



SUSE Manager 5.0

# Common Workflows

---

## Preface

Common Workflows

SUSE Manager 5.0

The SUSE Manager Common Workflows Guide provides step-by-step instructions for the most frequently used workflows to install, manage, and configure clients with SUSE Manager.

Each workflow in this guide has a clear objective and includes detailed steps to help you achieve it efficiently.

Designed for both routine and advanced tasks, this guide not only explains the actions you take but also highlights the available options at each stage.

Throughout this guide, each routine task is referred to as a Workflow.

**Publication Date:** 2025-11-07

Copyright © 2006–2025 SUSE LLC and contributors. All rights reserved. Permission is granted to copy, distribute and/or modify this document under the terms of the GNU Free Documentation License, Version 1.2 or (at your option) version 1.3; with the Invariant Section being this copyright notice and license. A copy of the license version 1.2 is included in the section entitled **Legal › License**.

For SUSE trademarks, see <https://www.suse.com/company/legal/>. All third-party trademarks are the property of their respective owners. Trademark symbols (®, ™ etc.) denote trademarks of SUSE and its affiliates. Asterisks (\*) denote third-party trademarks. All information found in this book has been compiled with utmost attention to detail. However, this does not guarantee complete accuracy. Neither SUSE LLC, its affiliates, the authors nor the translators shall be held liable for possible errors or the consequences thereof.

---

# Contents

<b>Preface</b>	<b>1</b>
<b>1. Client Onboarding</b>	<b>4</b>
1.1. Use Case	4
1.2. Outcome	4
1.3. Preparation	4
1.4. Step-by-step Workflow Instructions	4
1.5. Related Topics	6
<b>2. Clients Update Using Recurring Actions</b>	<b>7</b>
2.1. Use case / Situation	7
2.2. Outcome / Resolution	7
2.3. Preparation	7
2.4. Step-by-Step workflow instructions	7
2.5. Background information on <code>uptodate</code> state	9
2.6. Related topics	10
<b>3. Configuration Management</b>	<b>11</b>
3.1. Use Case	11
3.2. Outcome	11
3.3. Preparation	11
3.4. Step-by-step Workflow instructions	11
3.5. Example	12
SLS State for Keeping Clients Updated	12
3.6. Related Topics	13
<b>4. Content Lifecycle Management</b>	<b>14</b>
4.1. Use Case	14
4.2. Outcome	14
4.3. Preparations	14
4.4. Step-by-step Workflow Instructions	14
4.5. Related Topics	15
<b>5. In-place Upgrade of SUSE Linux Enterprise Server with SUSE Manager</b>	<b>16</b>
5.1. Use Case	16
5.2. Outcome	16
5.3. Step-by-step Preparation Instructions	16
5.4. Migration of Clients	19
<b>6. Installing SUSE Manager Using RAW Image</b>	<b>22</b>
6.1. Use Case	22
6.2. Outcome	22
6.3. Step-by-step Instructions	22
<b>7. Install SUSE Manager on ppc64le</b>	<b>24</b>
7.1. Use case	24

---

7.2. Outcome	24
7.3. Step-by-step instructions	24
8. Liberate Red Hat Enterprise Linux 8.10 with secureboot .....	26
9. Product Upgrade via Web UI .....	27
10. GNU Free Documentation License .....	29

## Chapter 1. Client Onboarding

SUSE Manager is all about managing client systems. So one of the first things you need to do is onboard some clients. This workflow shows you how to set up your SUSE Manager Server to manage a new client, set up the software channels you need, and bootstrap the client using an activation key.

### 1.1. Use Case

This workflow shows you how to onboard a client to your SUSE Manager Server.

The client must be running a supported Linux operating system. For a list of supported client systems, see **Client-configuration › Supported-features**.

This is one of the first tasks you need to do when you set up SUSE Manager for the first time, and you will probably have to do it many more times as you use the product.

### 1.2. Outcome

When you have completed this workflow, your client is onboarded, and it can be seen in the systems list of the SUSE Manager Web UI. You can then use SUSE Manager to manage the client.

### 1.3. Preparation

Before you start, you should already have:

- SUSE Manager Server installed, that you can access using the Web UI.
- Client machine with an operating system installed, which you can access across the network that your SUSE Manager Server is on, using SSH.
- Appropriate subscriptions from <http://scc.suse.com> for the products you are using.

This workflow uses a SUSE Linux Enterprise Server 15 SP2 operating system. You can use other Linux operating systems, but some of the steps might be different. For more information on onboarding other clients, see **Client-configuration › Registration-methods**.

### 1.4. Step-by-step Workflow Instructions

#### Procedure: Configure a Fully Qualified Domain Name (FQDN) on Your Client

1. On the client, at the command prompt, show the current hostname:

```
hostname -f
```

This command will probably return an error, or show something like localhost.

2. Set a new hostname. Your new hostname should have a subdomain name and thus include at least two periods. In this example, we are using client1.suma.example

```
hostnamectl set-hostname client1.suma.example
```

3. Check that your change was successful:

```
hostnamectl
```

4. Open YaST and navigate to **Network Services › Hostnames**. Edit the hostname to match the one you just set, and click **[OK]**.
5. In YaST, navigate to **System › Network Settings** and go to the Hostname/DNS tab. In the Static hostname field, type your new hostname.
6. Check that the change was successful:

```
hostname -f
```

This command should return your new FQDN.

## Procedure: Prepare Software Channels on the SUSE Manager Server

1. In the SUSE Manager Web UI, navigate to **Admin › Setup Wizard**.
2. In the **Organization Credentials** tab, ensure you have entered your SUSE Customer Center credentials, and are correctly authenticated.
3. In the **Products** tab, ensure that the product catalog is fully updated:
4. Use the product search bar to find the channels you need for your client operating system. Check the channels you want to install, and click **[Add products]**:
5. Wait for the product channels to fully synchronize. Depending on the products you have chosen, this could take a long time.

## Procedure: Create an Activation Key

1. In the SUSE Manager Web UI, navigate to **Systems › Activation Keys**, and click **[Create Key]**.
2. Give your activation key a name, and select the base channel that matches the client you want to onboard. This should be the product you just enabled:
3. Check the child channels to include, and any add-on system types you want clients registered with this key to have. Click **[Create Activation Key]**.

---

## Procedure: Bootstrap the Client

1. In the SUSE Manager Web UI, navigate to **Systems › Bootstrapping**.
2. Type the hostname and provide authentication credentials for the client you want to onboard, and select the activation key. Click **[Bootstrap]**:
3. Navigate to **Systems › System List** to manage your new client.

## 1.5. Related Topics

- For more information about supported clients and client features, see **Client-configuration › Supported-features**.
- For more information about different onboarding methods, and instructions for clients running various operating systems, see **Client-configuration › Registration-methods**.
- For more information about general client concepts, see **Client-configuration › Channels**.

## Chapter 2. Clients Update Using Recurring Actions

This workflow shows how to automate updating the clients registered at SUSE Manager using recurring actions.

### 2.1. Use case / Situation

Automated update of clients is beneficial when:

- update of a large number of clients is wanted
- the workflow should not be re-done every execution
- a dedicated maintenance window exists.

### 2.2. Outcome / Resolution

Successful completion of this workflow results in consistent and supportable state.

### 2.3. Preparation

Before you start, you should have a number of clients onboarded. It may make sense to have them sorted into groups you want to update together. In this workflow we use a system group named infra-services.

### 2.4. Step-by-Step workflow instructions

To update a client two steps are required. A third step is optional but highly recommended to finalize the update process.

#### Procedure: Creating a recurring action to update Salt itself

1. As an example, we create the action to update Salt itself as a recurring action for all systems in the organization. In the SUSE Manager Web UI, navigate to **Home › My Organization › Recurring Actions** and click **[Create]**.
2. Select Action Type **Custom State** and enter a Schedule Name like update-salt.
3. Select a schedule. For example, **Weekly: Wednesday, 9:00 am**.
4. Assign the update-salt state by selecting the checkbox.
5. Click **[Save Changes]** to save the action.

6. You can edit the execution order of the states if needed. Click **[Confirm]** to confirm the order.
7. Click **[Create Schedule]** to save the action.

### Procedure: Creating a recurring action to apply all available updates to the systems

1. As an example we create the action to apply all updates as a recurring action for a system group called **infra-services**. In the SUSE Manager Web UI go to **Systems › System Groups** and click on **infra-services**.
2. Now go to **Recurring Actions** and click **[Create]**.
3. Select Action Type **Custom State** and enter a Schedule Name like **full-system-update**.
4. Select a Schedule. For example, **Weekly: Wednesday, 9:30 am**. Keep enough time between this action and the update-salt action. The update-salt actions must be finished on all systems before this action should be executed.
5. Assign the states **util.syncall**, **certs**, **channels** and **uptodate** by selecting the checkboxes. To perform a reboot afterwards you can also add **reboot** or **rebootifneeded**.
6. Save the action by clicking **[Save Changes]**.
7. You can edit the execution order of the states. The order should be **util.syncall**, **certs**, **channels**, **uptodate** and finally **reboot** or **rebootifneeded** if chosen. Click **[Confirm]** to store the order.
8. Click **[Create Schedule]** to save the action.

### Procedure: Creating a recurring action to run a highstate after the update

1. As an example, we create the action to apply the highstate for the same group which was fully updated before. In the SUSE Manager Web UI, navigate to **Systems › System Groups** and click **infra-services**.

2. Go to Recurring Actions and click **[Create]**.
3. Select Action Type **Highstate** and enter a Schedule Name like highstate.
4. Select a Schedule. For example, **Weekly: Wednesday, 10:30 am** . Again, keep enough time between this action and the full-system-update action.
5. Click **[Create Schedule]** to save the action.

## 2.5. Background information on **uptodate** state

1. The **uptodate** state applies critical patches to the update components.
  - a. On SUSE-based systems, the state executes the command:
 

```
zypper --non-interactive patch --updatestack-only
```

And then, the state also updates Salt.
  - b. On all the other systems, not based on SUSE, the state only updates Salt.
2. The state runs the package manager, such as **dnf**, **yum**, **apt**, or **zypper** based on what is available on the client operating system to update the rest of the packages.
  - a. The state lists all of the upgradable packages, based on the synchronized package repositories in SUSE Manager.
  - b. The state upgrades the packages to their latest available version by using the client's package manager. The executed command depends on the operating system of the client:
    - i. For Debian-based clients, such as Debian or Ubuntu, the action executes `apt dist-upgrade -q -y $PACKAGES`.
    - ii. For RPM-based clients that are not SUSE, such as Red Hat Enterprise Linux or SUSE Liberty Linux, the action executes `yum --quiet -y update $PACKAGES` or `dnf --quiet -y upgrade $PACKAGES` (depending on the package manager the client is using).
    - iii. For non-transactional SUSE clients, such as SUSE Linux Enterprise 15, the action executes `zypper --non-interactive --auto-agree-with-licenses update $PACKAGES`.
    - iv. For transactional SUSE clients, the action executes the same in a transactional shell.
3. SUSE Manager provides the **reboot** and **rebootifneeded** actions. Use one of the actions if you want your client to reboot after the package upgrade.

---

**rebootifneeded**

Reboot detection is specific to the client operating system.

- For Debian or Ubuntu, see <https://www.debian.org/doc/debian-policy/ch-opersys.html#signaling-that-a-reboot-is-required>.
- For non-transactional SUSE clients, SUSE Manager reboots the client when `zypper -x list-patches` indicates that the patches require a reboot.
- For transactional SUSE clients, SUSE Manager reboots the client if there is a pending transaction.
- For the Red Hat-based clients, SUSE Manager reboots the client if `dnf -q needs-restarting -r` indicates that a reboot is required.

For more information, see the `reboot_info.py` module: [https://github.com/uyuni-project/uyuni/blob/master/susemanager-utils/susemanager-sls/src/modules/reboot\\_info.py](https://github.com/uyuni-project/uyuni/blob/master/susemanager-utils/susemanager-sls/src/modules/reboot_info.py)

## 2.6. Related topics

- For more information about recurring actions, see [Recurring Actions](#).
- For more information about custom info values, see **Client-configuration › Custom-info**.

## Chapter 3. Configuration Management

You can use configuration files and channels to manage configuration for your clients, rather than configuring each client manually. This workflow shows you how to use the SUSE Manager Web UI to create a centrally managed configuration file, assign it to a client, and apply the configuration.

### 3.1. Use Case

If you are managing a lot of clients, you probably do not want to manually apply configuration settings to each of them in turn. Configuration channels are used to organize configuration files. You can subscribe clients to configuration channels, and deploy configuration files as required.

### 3.2. Outcome

When you have completed this workflow, you will have a configuration channel containing a configuration file, have assigned clients to the channel, and applied the configuration successfully.

### 3.3. Preparation

Before you start, you should already have:

- SUSE Manager Server installed, that you can access using the Web UI.
- At least one client registered to your server.
- Appropriate subscriptions from <http://scc.suse.com> for the products you are using.

This workflow uses a centrally managed configuration file and a Salt state. You can also use locally managed configuration files and different methods, to get more flexibility in how you manage configuration in your environment. For more information about the different ways to manage configuration, see **Client-configuration › Configuration-management**.

### 3.4. Step-by-step Workflow instructions

#### Procedure: Create a New Configuration Channel and file

1. In the SUSE Manager Web UI, navigate to **Configuration › Channels** and click **[ Create State Channel ]**.
2. Type a name, label, and description for your configuration file, and type the contents of your configuration file. An example that you can copy is at the end of this section. . Click **[ Create Config State Channel ]**
3. Procedure: Assign Clients to the Configuration Channel
4. In the SUSE Manager Web UI, navigate to **Systems › Systems List** and select the client you want to assign to your configuration channel.

5. Navigate to the Configuration tab. In the guimenu:Configuration Overview section, click **[Subscribe to channels]**.
6. Check the configuration channel you created earlier, and click **[Continue]**.
7. If you have more than one configuration channel, you can rank them in order of importance, or click **[Update Channel Rankings]** to finish.

## Procedure: Apply the Configuration to Your Client

1. In the SUSE Manager Web UI, navigate to **Systems › Systems List** and select the client you want to assign to your configuration channel.
2. Navigate to the Configuration tab. In the guimenu:Configuration Actions section, click **[Deploy all managed config files]**.

## 3.5. Example

### SLS State for Keeping Clients Updated

```
include:
  - channels

int_keep_system_up2date_updatestack:
  pkg.latest:
    - pkgs:
      - salt
      - salt-minion
  {%- if grains.os_family == 'Suse'%}
    - zypper
    - libzypp
  {%- elif grains['os_family'] == 'RedHat' %}
  {%- if grains['osmajorrelease'] >= 8 %}
    - dnf
  {%- else %}
    - yum
  {%- endif %}
  {%- endif %}
  - require:
    - sls: channels
  - order: last

int_keep_system_up2date_pkgs:
  pkg.up2date:
    - require:
      - sls: channels
      - pkg: int_keep_system_up2date_updatestack
    - order: last

int_reboot_if_needed:
  cmd.run:
    - name: shutdown -r +5
  {%- if grains['os_family'] == 'RedHat' and grains['osmajorrelease'] >= 8 %}
    - onlyif: 'dnf -q needs-restarting -r; [ $? -eq 1 ]'
  {%- elif grains['os_family'] == 'RedHat' and grains['osmajorrelease'] <= 7 %}
    - onlyif: 'needs-restarting -r; [ $? -eq 1 ]'
```

```
{%- elif grains['os_family'] == 'Debian' %}
- onlyif:
- test -e /var/run/reboot-required
{%- else %}
- onlyif: 'zypper ps -s; [ $? -eq 102 ]'
{%- endif %}
```

## 3.6. Related Topics

- For more information about configuration management, see **Client-configuration › Configuration-management**.
- For more information about SLS files, see: [https://docs.saltproject.io/en/latest/topics/tutorials/starting\\_states.html](https://docs.saltproject.io/en/latest/topics/tutorials/starting_states.html).

## Chapter 4. Content Lifecycle Management

If you are managing a lot of clients and you need to apply customized packages to them, you can use content lifecycle management (CLM) to manage your packages. CLM allows you to customize and test packages before updating production clients. It is also useful if you need to apply updates during a limited maintenance window.

### 4.1. Use Case

Content lifecycle management allows you to select software channels as sources, adjust them as required for your environment, and thoroughly test them before installing onto your production clients. You can use CLM to manage your software channels from development, through testing, and rolling the changes out to your clients.

### 4.2. Outcome

When you have completed this workflow, you will have a content lifecycle project set up. You will have created a basic CLM project, and promoted it through its lifecycle.

### 4.3. Preparations

Before you start, you should already have:

- SUSE Manager Server deployed, and accessible using the Web UI.
- Client machine with an operating system installed, which you can access across the network that your SUSE Manager Server is on, using SSH.
- Appropriate subscriptions from <http://scc.suse.com> for the products you are using.

### 4.4. Step-by-step Workflow Instructions

#### Procedure: Create a new CLM Project

1. In the SUSE Manager Web UI, navigate to **Content Lifecycle › Projects** section, and click **[Create Project]**.

Type a name, label, and description for your project, and click **[Create]**.

2. In the Sources section, click **[Attach/Detach Sources]**.

Select the source type, and select a base channel for your project.

The available child channels for the selected base channel are displayed, including information on whether the channel is mandatory or recommended. Check the child channels you require, and click **[Save]** to return to the project page.

3. Leave the **Filters** section blank for now, we will not be using them in this example. You can add filters later on if you need to.
4. In the **Environment Lifecycle** section, create three environments: **production**, **testing**, and **development**. Click **[Add Environment]** and complete the name and label for each.

For the **production** environment, leave the **Insert before** field blank.

For the **testing** environment, in the **Insert before** field, select **production**.

For the **development** environment, in the **Insert before** field, select **testing**.

5. Click **[Build]** to build version 1 of your project:

## Procedure: Assign Clients

1. Navigate to **Systems › System List**, select the client to assign, and go to the **Software › Software Channels** tab.
2. In the **Base Channel** section, select the CLM project and environment you want to assign the client to.

For example, if you want this client to receive updates from your CLM only when packages are in the **production** environment, assign the base channel `<CLM_Project_Name>-production-<Channel_Name>`.

Alternatively, you could use this client as a way to test if your CLM packages are working as expected before you promote them to **development**, so you assign the base channel `<CLM_Project_Name>-testing-<Channel_Name>`.

3. Click **[Next]** to assign the client.

## Procedure: Promote Environments

1. In the SUSE Manager Web UI, navigate to **Content Lifecycle › Projects**, and select the project you want to work with.
2. In the **Environment Lifecycle** section, locate the environment to promote to its successor, and click **[Promote]**. You can monitor build progress in the **Environment Lifecycle** section.

## 4.5. Related Topics

- For more information about CLM, including information about how to use filters, see **Administration › Content-lifecycle**.
- For CLM examples, see **Administration › Content-lifecycle-examples**.

## Chapter 5. In-place Upgrade of SUSE Linux Enterprise Server with SUSE Manager

This workflow shows how to automatically complete the task of in-place SUSE Linux Enterprise Server instances upgrade with SUSE Manager Server.

### 5.1. Use Case

In-place migration is beneficial when:

- migrating large number of the older SUSE Linux Enterprise Server is time-consuming
- you are looking for a way to automate migrations

### 5.2. Outcome

Successful completion of this workflow results in consistent, supportable outcomes.

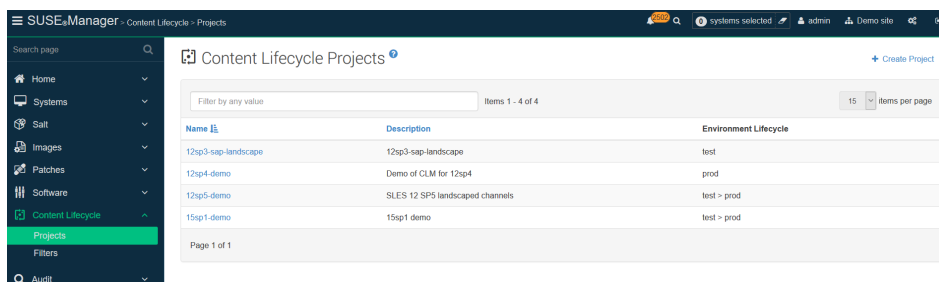
### 5.3. Step-by-step Preparation Instructions



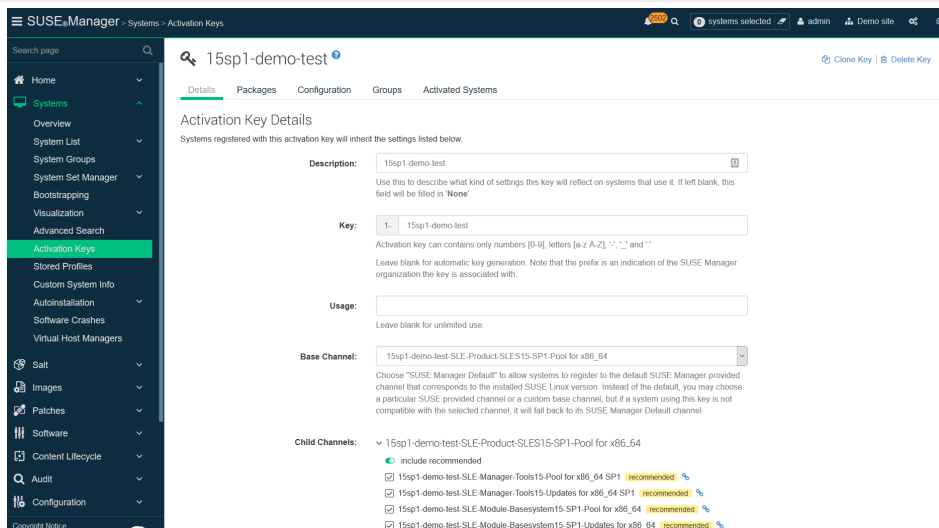
This workflow is complex and time-consuming. Make sure that adequate testing is done before deploying the procedure in live environment.

#### Procedure: Prepare the SUSE Manager Server for Provisioning

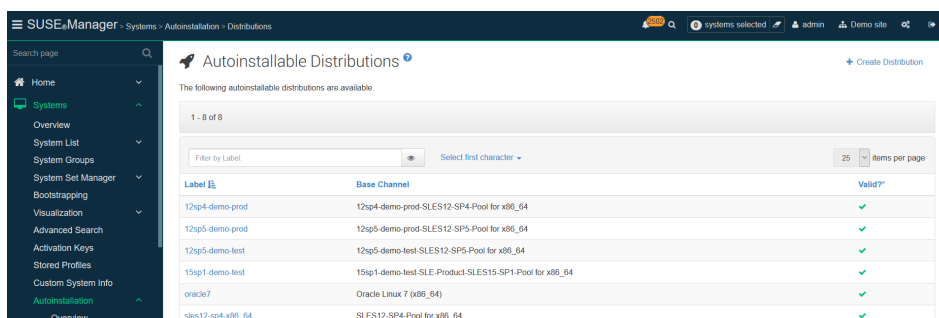
1. Create a SUSE Manager Content Lifecycle Management project for your distribution. Choose a short-but-descriptive prefix in the name, including all source channel modules. Add Filters as needed. Add at least one Environment.



2. Create an Activation Key that includes the filtered project channels.



3. (Optional) Create a bootstrap script. The profile will not need it, because it is managed in the AutoYaST.
4. Create a `/var/spacwalk/iso` directory, and for SLES 15 SP2 and following, copy the Full iso (>10 GB) there. Create a mount point for it, such as `/opt/install/15sp3` and mount the ISO there. Ensure this path gets re-mounted at boot time.
5. Create an Autoinstallation Distribution in SUSE Manager for each base channel to which you will migrate.
  - a. In the Distribution, reference the specific Base Channel to match the base to which you might migrate, for example the base channel of your CLM project Environment Lifecycle.
  - b. Label the Distribution something that references your specific Base Channel.
  - c. Set the Installer Generation to match your specific version of SUSE Linux Enterprise Server (12, 15, etc.).
  - d. The kernel options will be automatically populated when you click Create Autoinstallable Distribution.
6. You may create more Distributions depending on the Base Channel you need to assign, and you can re-use the same Tree Path for the boot media if required.

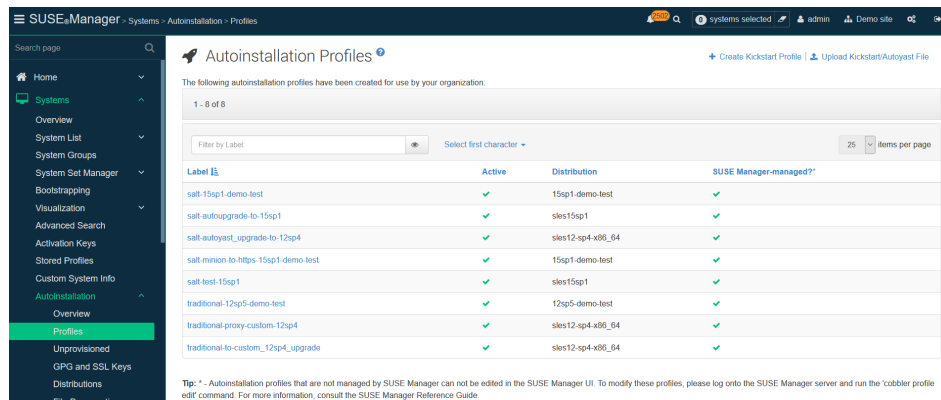


7. Click on Profiles, and upload Kickstart/AutoYaST file for each target SUSE Linux Enterprise Server distribution, service pack and channels you wish to migrate to.
  - a. This profile will be associated with the activation key and autoinstallation distribution created above.

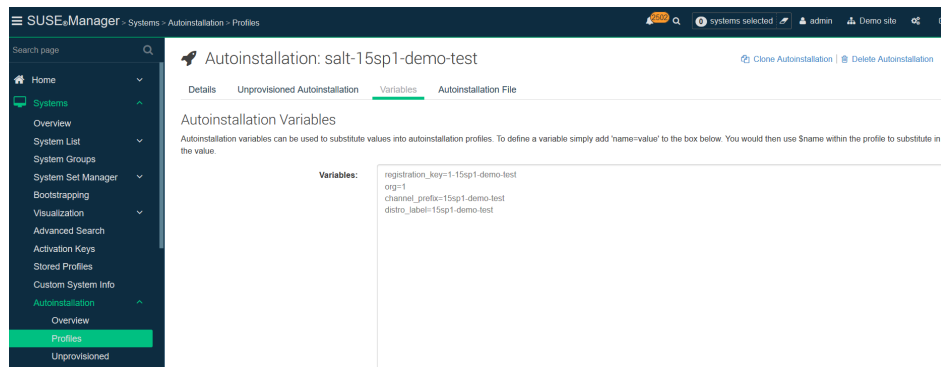
- b. Cut-and-paste a Profile template as the basis for what you upload, assign it the Autoinstall tree you created as a Distribution above.
  - c. Do not put anything in the Virtualization Type box, and click **[Create]**.
8. Once created, your profile will now have some new fields on this Details page. In the Kernel Options line on this Details page, put in

```
autoupgrade=1 insecure=1 useonlinerepo
```

9. This will tell your profile to treat its install as an upgrade, and allow http access to the SUSE Manager Server to obtain installer updates without needing to go to SUSE Customer Center.



10. Click the variables tab in your Autoinstallation Profile to specify CLM prefix, Activation Key, Distribution tree, and Organization:



Sample Variables:

- registration\_key=1-15sp1-demo-test
- org=1
- channel\_prefix=15sp1-demo-test
- distrotree=15sp1-demo-test

Edit the AutoYaST profile itself in a tool where you can use cut-and-paste for the channels in your profile. Use

variables in your profiles where possible.

Published profiles can be used as a starting point.



For profile files, see <https://github.com/SUSE/manager-build-profiles>.

The profiles follow AutoYaST XML guidelines, and for an in-place upgrade there are several important sections:

#### Add-ons - the repositories used in the upgrade

```
<listentry>
<ask_on_error config:type="boolean">true</ask_on_error>
#if $channel_prefix != ""
<media_url>https://$redhat_management_server/ks/dist/child/$channel_prefix-sle-manager-
tools15-pool-$arch-sp3/$distrotree</media_url>
#else
<media_url>https://$redhat_management_server/ks/dist/child/sle-manager-tools15-pool-$arch-
sp3/$distrotree</media_url>
#end if
<name>$channel_prefix SLE-15-Manager-Tools Pool</name>
<product>sle-manager-tools</product>
</listentry>
```

Be sure to include all (and only) the relevant modules (both Pool and Updates) to be used in the migration. In migration, it is recommended to add all available modules, as the location of certain packages changes with new major versions.

After finishing the preparation, proceed with the actual migration.

## 5.4. Migration of Clients

### Procedure: Migrating Clients

1. Prior to migration, be sure to check Software → Non-Compliant. This will show any orphaned packages on your system - those SUSE Manager does not find in any assigned channel. Make sure this list is very small or empty, and that you can account for all the packages there. Delete any that are unnecessary.
2. Before provisioning, issue the following Remote Command to the systems you wish to upgrade to remove the existing SUSE Manager channels during the upgrade process:

```
rm -rf /etc/zypp/repos.d/susemanager*
```

3. Assign your Autoinstallation Profile in System Details → Provisioning for one system, or in the Provisioning tab in SSM for as many systems as you need. SUSE Manager provisioning then auto-assigns a Reactivation Key to this system, that is referenced in the provisioning process. If you need to perform the upgrade through a particular SUSE Manager Proxy you will need to group just those systems together in SSM.

**Screenshot 1: Schedule Autoinstallation**

newer12.site.com

Details Software Configuration Provisioning Groups Audit States Formulas Events

Autoinstallation Power Management

Schedule

**Schedule Autoinstallation**

You can schedule this system for an autoinstallation action. This will re-install this system using the selected autoinstallation options.

**Select Autoinstallation Profile**

Please select the autoinstallation profile you'd like to use to autoinstall this system:

1 - 8 of 8

Filter by Autoinstallation Profile: Select first character: 25 items per page

Autoinstallation Profile	Distribution	SUSE Manager-managed?
<input type="radio"/> salt-15sp1-demo-test	15sp1-demo-test	✓
<input type="radio"/> salt-autoupgrade-to-15sp1	sles15sp1	✓
<input type="radio"/> salt-autoyes!_upgrade-to-12sp4	sles12-sp4-x86_64	✓
<input checked="" type="radio"/> salt-minion-to-https-15sp1-demo-test	15sp1-demo-test	✓

**Screenshot 2: System Set Manager Overview**

Overview Systems Patches Packages Groups Channels Configuration Provisioning States Misc

Autoinstallation Power Management Configuration Power Management Operations

**Autoinstallable Systems**

Below are the systems in your selected systems list that are autoinstallable using SUSE Manager:

1 - 1 of 1

Filter by System Name: Select first character: 25 items per page

System	Base Channel
newer12.site.com	SLES12-SP3-Pool for x86_64

**Autoinstall Selected Systems**

You may autoinstall the selected systems.

**Autoinstallable Type:**

☒ Select autoinstallation profile.  
☐ Autoinstall by IP Address \*


\* If there is no organization default profile specified for this organization, an autoinstallation will not get scheduled for systems that do not fall under an ip range.


[Continue](#)

SUSE Manager creates the proper entry in `/etc/grub.d/` for the reinstallation, and boots the selected systems to that entry. The Profile you created above will be used to drive automated upgrade, following which your system will use the reactivation key (one time), associating the upgraded system with the previous SUSE Manager profile.

The Session Status screen in SUSE Manager will not be updated real-time. Instead, watch the target system console to track progress. If you are updating an instance on a hyperscaler like AWS you may be able to get screenshots of the console.

## 5.4. Migration of Clients



 Services  [Alt+S]

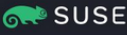
EC2  AWS Cost Explorer

EC2 > Instances > i-0967884ceaf68f70e > Get Instance screenshot

### Get instance screenshot [Info](#)

i-0967884ceaf68f70e (dpv-slesupdate) on 2022-04-29 at T16:13:01.642 -04:00

  Download




#### Performing Upgrade


Media	Remaining	Packages	Time
Total	2.149 GiB	873	X
SLES15-SP3-15-3-0	334.5 KiB	1	X
SLE-15-Manager-Tools-Updates	8.83 MiB	5	X
SLE-Module-Basesystem15-SP3-Pool-for-x86_64-SAP	259.83 MiB	391	X
SLE-Module-Basesystem15-SP3-Updates-for-x86_64-SAP	1.730 GiB	381	X
SLE-Module-Public-Cloud15-SP3-Pool-for-x86_64-SAP	680 KiB	5	X
SLE-Module-Public-Cloud15-SP3-Updates-for-x86_64-SAP	402.9 KiB	7	X
SLE-Module-Python2-15-SP3-Pool-for-x86_64-SAP	12.42 MiB	5	X
SLE-Module-Python2-15-SP3-Updates-for-x86_64-SAP	22.86 MiB	32	X
SLE-Module-Python2-15-SP3-Updates-for-x86_64-SAP	53.68 MiB	15	X
SLE-Module-Server-Applications15-SP3-Pool-for-x86_64-SAP	4.98 MiB	18	X
SLE-Module-Server-Applications15-SP3-Updates-for-x86_64-SAP	53.85 MiB	2	X

Actions performed:

Downloading libstdc++6 (download size 551.8 KiB)  
Installing libstdc++6-11.2.1-x86\_64.rpm (installed size 2.06 MiB)  
Retaining libstdc++6-2.2.4-7.2-x86\_64.rpm (installed size 1.34 MiB)  
Downloading libstdc++6-2.2.4-7.2-x86\_64.rpm (download size 208 KiB)  
Installing libstdc++6-2.2.4-7.2-x86\_64.rpm (installed size 1.12 MiB)  
Downloading libncurses6 (download size 403.6 KiB)  
Installing libncurses6-6.1.5-9.1-x86\_64.rpm (installed size 1.06 MiB)  
Downloading lifecycle-data-sle-module-desktop-applications (download size 15.5 KiB)  
Installing lifecycle-data-sle-module-desktop-applications-15.4.1-x86\_64.rpm (installed size 17.8 KiB)  
Downloading cloud-init-config-suse (download size 159.5 KiB)  
Installing cloud-init-config-suse-21.4-150100.8.50.1-x86\_64.rpm (installed size 2.3 KiB)  
Downloading lifecycle-data-sle-module-server-applications (download size 15.5 KiB)  
Installing lifecycle-data-sle-module-server-applications-15.4.1-x86\_64.rpm (installed size 17.8 KiB)  
Downloading grub2-x86\_64-efi (download size 2.85 MiB)  
Downloading grub2-x86\_64-efi-2.56 MiB/s (on average 2.56 MiB/s) (download size 2.85 MiB)  
100%  
Installing Packages... (Remaining: 2.149 GiB, 872 packages)  
2%

 For boot or networking issues, use the EC2 serial console for troubleshooting. Choose the **Connect** button to start a session.

Connect



#### Performing Upgrade

Media	Remaining	Packages
Total	565.27 MiB	252
15sp3filtered-preprod SLE-15-Manager-Tools-Updates	262.8 KiB	1
15sp3filtered-preprod SLE-Module-Basesystem15-SP3-Pool-for-x86_64-SAP	70.10 MiB	74
15sp3filtered-preprod SLE-Module-Basesystem15-SP3-Updates-for-x86_64-SAP	367.82 MiB	107
15sp3filtered-preprod SLE-Module-Public-Cloud15-SP3-Pool-for-x86_64-SAP	68 KiB	1
15sp3filtered-preprod SLE-Module-Python2-15-SP3-Pool-for-x86_64-SAP	18.76 MiB	23
15sp3filtered-preprod SLE-Module-Python2-15-SP3-Updates-for-x86_64-SAP	54.08 MiB	15
15sp3filtered-preprod SLE-Module-Server-Applications15-SP3-Pool-for-x86_64-SAP	4.33 MiB	11
15sp3filtered-preprod SLE-Module-Server-Applications15-SP3-Updates-for-x86_64-SAP	34.97 MiB	2
15sp3filtered-preprod SLE-Module-DevTools15-SP3-Pool-for-x86_64-SAP	29.3 KiB	1
15sp3filtered-preprod SLE-Module-DevTools15-SP3-Updates-for-x86_64-SAP	24 KiB	1
SLE-Module-Public-Cloud12-Updates-for-x86_64-SP4	4.90 MiB	7
SLES12-SP4-Pool-for-x86_64	1.31 MiB	6

Actions performed:

Downloading libidn2 (download size 72.7 KiB)  
Installing libidn2-2.3.1-4.75-x86\_64.rpm (installed size 229.4 KiB)  
Downloading dirmngr (download size 365 KiB)  
Installing dirmngr-2.2.27-1.2-x86\_64.rpm (installed size 891 KiB)  
Downloading kbd-legacy (download size 495.7 KiB)  
Installing kbd-legacy-2.0.4-14.38.noarch.rpm (installed size 517 KiB)  
Downloading python3-appdirs (download size 22.5 KiB)  
Installing python3-appdirs-1.4.3-1.21.noarch.rpm (installed size 83.5 KiB)  
Downloading python3-pyparsing (download size 187.4 KiB)  
Installing python3-pyparsing-2.4.7-1.24.noarch.rpm (installed size 877 KiB)  
Downloading yast2-transfer (download size 43.1 KiB)  
Installing yast2-transfer-4.1.0-1.28.x86\_64.rpm (installed size 123.5 KiB)  
Downloading gpg2 (download size 1.95 MiB)  
Installing gpg2-2.2.27-1.2-x86\_64.rpm (installed size 7.02 MiB)  
Installing gpg2-2.2.27-1.2-x86\_64.rpm (installed size 7.02 MiB)  
100%  
Installing Packages... (Remaining: 565.27 MiB / 01:15, 252 packages)  
48%

[Help](#) [Abort](#) [Back](#) [Next](#)

## Chapter 6. Installing SUSE Manager Using RAW Image

SUSE Manager offers various image formats, including a RAW format. This guide demonstrates how to set up SUSE Manager Server using the raw image.

### 6.1. Use Case

RAW images are pre-built, ready-to-use representations of a running operating system. Instead of being installed through a traditional installer, they are directly copied to the hard disk of the target host. RAW image format is flexible and compatible with a wide range of virtualization and deployment tools.

This guide provides essential information about these pre-configured images.

### 6.2. Outcome

Successful completion of this workflow results in successful installation of SUSE Manager Server.

### 6.3. Step-by-step Instructions



This workflow is complex and time-consuming. Make sure that adequate testing is done before deploying the procedure in live environment.

#### Procedure: Prepare the Prerequisites

1. **Download the Image:** Download the architecture-specific .raw.xz image of SUSE Manager Server for your target block size.
2. **Make Image Accessible:** Copy the image to a web server (preferred), or expand the .raw file to add directly as a disk in a virtual environment (if supported).
3. **Target Disk Setup:** If applicable, in virtual machine hypervisor, create:
  - a. A 40GB root disk
  - b. Additional storage for persistent SUSE Manager data

#### Procedure: Installation Steps

1. **Prepare Boot Environment and Network**
  - a. Provide a bootable ISO (SUSE Linux Enterprise Server 15 SPX or SLE Micro 5.5) to access the "Rescue System." Add netsetup=1 on the kernel command line for networking, or configure IP via ifcfg.
  - b. Create a new instance, attach the root and persistent storage, then attach the SUSE Linux Enterprise Server or SLE Micro ISO as a virtual CD.
  - c. Boot the instance to the ISO, selecting the Rescue System.

- d. Add the following on the command line to enable network configuration.

```
netsetup=1
```

## 2. Configure Network and Identify Devices

- a. Complete network setup as prompted and log in as root.
- b. Use a disk storage utility like `blockdev` or `lsblk` to verify the block size against your downloaded image.

```
blockdev --getpbsz $device
```

```
lsblk -o NAME,PHY-SEC
```

## 3. Transfer the Image

- a. Use `curl` to copy the `.raw.xz` image onto the root disk:

```
curl -Sks $url | xz -d > $device -v
```

- b. Replace `$url` with the image URL and `$device` with the root partition device.

## 4. Finalize Boot and Configuration

- a. Power off the instance, remove the virtual CD from the boot sequence, and start it again to boot from the newly created instance.
- b. Follow on-screen installation directions and, if needed, register with SUSE Customer Center, adding the SUSE Manager Server Extension.

## 5. Install VMware Tools (if applicable)

- a. Install the `open-vm-tools`

```
transactional-update pkg install open-vm-tools
```

- b. Reboot after installation.

## 6. Provision Persistent Storage

```
mgr-storage-server $device
```

Ensure `$device` points to the fast, persistent storage.

For more information, see [Persistent Volumes](#).

## Chapter 7. Install SUSE Manager on ppc64le

This guide demonstrates how to set up SUSE Manager Server using SelfInstall ISO image on ppc64le machine.

### 7.1. Use case

This workflow outlines the steps to install SUSE Manager on a ppc64le architecture using the SelfInstall ISO image. The method is used to create a container host for SUSE Manager, allowing for efficient management of your systems.

### 7.2. Outcome

Successful completion of this workflow results in successful installation of SUSE Manager Server running on a ppc64le system.

### 7.3. Step-by-step instructions



The following workflow is complex and time-consuming. Make sure that adequate testing is done before deploying the procedure in live environment.

#### Procedure: Prepare the prerequisites

1. Prepare a physical or virtual machine that supports the ppc64le architecture.
2. Ensure access to the SUSE SelfInstall ISO image for SUSE Manager (either 512 or 4096 block size, depending on your disk configuration).
3. Ensure sufficient storage for the root disk (40GB recommended) and a separate, large, fast storage device for persistent volumes.
4. Ensure network connectivity for registration and updates from SUSE Customer Center.
5. Prepare a valid LCM+ subscription key.

#### Procedure: Installing SUSE Manager

1. Download and prepare the installation media:
  - a. Download the SelfInstall ISO image for the appropriate physical block size (512 or 4096) from suse.com. For example: `SUSE-Manager-Server.ppc64le-5.0.2-SelfInstall-ppc-4096-2024.12.install.iso`
  - b. Create a new instance with a root disk size of 40GB (recommended).
  - c. Attach the SelfInstall ISO as a virtual CD and attach large, fast storage for the persistent volume.
2. Boot from SelfInstall ISO:

- a. Boot from the SelfInstall ISO and follow the on-screen prompts.
  - b. Select the desired disk for the root partition (/). The system will copy the disk image to the selected volume.
3. Finalize the installation and initial setup:
  - a. Shut down the instance and remove the virtual CD-ROM from the boot sequence.
  - b. Start the instance. It will boot from the newly installed SUSE Manager host OS.
  - c. The system will adapt to the disk size and allow you to log in.
4. Register with SCC and apply updates:
  - a. Register the server with SCC using the SUSEConnect command, including the SUSE Manager Extension.
  - b. Use your ppc64le LCM+ subscription key for registration.
  - c. Apply all available updates using transactional-update.
  - d. Reboot the system as directed.
5. Install required packages:
  - a. Install the packages to use this instance as a container host for SUSE Manager

```
transactional-update pkg install netavark podman \
mgradm mgrctl uyuni-storage-setup-server
```

- b. Provision persistent storage for SUSE Manager

```
mgr-storage-server $device
```

Ensure \$device points to the fast, persistent storage.

For more information, see [Persistent Volumes](#).

To continue with deployment, see [Server Deployment](#).

## Chapter 8. Liberate Red Hat Enterprise Linux 8.10 with secureboot

To successfully liberate Red Hat Enterprise Linux 8.10 server with secure boot enabled, ensure that the installed kernel, grub2, and shim-x64 packages meet minimum version requirements to prevent boot failures after the migration.

For a fresh server with secure boot, shim-x64-15.8-2.el8\_10.x86\_64 package is installed during liberation. The other components must be updated manually to specific versions.

### Procedure: Preparing a Red Hat Enterprise Linux 8.10 server for liberation with secure boot

1. Ensure that the following versions or higher are installed:

- shim-x64-15.8-2.el8\_10.x86\_64
- grub2-\*--2.02-156.el8.1
- kernel-4.18.0-553.16.1.el8\_10.1

2. If the current versions are lower then run the following:

```
dnf install grub2-*--2.02-156.el8.1
dnf upgrade kernel-4.18.0-553.16.1.el8_10.1
```

3. Reboot the system.



These specific version numbers are for a fresh Red Hat Enterprise Linux 8.10 installation. If your server has been updated, the required versions may be different.

## Chapter 9. Product Upgrade via Web UI

If you want to upgrade the registered SUSE Linux Enterprise client pack to a newer product version, it can be done either on the command line or via Web UI.

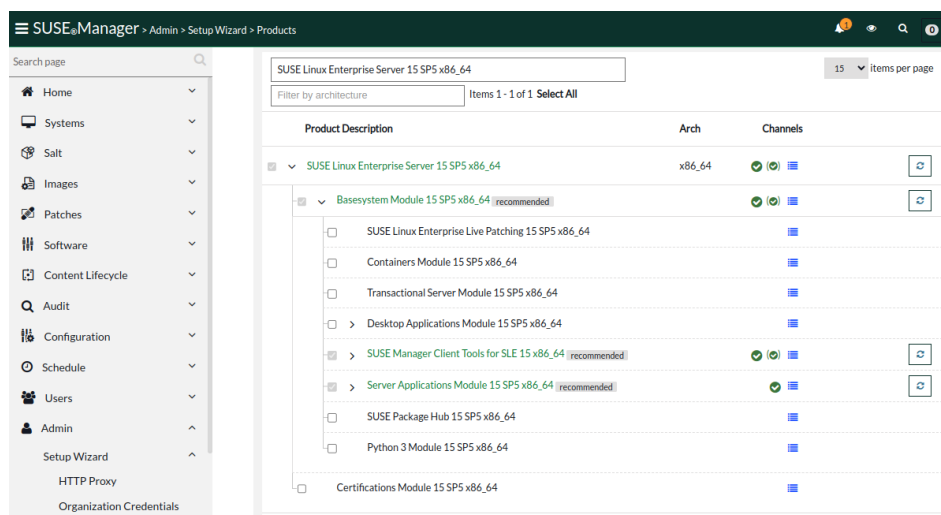
This document describes and illustrates in detail the product upgrade using the Web UI.



Product versions used are not reflective of the actual latest versions available. They are used for illustration purposes only. As an example, the following procedure describes the upgrade to version 15 SP5 from and older version 15. If you are targeting a different version, select the corresponding channels and versions.

### Procedure: Upgrading Product to a Newer Version Using Web UI

1. Log in to SUSE Manager Web UI and navigate to **Admin** › **Setup Wizard** › **Products** and search for SUSE Linux Enterprise Server 15 SP5 x86\_64.
2. Select the recommended channels.



3. Click **[Add Products]**.
4. Navigate to **Systems** › **Registered client** › **Software** › **Product Migration**. You will see the targets available for that registered client.

suma- [redacted] sles15.mgr.suse.de [Delete](#)

Details **Software** Configuration Provisioning Groups Audit States Formulas Recurring Actions Events

Patches Packages Software Channels **Product Migration**

### Product Migration - Target

Only shows migrations that are officially supported by SUSE in an online way. For offline migrations the autoinstallation feature in upgrade mode should be used.

**Installed Products:**

- SUSE Linux Enterprise Server 15 SP4 x86\_64
  - Desktop Applications Module 15 SP4 x86\_64
  - Basesystem Module 15 SP4 x86\_64
  - Containers Module 15 SP4 x86\_64
  - Server Applications Module 15 SP4 x86\_64
  - SUSE Manager Client Tools for SLE 15 x86\_64
  - Development Tools Module 15 SP4 x86\_64

**Target Products:**

- ☐ SUSE Linux Enterprise Server 15 SP5 x86\_64
  - Desktop Applications Module 15 SP5 x86\_64
  - Basesystem Module 15 SP5 x86\_64
  - Containers Module 15 SP5 x86\_64
  - Server Applications Module 15 SP5 x86\_64
  - SUSE Manager Client Tools for SLE 15 x86\_64
  - Development Tools Module 15 SP5 x86\_64

[Select Channels](#)

5. Select SUSE Linux Enterprise Server 15 SP5 x86\_64. This will expand further.
6. Select Target Base Channel as SLE-Product-SLES15-SP5-Pool for x86\_64. Keep Allow Vendor Change unchecked.
7. Click **[Schedule Migration]**. The message will be highlighted It is better to do a dry run first so continuing with dry run first.
8. Click **[Dry run]** and check the status of the simulation in **Events › History**. You should see a return code 0 indicating a successful dry run.
9. Click **[Schedule Migration]** to perform the actual product migration. The message will be highlighted on top of the screen indicating the scheduling of the action.
10. When the upgrade is complete, check the status in **Events › History**.
11. On the SUSE Manager Web UI side, verify the successfully completed product upgrade by going to **Systems › Registered client › Details**.
12. On the client side you can verify it by running:

```
cat /etc/os-release
```

13. The output will look similar to:

```
NAME="SLES"
VERSION="15-SP5"
VERSION_ID="15.5"
PRETTY_NAME="SUSE Linux Enterprise Server 15 SP5"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15:sp5"
DOCUMENTATION_URL="https://documentation.suse.com/"
```

---

## Chapter 10. GNU Free Documentation License

Copyright © 2000, 2001, 2002 Free Software Foundation, Inc. 51 Franklin St, Fifth Floor, Boston, MA 02110-1301 USA. Everyone is permitted to copy and distribute verbatim copies of this license document, but changing it is not allowed.

### 0. PREAMBLE

The purpose of this License is to make a manual, textbook, or other functional and useful document "free" in the sense of freedom: to assure everyone the effective freedom to copy and redistribute it, with or without modifying it, either commercially or noncommercially. Secondly, this License preserves for the author and publisher a way to get credit for their work, while not being considered responsible for modifications made by others.

This License is a kind of "copyleft", which means that derivative works of the document must themselves be free in the same sense. It complements the GNU General Public License, which is a copyleft license designed for free software.

We have designed this License in order to use it for manuals for free software, because free software needs free documentation: a free program should come with manuals providing the same freedoms that the software does. But this License is not limited to software manuals; it can be used for any textual work, regardless of subject matter or whether it is published as a printed book. We recommend this License principally for works whose purpose is instruction or reference.

### 1. APPLICABILITY AND DEFINITIONS

This License applies to any manual or other work, in any medium, that contains a notice placed by the copyright holder saying it can be distributed under the terms of this License. Such a notice grants a world-wide, royalty-free license, unlimited in duration, to use that work under the conditions stated herein. The "Document", below, refers to any such manual or work. Any member of the public is a licensee, and is addressed as "you". You accept the license if you copy, modify or distribute the work in a way requiring permission under copyright law.

A "Modified Version" of the Document means any work containing the Document or a portion of it, either copied verbatim, or with modifications and/or translated into another language.

A "Secondary Section" is a named appendix or a front-matter section of the Document that deals exclusively with the relationship of the publishers or authors of the Document to the Document's overall subject (or to related matters) and contains nothing that could fall directly within that overall subject. (Thus, if the Document is in part a textbook of mathematics, a Secondary Section may not explain any mathematics.) The relationship could be a matter of historical connection with the subject or with related matters, or of legal, commercial, philosophical, ethical or political position regarding them.

---

The "Invariant Sections" are certain Secondary Sections whose titles are designated, as being those of Invariant Sections, in the notice that says that the Document is released under this License. If a section does not fit the above definition of Secondary then it is not allowed to be designated as Invariant. The Document may contain zero Invariant Sections. If the Document does not identify any Invariant Sections then there are none.

The "Cover Texts" are certain short passages of text that are listed, as Front-Cover Texts or Back-Cover Texts, in the notice that says that the Document is released under this License. A Front-Cover Text may be at most 5 words, and a Back-Cover Text may be at most 25 words.

A "Transparent" copy of the Document means a machine-readable copy, represented in a format whose specification is available to the general public, that is suitable for revising the document straightforwardly with generic text editors or (for images composed of pixels) generic paint programs or (for drawings) some widely available drawing editor, and that is suitable for input to text formatters or for automatic translation to a variety of formats suitable for input to text formatters. A copy made in an otherwise Transparent file format whose markup, or absence of markup, has been arranged to thwart or discourage subsequent modification by readers is not Transparent. An image format is not Transparent if used for any substantial amount of text. A copy that is not "Transparent" is called "Opaque".

Examples of suitable formats for Transparent copies include plain ASCII without markup, Texinfo input format, LaTeX input format, SGML or XML using a publicly available DTD, and standard-conforming simple HTML, PostScript or PDF designed for human modification. Examples of transparent image formats include PNG, XCF and JPG. Opaque formats include proprietary formats that can be read and edited only by proprietary word processors, SGML or XML for which the DTD and/or processing tools are not generally available, and the machine-generated HTML, PostScript or PDF produced by some word processors for output purposes only.

The "Title Page" means, for a printed book, the title page itself, plus such following pages as are needed to hold, legibly, the material this License requires to appear in the title page. For works in formats which do not have any title page as such, "Title Page" means the text near the most prominent appearance of the work's title, preceding the beginning of the body of the text.

A section "Entitled XYZ" means a named subunit of the Document whose title either is precisely XYZ or contains XYZ in parentheses following text that translates XYZ in another language. (Here XYZ stands for a specific section name mentioned below, such as "Acknowledgements", "Dedications", "Endorsements", or "History".) To "Preserve the Title" of such a section when you modify the Document means that it remains a section "Entitled XYZ" according to this definition.

The Document may include Warranty Disclaimers next to the notice which states that this License applies to the Document. These Warranty Disclaimers are considered to be included by reference in this License, but only as regards disclaiming warranties: any other implication that these Warranty Disclaimers may have is void and has no effect on the meaning of this License.

---

## 2. VERBATIM COPYING

You may copy and distribute the Document in any medium, either commercially or noncommercially, provided that this License, the copyright notices, and the license notice saying this License applies to the Document are reproduced in all copies, and that you add no other conditions whatsoever to those of this License. You may not use technical measures to obstruct or control the reading or further copying of the copies you make or distribute. However, you may accept compensation in exchange for copies. If you distribute a large enough number of copies you must also follow the conditions in section 3.

You may also lend copies, under the same conditions stated above, and you may publicly display copies.

## 3. COPYING IN QUANTITY

If you publish printed copies (or copies in media that commonly have printed covers) of the Document, numbering more than 100, and the Document's license notice requires Cover Texts, you must enclose the copies in covers that carry, clearly and legibly, all these Cover Texts: Front-Cover Texts on the front cover, and Back-Cover Texts on the back cover. Both covers must also clearly and legibly identify you as the publisher of these copies. The front cover must present the full title with all words of the title equally prominent and visible. You may add other material on the covers in addition. Copying with changes limited to the covers, as long as they preserve the title of the Document and satisfy these conditions, can be treated as verbatim copying in other respects.

If the required texts for either cover are too voluminous to fit legibly, you should put the first ones listed (as many as fit reasonably) on the actual cover, and continue the rest onto adjacent pages.

If you publish or distribute Opaque copies of the Document numbering more than 100, you must either include a machine-readable Transparent copy along with each Opaque copy, or state in or with each Opaque copy a computer-network location from which the general network-using public has access to download using public-standard network protocols a complete Transparent copy of the Document, free of added material. If you use the latter option, you must take reasonably prudent steps, when you begin distribution of Opaque copies in quantity, to ensure that this Transparent copy will remain thus accessible at the stated location until at least one year after the last time you distribute an Opaque copy (directly or through your agents or retailers) of that edition to the public.

It is requested, but not required, that you contact the authors of the Document well before redistributing any large number of copies, to give them a chance to provide you with an updated version of the Document.

## 4. MODIFICATIONS

You may copy and distribute a Modified Version of the Document under the conditions of sections 2 and 3 above, provided that you release the Modified Version under precisely this License, with the Modified Version filling the role of the Document, thus licensing distribution and modification of the Modified Version to whoever possesses a copy of it. In addition, you must do these things in the Modified Version:

- 
- A. Use in the Title Page (and on the covers, if any) a title distinct from that of the Document, and from those of previous versions (which should, if there were any, be listed in the History section of the Document). You may use the same title as a previous version if the original publisher of that version gives permission.
  - B. List on the Title Page, as authors, one or more persons or entities responsible for authorship of the modifications in the Modified Version, together with at least five of the principal authors of the Document (all of its principal authors, if it has fewer than five), unless they release you from this requirement.
  - C. State on the Title page the name of the publisher of the Modified Version, as the publisher.
  - D. Preserve all the copyright notices of the Document.
  - E. Add an appropriate copyright notice for your modifications adjacent to the other copyright notices.
  - F. Include, immediately after the copyright notices, a license notice giving the public permission to use the Modified Version under the terms of this License, in the form shown in the Addendum below.
  - G. Preserve in that license notice the full lists of Invariant Sections and required Cover Texts given in the Document's license notice.
  - H. Include an unaltered copy of this License.
  - I. Preserve the section Entitled "History", Preserve its Title, and add to it an item stating at least the title, year, new authors, and publisher of the Modified Version as given on the Title Page. If there is no section Entitled "History" in the Document, create one stating the title, year, authors, and publisher of the Document as given on its Title Page, then add an item describing the Modified Version as stated in the previous sentence.
  - J. Preserve the network location, if any, given in the Document for public access to a Transparent copy of the Document, and likewise the network locations given in the Document for previous versions it was based on. These may be placed in the "History" section. You may omit a network location for a work that was published at least four years before the Document itself, or if the original publisher of the version it refers to gives permission.
  - K. For any section Entitled "Acknowledgements" or "Dedications", Preserve the Title of the section, and preserve in the section all the substance and tone of each of the contributor acknowledgements and/or dedications given therein.
  - L. Preserve all the Invariant Sections of the Document, unaltered in their text and in their titles. Section numbers or the equivalent are not considered part of the section titles.
  - M. Delete any section Entitled "Endorsements". Such a section may not be included in the Modified Version.
  - N. Do not retitle any existing section to be Entitled "Endorsements" or to conflict in title with any Invariant Section.
  - O. Preserve any Warranty Disclaimers.

If the Modified Version includes new front-matter sections or appendices that qualify as Secondary Sections and contain no material copied from the Document, you may at your option designate some or all of these

---

sections as invariant. To do this, add their titles to the list of Invariant Sections in the Modified Version's license notice. These titles must be distinct from any other section titles.

You may add a section Entitled "Endorsements", provided it contains nothing but endorsements of your Modified Version by various parties—for example, statements of peer review or that the text has been approved by an organization as the authoritative definition of a standard.

You may add a passage of up to five words as a Front-Cover Text, and a passage of up to 25 words as a Back-Cover Text, to the end of the list of Cover Texts in the Modified Version. Only one passage of Front-Cover Text and one of Back-Cover Text may be added by (or through arrangements made by) any one entity. If the Document already includes a cover text for the same cover, previously added by you or by arrangement made by the same entity you are acting on behalf of, you may not add another; but you may replace the old one, on explicit permission from the previous publisher that added the old one.

The author(s) and publisher(s) of the Document do not by this License give permission to use their names for publicity for or to assert or imply endorsement of any Modified Version.

## 5. COMBINING DOCUMENTS

You may combine the Document with other documents released under this License, under the terms defined in section 4 above for modified versions, provided that you include in the combination all of the Invariant Sections of all of the original documents, unmodified, and list them all as Invariant Sections of your combined work in its license notice, and that you preserve all their Warranty Disclaimers.

The combined work need only contain one copy of this License, and multiple identical Invariant Sections may be replaced with a single copy. If there are multiple Invariant Sections with the same name but different contents, make the title of each such section unique by adding at the end of it, in parentheses, the name of the original author or publisher of that section if known, or else a unique number. Make the same adjustment to the section titles in the list of Invariant Sections in the license notice of the combined work.

In the combination, you must combine any sections Entitled "History" in the various original documents, forming one section Entitled "History"; likewise combine any sections Entitled "Acknowledgements", and any sections Entitled "Dedications". You must delete all sections Entitled "Endorsements".

## 6. COLLECTIONS OF DOCUMENTS

You may make a collection consisting of the Document and other documents released under this License, and replace the individual copies of this License in the various documents with a single copy that is included in the collection, provided that you follow the rules of this License for verbatim copying of each of the documents in all other respects.

You may extract a single document from such a collection, and distribute it individually under this License, provided you insert a copy of this License into the extracted document, and follow this License in all other

---

respects regarding verbatim copying of that document.

## 7. AGGREGATION WITH INDEPENDENT WORKS

A compilation of the Document or its derivatives with other separate and independent documents or works, in or on a volume of a storage or distribution medium, is called an "aggregate" if the copyright resulting from the compilation is not used to limit the legal rights of the compilation's users beyond what the individual works permit. When the Document is included in an aggregate, this License does not apply to the other works in the aggregate which are not themselves derivative works of the Document.

If the Cover Text requirement of section 3 is applicable to these copies of the Document, then if the Document is less than one half of the entire aggregate, the Document's Cover Texts may be placed on covers that bracket the Document within the aggregate, or the electronic equivalent of covers if the Document is in electronic form. Otherwise they must appear on printed covers that bracket the whole aggregate.

## 8. TRANSLATION

Translation is considered a kind of modification, so you may distribute translations of the Document under the terms of section 4. Replacing Invariant Sections with translations requires special permission from their copyright holders, but you may include translations of some or all Invariant Sections in addition to the original versions of these Invariant Sections. You may include a translation of this License, and all the license notices in the Document, and any Warranty Disclaimers, provided that you also include the original English version of this License and the original versions of those notices and disclaimers. In case of a disagreement between the translation and the original version of this License or a notice or disclaimer, the original version will prevail.

If a section in the Document is Entitled "Acknowledgements", "Dedications", or "History", the requirement (section 4) to Preserve its Title (section 1) will typically require changing the actual title.

## 9. TERMINATION

You may not copy, modify, sublicense, or distribute the Document except as expressly provided for under this License. Any other attempt to copy, modify, sublicense or distribute the Document is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

## 10. FUTURE REVISIONS OF THIS LICENSE

The Free Software Foundation may publish new, revised versions of the GNU Free Documentation License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns. See <http://www.gnu.org/copyleft/>.

---

Each version of the License is given a distinguishing version number. If the Document specifies that a particular numbered version of this License "or any later version" applies to it, you have the option of following the terms and conditions either of that specified version or of any later version that has been published (not as a draft) by the Free Software Foundation. If the Document does not specify a version number of this License, you may choose any version ever published (not as a draft) by the Free Software Foundation.

## ADDENDUM: How to use this License for your documents

Copyright (c) YEAR YOUR NAME.

Permission is granted to copy, distribute and/or modify this document under the terms of the GNU Free Documentation License, Version 1.2 or any later version published by the Free Software Foundation; with no Invariant Sections, no Front-Cover Texts, and no Back-Cover Texts. A copy of the license is included in the section entitled "GNU Free Documentation License".