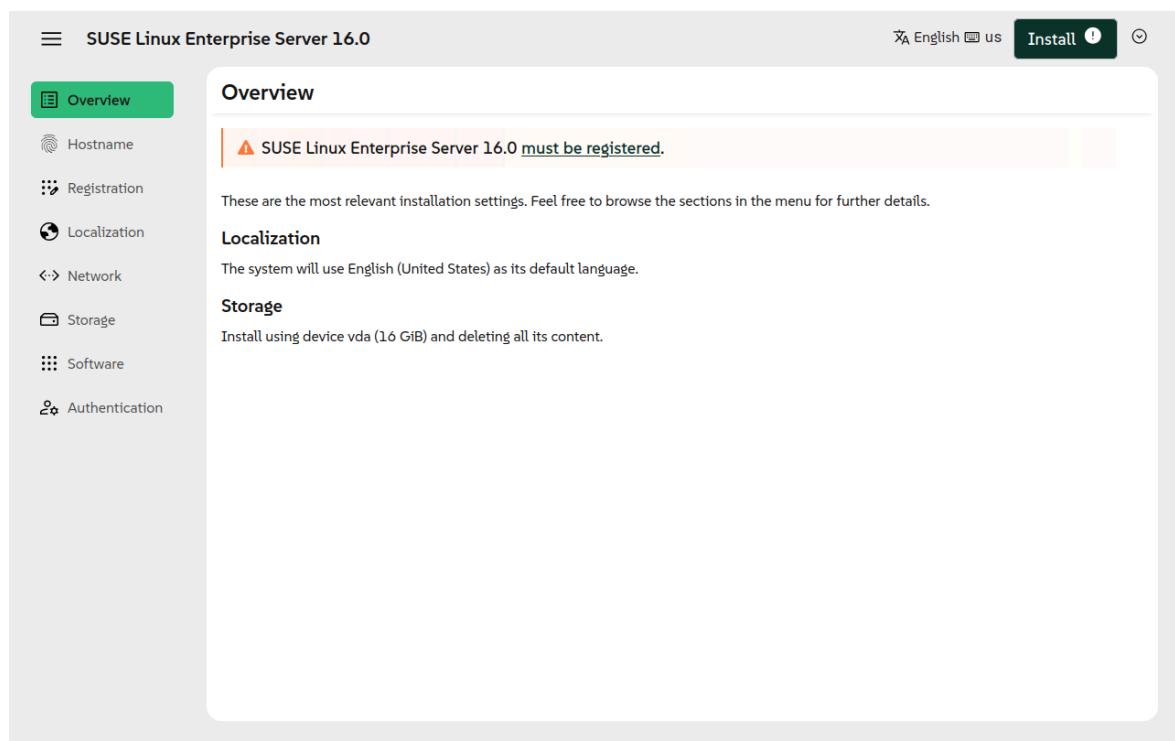
DASD alias devices are special in that they appear not operational until at least one associated DASD base device has been enabled. As a result, the Agama installer cannot determine their actual type (ECKD or FBA DASD).

As a workaround, specify `dasd-eckd` as device type. This should provide `chzdev` with enough information to create `udev` rules for enabling these devices even in the absence of a working device. When the the base device is enabled later and the alias devices become operational, they will be automatically set online.

4. Open a web browser pointing to the given IP address from the parmfile. Enter the `root` password and proceed with the installation.
5. Select SUSE Linux Enterprise Server 16.0 for installation and accept the license to continue.



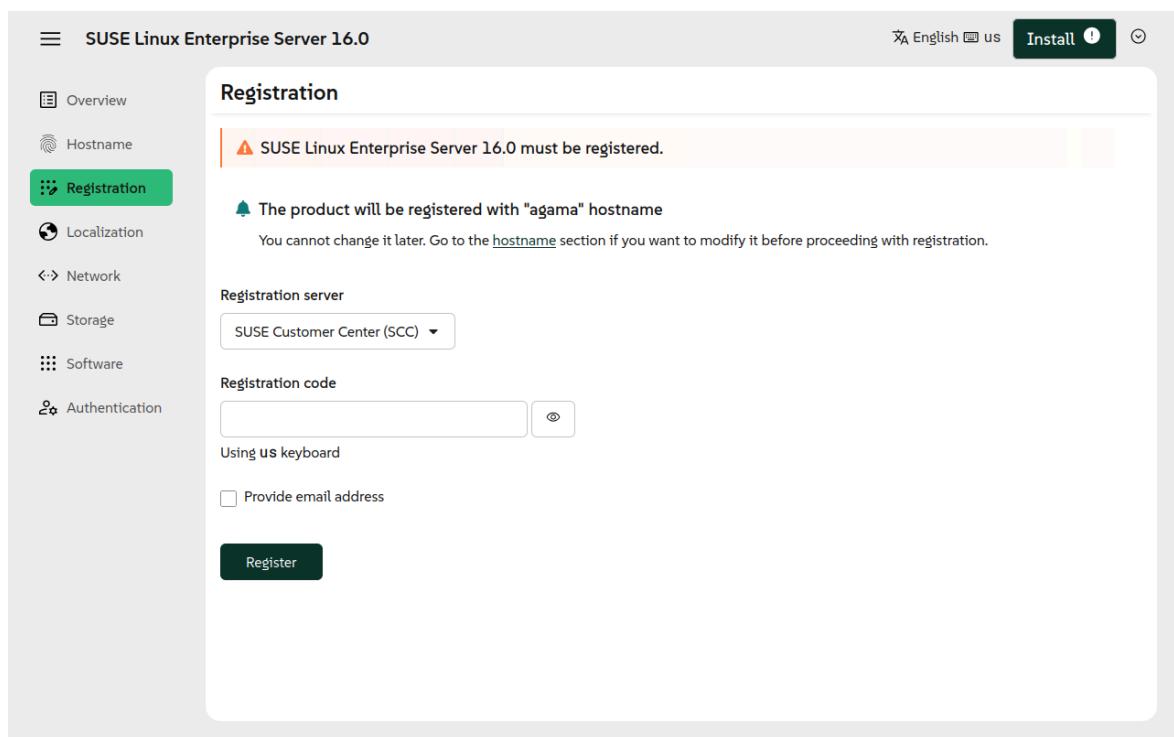
6. The overview with the most relevant installation settings is shown. Adjust the settings by selecting the category from the menu on the left or directly proceed with the installation.



## Tip: Installer language and keyboard

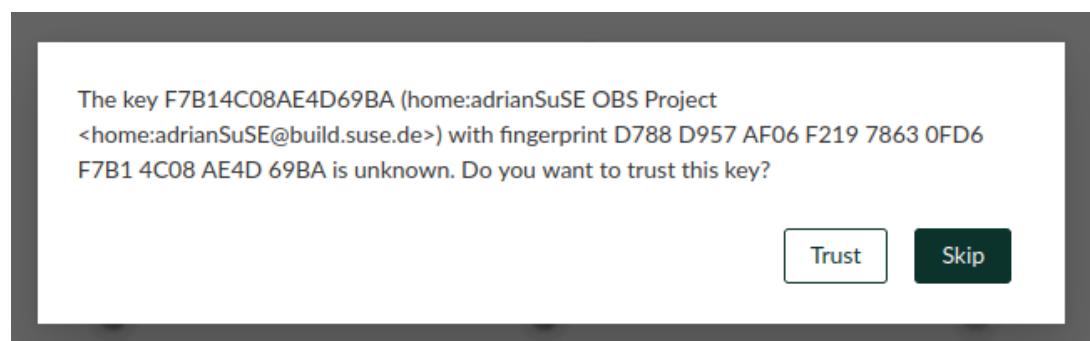
Click the arrow menu in the top right corner and select *Installer options* to change the language and keyboard layout used by the installer. The language can only be changed on local installations. If you are using a web browser for a remote installation, configure the preferred content language in the browser settings and reload the installer.

7. Register your product. Enter a registration code and optionally a valid email address.



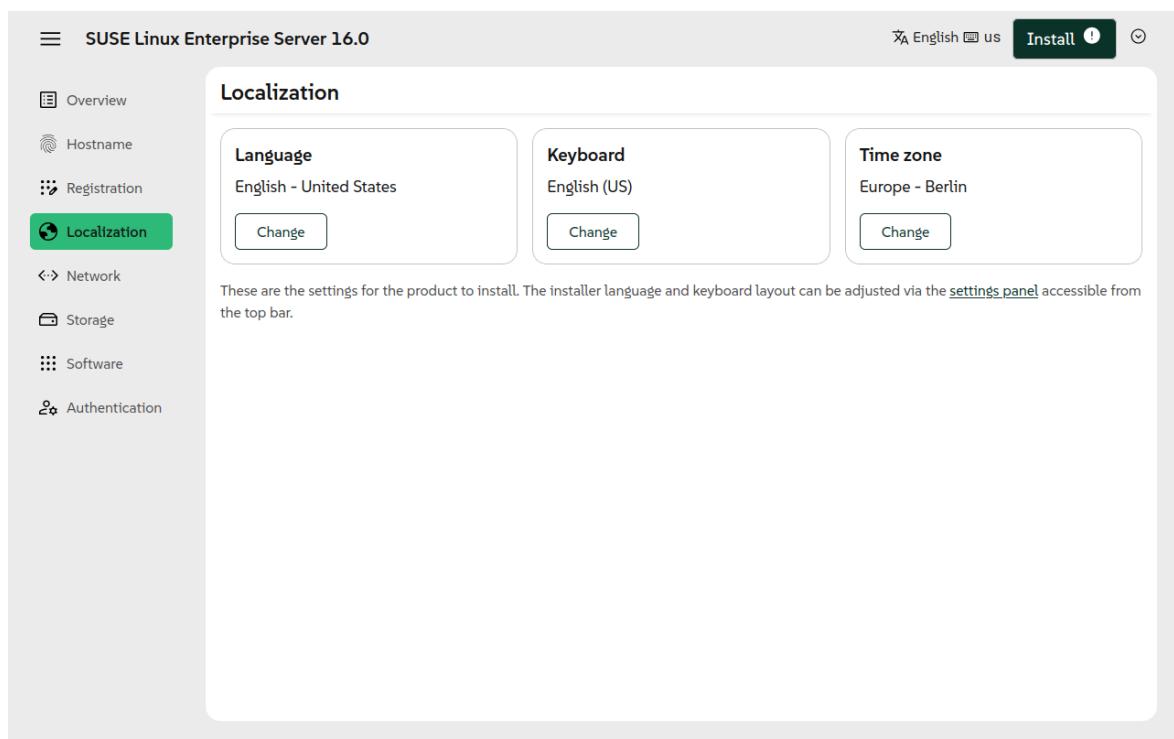
## Note: Optional registration for images signed with the developer's key

Images signed with the developer's key may allow you to skip registration before installation. If your product's image supports installation without registration, you may see a pop-up similar to the following:

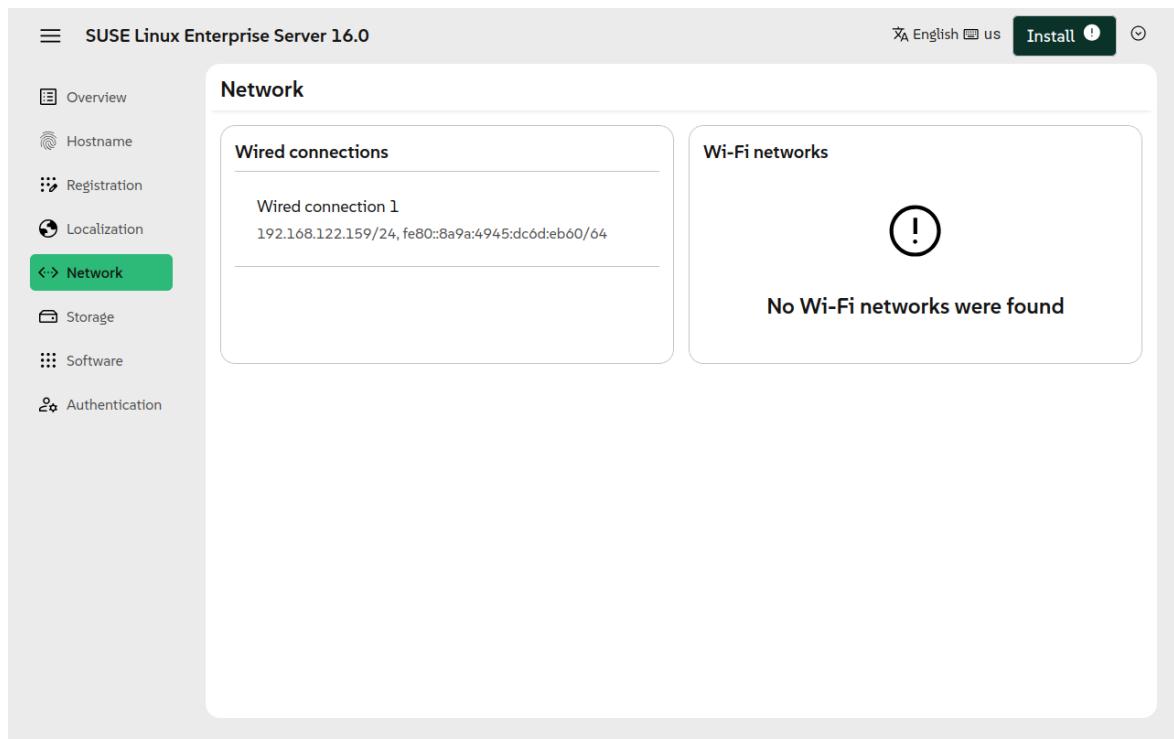


To install without registration, select *Trust* on the pop-up.

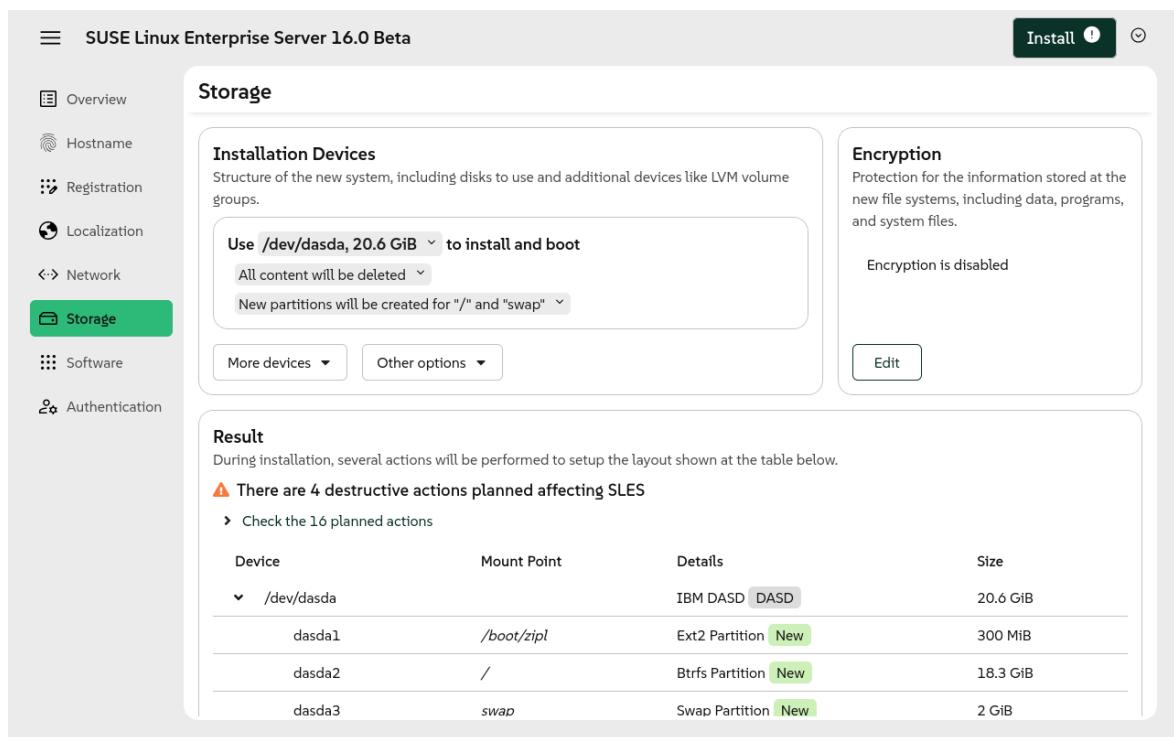
8. (Optional) Adjust your localization settings such as language, keyboard layout and time zone.



9. (Optional) Configure your network settings. To edit an existing network connection, click the three dots.



## 10. Select a storage device for installation.



Currently installations on single discs or LVM are supported. To change the disk or use LVM, click the device name *More devices* button in the *Installation devices* section.

To use DASD, iSCSI or zFCP devices, you need configure them first. Click *Other options* and select the desired technology. The DASD and zFCP options are only available if the corresponding devices are attached.

To activate a DASD disk, select it from the list and click *Perform an action > Activate*. Once the disk is activated, you can select it for installation in the previous screen.

To activate a zFCP disk, select it from the list and activate it by clicking on the three-dot menu. If the activation status is not displayed correctly, press **F5** to refresh the installer interface.

To detect an iSCSI disk, select the iSCSI initiator and click *Discover iSCSI targets*.

By default, the file systems will be allocated as new partitions on the selected device. You can change this behavior in the drop-down list labeled *All content will be deleted* drop-down list in the *Installatin devices* section. The following space policies are available:

### SPACE POLICIES

#### Delete current content

All partitions will be removed and any data on the disks will be lost.

### Shrink existing partitions

The data is kept, but current partitions will be shrunk as needed.

### Use available space

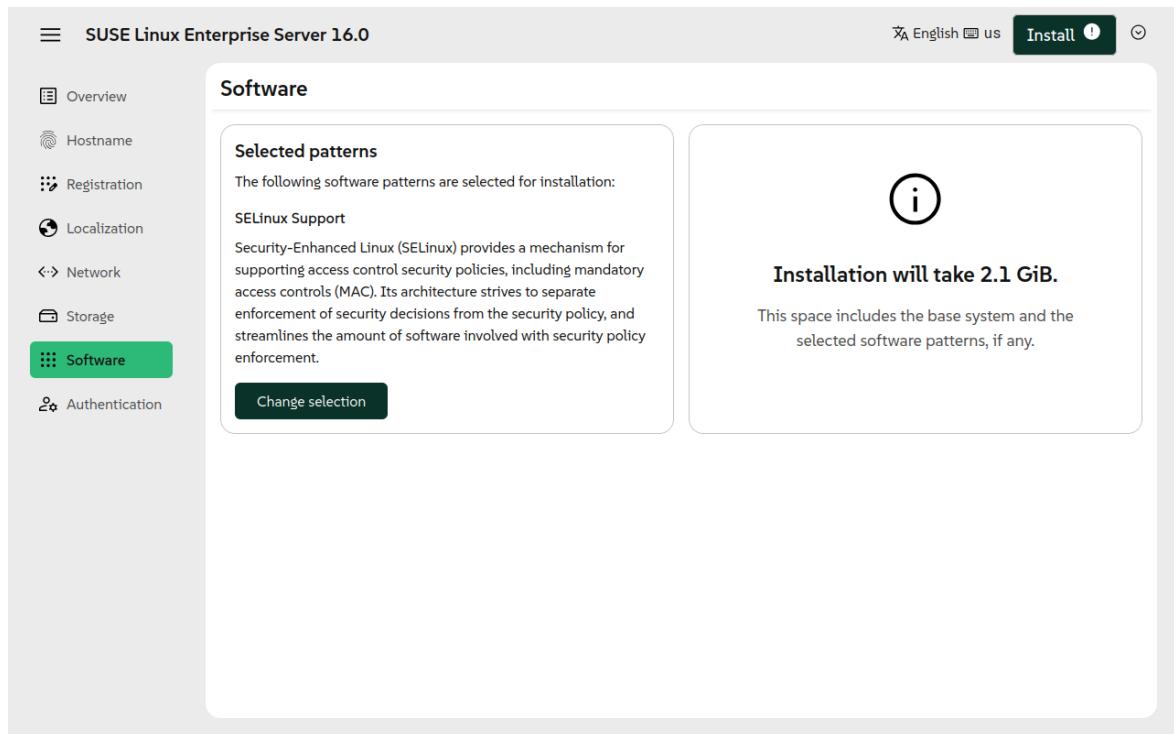
The data is kept. Only the space not assigned to any partition will be used.

### Custom

Select what to do with each partition.

To edit individual partitions, expand the *Partitions and file systems* section by clicking on the >. Optionally, you can configure Btrfs snapshots, boot options and enable full disk encryption (FDE).

11. (Optional) Add additional software to install such as the KVM hypervisor or Cockpit system management service.



### Note: Trust the GPG key for the Package Hub repository

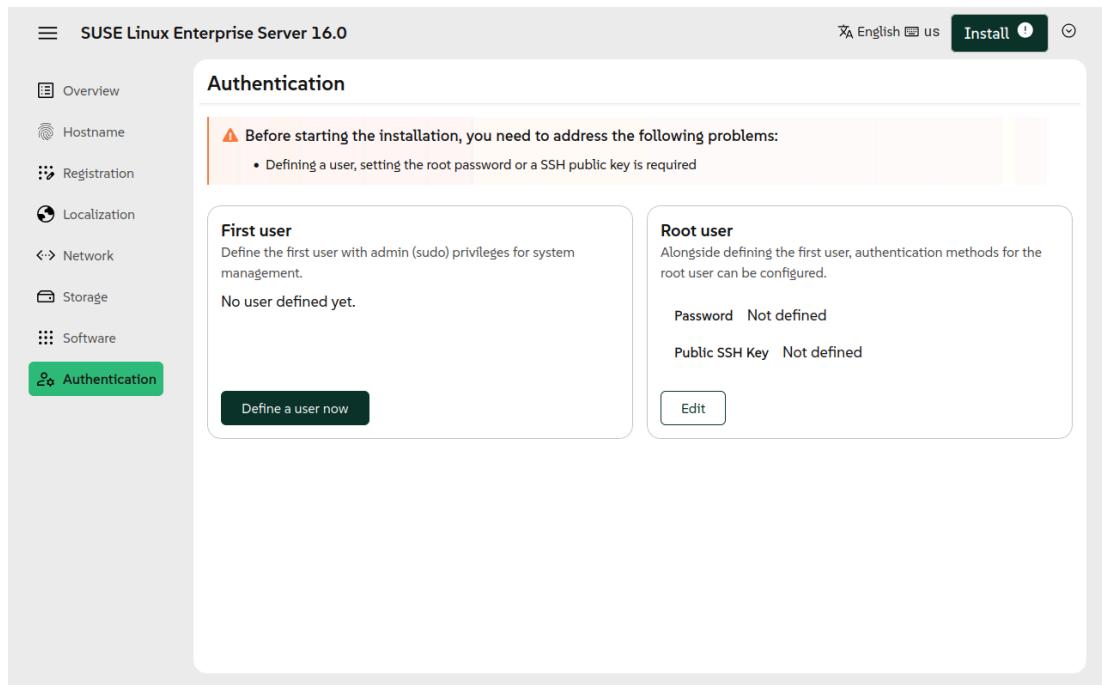
If you select the Package Hub add-on and see a popup, trust the GPG key for that repository.

12. Configure the authentication settings.

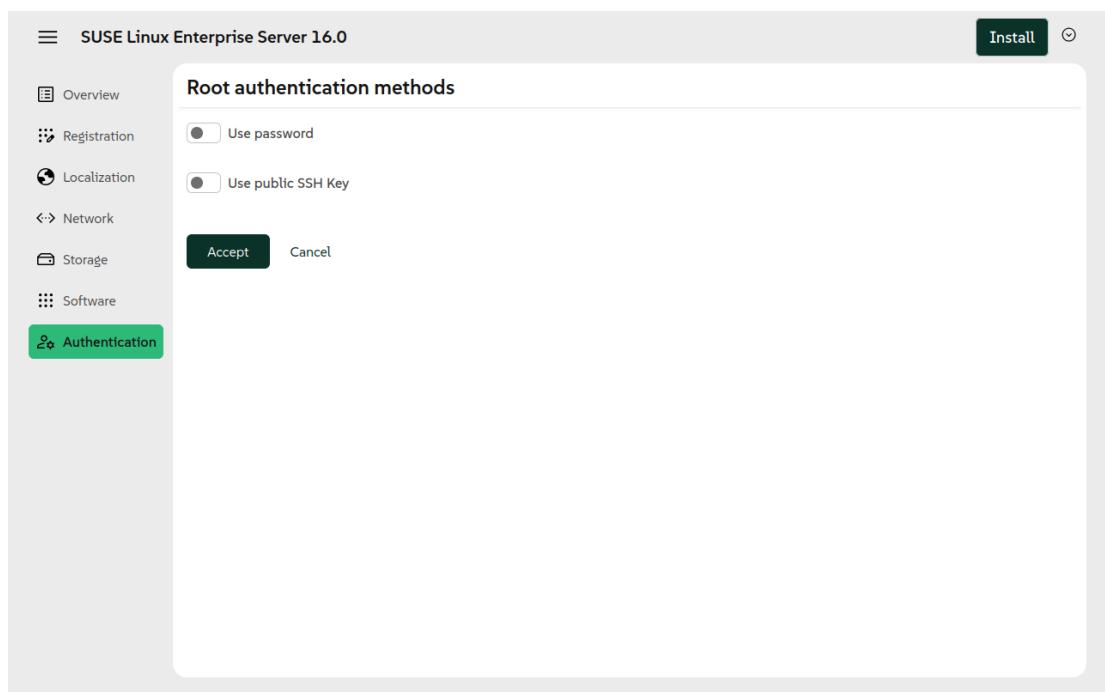
## ! Important: No SSH root access

SSH access for root is disabled by default. Therefor it is strongly recommended to create a system user. The first system user is granted sudo privileges automatically and can also be used for accessing Cockpit.

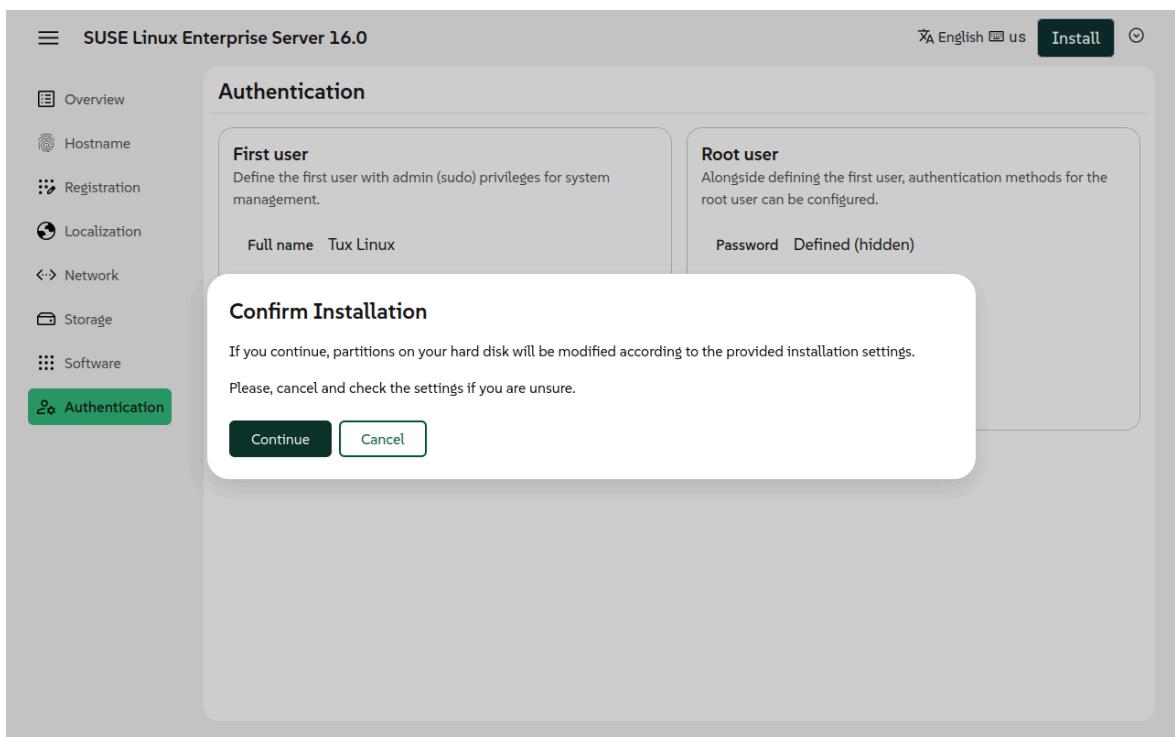
- a. Create a non-root user. Click *Define a user now* and enter details such as user name and password.



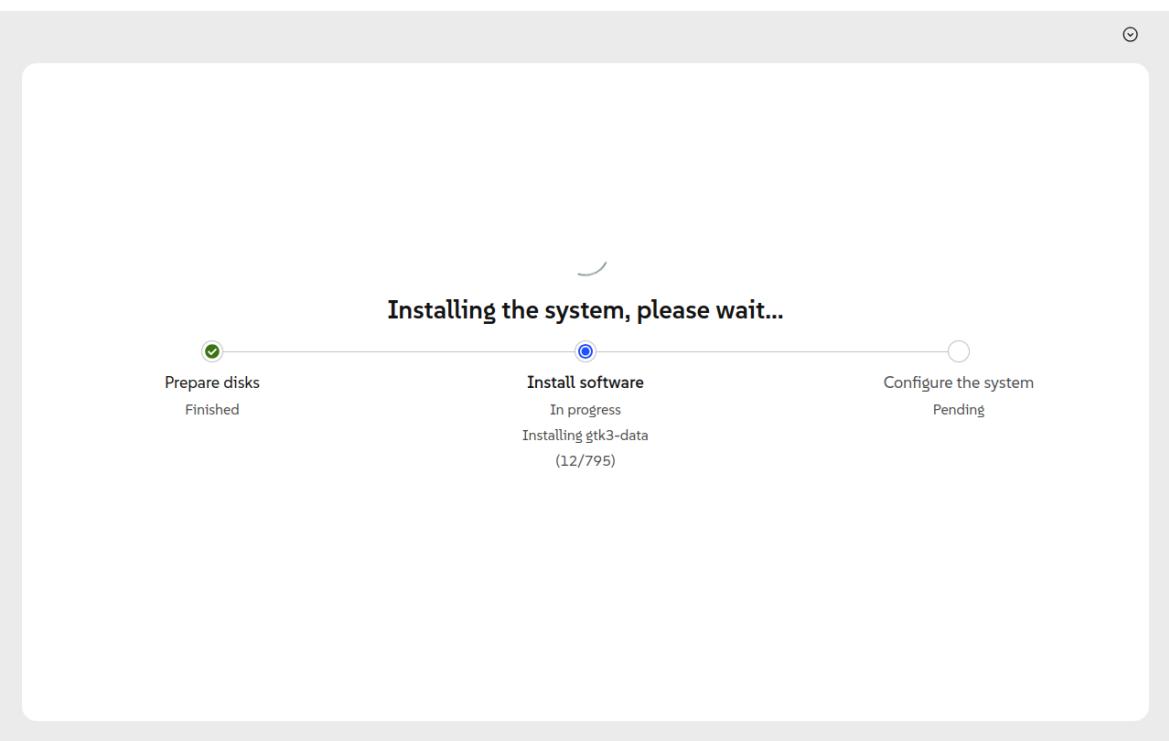
- b. Configure the authentication methods for the root. You can use a secure password, a SSH public key, or both.



13. Click *Install* and confirm to start the installation.



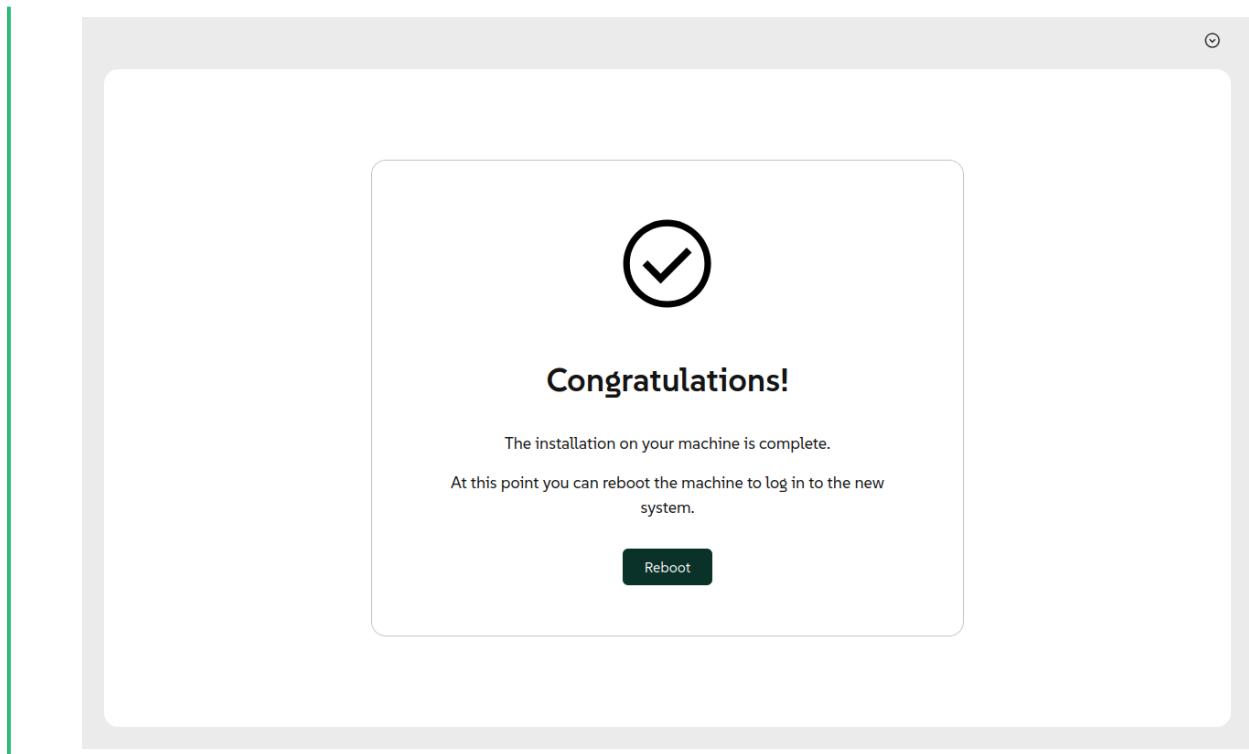
14. Wait for the system installation to complete. It takes around 30 minutes to complete the installation.



### Tip: Installation logs

You can use the arrow menu in the top right corner of the window to view the logs and system messages.

15. Once the installation is complete, select *Reboot*.



## 2.4 Summary

After successful configuration checks, product registration, installation and reboot, verify that you can log in and use your system.

### PROCEDURE 2: VERIFYING THE SYSTEM AFTER INSTALLATION

1. Log in to the system as root.

```
Welcome to SUSE Linux Enterprise Server 16.0 Alpha3 (x86_64) - Kernel 6.4.0-s1fo.1.8-default (tty1).

SSH host key: SHA256:bUpdqEfAYuolgMY0s70qIdMEHHC/eKkm?cL3kwCMA (RSA)
SSH host key: SHA256:L5PQdXeaN9edpLw0z29LWxCNKe26EWWtNFopxMgn3U (ECDSA)
SSH host key: SHA256:CKa9BVCHu5jKhECTUSyBGQRyQQQMReyIfUIoR/nDsXY (ED25519)
enp1s0: 192.168.122.40 fe80::a486:c31a:e64:6c0c

Hint: Num Lock on

localhost login: root
Password: _
```

2. To verify that your system is working as expected, run a few basic commands.

```
Welcome to SUSE Linux Enterprise Server 16.0 Alpha3 (x86_64) - Kernel 6.4.0-s1fo.1.8-default (tty1).

SSH host key: SHA256:bUpdqEfAYuolgMY0s7OqIdMEHHC/eKkm7cL3kwCMA (RSA)
SSH host key: SHA256:L5PQdXeaN9edpLw0z29LWxCNKeZ6EWWWtNFpxMgn3U (ECDSA)
SSH host key: SHA256:CKA9BUCHu5jKhECTUSyBGQRyQQQMReyIfUI0R/nDsXY (ED25519)
enp1s0: 192.168.122.40 fe80::a486:c31a:e64:6c0c

Hint: Num Lock on

localhost login: root
Password:
Have a lot of fun...
localhost:~ # whoami
root
localhost:~ # pwd
/root
localhost:~ #
```

## 3 For more information

For information on related topics, refer to the following resources:

- Documentation of the Agama open-source project: <https://agama-project.github.io/docs>
- IBM documentation for SUSE distributions <https://www.ibm.com/docs/en/linux-on-systems?topic=distributions-suse-linux-enterprise-server>

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