



SUSE Multi-Linux Manager 5.2 Beta 2

Common Workflows

Preface

Common Workflows | SUSE Multi-Linux Manager 5.2 Beta 2

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

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Chapter 1. Client Onboarding

SUSE Multi-Linux 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 Multi-Linux 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 Multi-Linux Manager Server.

The client must be running a supported Linux operating system. For a list of supported client systems, see **Client Configuration Guide › Supported Features**.

This is one of the first tasks you need to do when you set up SUSE Multi-Linux 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 Multi-Linux Manager Web UI. You can then use SUSE Multi-Linux Manager to manage the client.

1.3. Preparation

Before you start, you should already have:

- SUSE Multi-Linux 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 Multi-Linux 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 Guide › 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.MLM.example

```
hostnamectl set-hostname client1.MLM.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 Multi-Linux Manager Server

1. In the SUSE Multi-Linux 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 Multi-Linux 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 Multi-Linux 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 Guide › Supported Features**.
- For more information about different onboarding methods, and instructions for clients running various operating systems, see **Client Configuration Guide › Registration Methods**.
- For more information about general client concepts, see **Client Configuration Guide › Channels**.

Chapter 2. Clients Update Using Recurring Actions

This workflow shows how to automate updating the clients registered at SUSE Multi-Linux 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 Multi-Linux 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 Multi-Linux 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 Multi-Linux 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 Multi-Linux 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 Multi-Linux 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 Multi-Linux Manager reboots the client when `zypper -x list-patches` indicates that the patches require a reboot.
- For transactional SUSE clients, SUSE Multi-Linux Manager reboots the client if there is a pending transaction.
- For the Red Hat-based clients, SUSE Multi-Linux 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

2.6. Related topics

- For more information about recurring actions, see **Administration Guide › Recurring Actions**.
- For more information about custom info values, see **Client Configuration Guide › 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 Multi-Linux 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 Multi-Linux 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. For more information about the different ways to manage configuration, see **Client Configuration Guide › Configuration Management**.

3.4. Step-by-step Workflow instructions

Procedure: Create a New Configuration Channel and File

1. In the SUSE Multi-Linux 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.

Procedure: Assign Clients to the Configuration Channel

1. In the SUSE Multi-Linux 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 Overview section, click **[Subscribe to channels]**.
3. Check the configuration channel you created earlier, and click **[Continue]**.
4. 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 Multi-Linux 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

3.5.1. 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.uptodate:
```

```

- 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 Guide › Configuration Management**.
- For more information about SLS files, see: 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 Multi-Linux 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 Multi-Linux 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 Multi-Linux 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 Multi-Linux 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 Guide › Content Lifecycle**.
- For CLM examples, see **Administration Guide › Content Lifecycle Examples**.

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

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

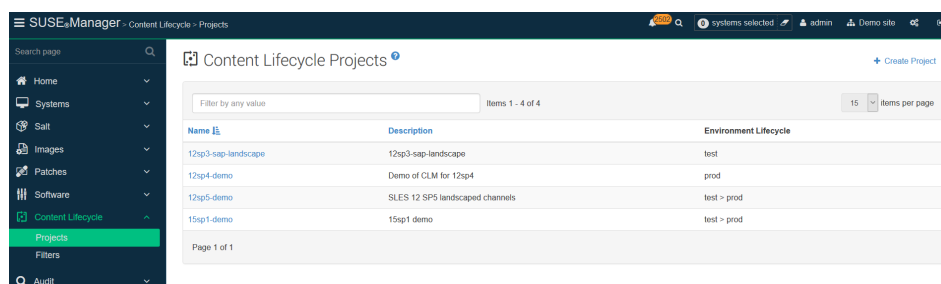
5.3. Step-by-step Preparation Instructions



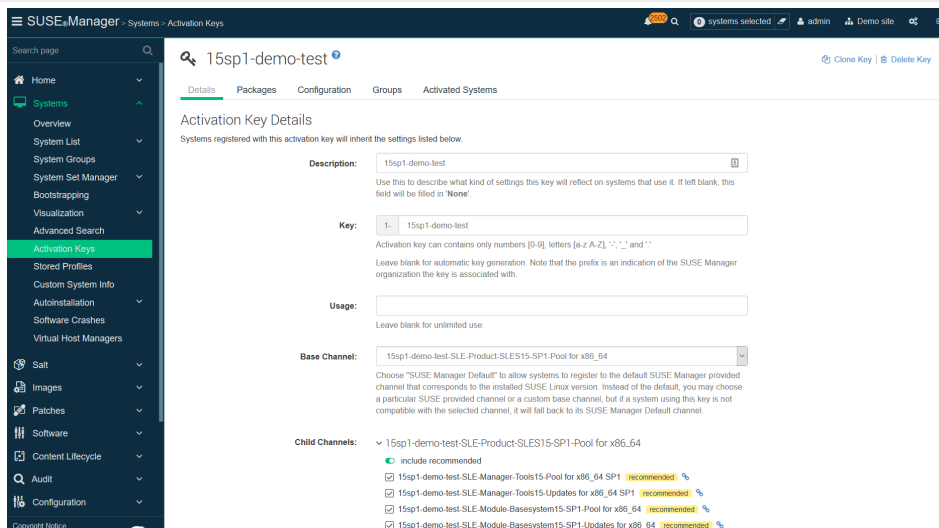
This workflow is complex and time-consuming. Make sure that adequate testing is done before deploying the procedure in live environment.

Procedure: Prepare the SUSE Multi-Linux Manager Server for Provisioning

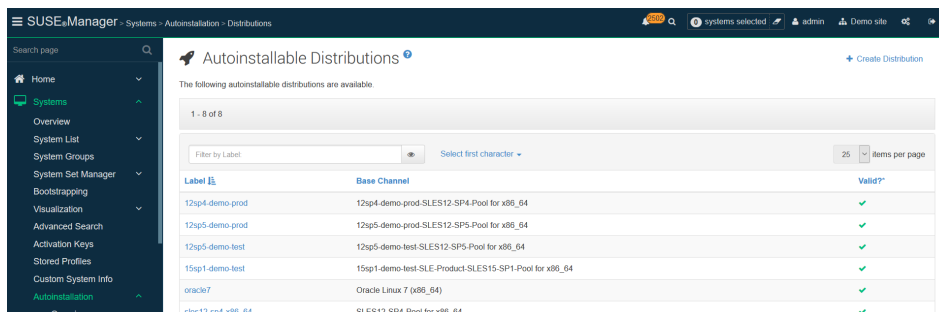
1. Create a SUSE Multi-Linux Manager Content Lifecycle Management project for your distribution. Choose a short-but-descriptive prefix in the name, including all source channel modules. Add Filters as needed. Add at least one Environment.



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

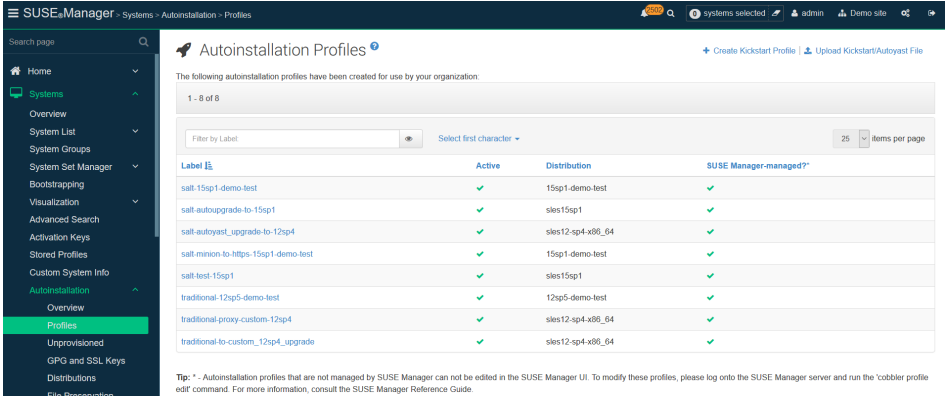


3. (Optional) Create a bootstrap script. The profile will not need it, because it is managed in the AutoYaST.
4. Create a `/var/spacwalk/iso` directory, and for SLES 15 SP2 and following, copy the Full iso (>10 GB) there. Create a mount point for it, such as `/opt/install/15sp3` and mount the ISO there. Ensure this path gets re-mounted at boot time.
5. Create an Autoinstallation Distribution in SUSE Multi-Linux 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 Multi-Linux Manager Server to obtain installer updates without needing to go to SUSE Customer Center.

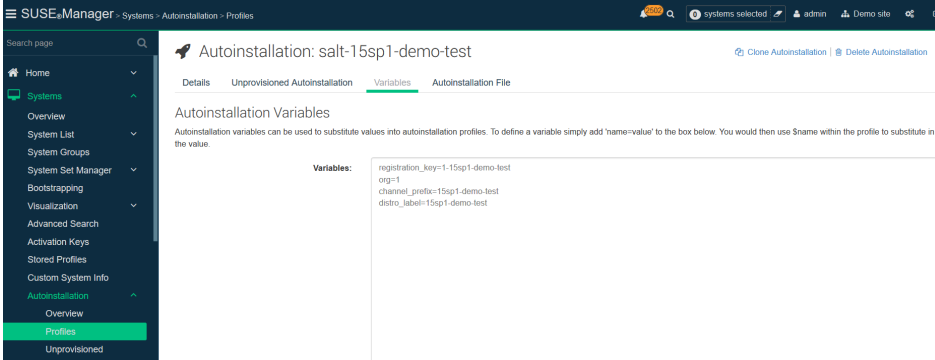


The following autoinstallation profiles have been created for use by your organization:

Label	Active	Distribution	SUSE Manager-managed?
salt-15sp1-demo-test	✓	15sp1-demo-test	✓
salt-autoupgrade-to-15sp1	✓	sles15sp1	✓
salt-autotest_upgrade-to-12sp4	✓	sles12-sp4-x86_64	✓
salt-minion-to-https-15sp1-demo-test	✓	15sp1-demo-test	✓
salt-test-15sp1	✓	sles15sp1	✓
traditional-12sp5-demo-test	✓	12sp5-demo-test	✓
traditional-proxy-custom-12sp4	✓	sles12-sp4-x86_64	✓
traditional-to-custom-12sp4_upgrade	✓	sles12-sp4-x86_64	✓

Tip: - Autoinstallation profiles that are not managed by SUSE Manager can not be edited in the SUSE Manager UI. To modify these profiles, please log onto the SUSE Manager server and run the 'cobbler profile edit' command. For more information, consult the SUSE Manager Reference Guide.

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



Autoinstallation Variables

Autoinstallation variables can be used to substitute values into autoinstallation profiles. To define a variable simply add 'name=value' to the box below. You would then use \$name within the profile to substitute in the value.

Variables:

```
registration_key=1-15sp1-demo-test
org=1
channel_prefix=15sp1-demo-test
distro_label=15sp1-demo-test
```

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 Multi-Linux 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 Multi-Linux 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 Multi-Linux 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 Multi-Linux 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 checked="" type="checkbox"/>
<input type="radio"/> salt-autoupgrade-to-15sp1	sles15sp1	<input checked="" type="checkbox"/>
<input type="radio"/> salt-autoyesl_upgrade-to-12sp4	sles12-sp4-x86_64	<input checked="" type="checkbox"/>
<input checked="" type="radio"/> salt-minion-to-https-15sp1-demo-test	15sp1-demo-test	<input checked="" type="checkbox"/>

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 Multi-Linux 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 Multi-Linux Manager profile.

The Session Status screen in SUSE Multi-Linux 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]

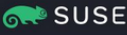
EC2  AWS Cost Explorer

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

Get instance screenshot [Info](#)

i-0967884ceaf68f70e (dpv-slesupdater) 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 (download size 2.06 MiB)
Resolving libstdc++6-11.2.1-x86_64.rpm (download size 1.34 MiB)
Installing libstdc++6-11.2.1-x86_64.rpm (download size 2.06 MiB)
Downloading libgcc_s.so.1 (download size 403.6 KiB)
Installing libgcc_s.so.1-11.2.1-x86_64.rpm (download size 1.06 MiB)
Downloading libgcc_s.so.1 (download size 403.6 KiB)
Installing libgcc_s.so.1-11.2.1-x86_64.rpm (download 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 (download size 17.8 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 (download size 17.8 KiB)
Downloading grub2-x86_64-efi (download size 2.85 MiB)
Installing grub2-x86_64-efi (download size 2.85 MiB)
Installing Packages... (Remaining: 2.149 GiB, 872 packages)


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 libidpccpp1 (download size 72.7 KiB)
Installing libidpccpp1-0.3.1-4.75-x86_64.rpm (download size 229.4 KiB)
Downloading dirmngr (download size 365 KiB)
Installing dirmngr-2.2.27-1.2-x86_64.rpm (download size 891 KiB)
Downloading kbd-legacy (download size 495.7 KiB)
Installing kbd-legacy-2.0.4-14.38.noarch.rpm (download size 517 KiB)
Downloading python3-appdirs (download size 22.5 KiB)
Installing python3-appdirs-1.4.3-1.21.noarch.rpm (download size 83.5 KiB)
Downloading python3-pyparsing (download size 187.4 KiB)
Installing python3-pyparsing-2.4.7-1.24.noarch.rpm (download size 877 KiB)
Downloading yast2-transfer (download size 43.1 KiB)
Installing yast2-transfer-4.1.0-1.28.x86_64.rpm (download size 123.5 KiB)
Downloading gpg2 (download size 1.95 MiB)
Installing gpg2-2.2.27-1.2-x86_64.rpm (download size 7.02 MiB)
Installing gpg2-2.2.27-1.2-x86_64.rpm (download size 7.02 MiB)
Installing Packages... (Remaining: 565.27 MiB / 01:15, 252 packages)

100%

Installing Packages... (Remaining: 565.27 MiB / 01:15, 252 packages)

48%

Help

Abort Back Next

Chapter 6. Installing SUSE Multi-Linux Manager Using RAW Image

SUSE Multi-Linux Manager offers various image formats, including a RAW format. This guide demonstrates how to set up SUSE Multi-Linux 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 Multi-Linux 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 Multi-Linux 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 Multi-Linux 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 Multi-Linux 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 **Installation and Upgrade Guide › Container Deployment › Persistent Volumes**.

Chapter 7. Install SUSE Multi-Linux Manager on ppc64le

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

7.1. Use case

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

7.2. Outcome

Successful completion of this workflow results in successful installation of SUSE Multi-Linux 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: Preparing 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 Multi-Linux 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 Multi-Linux 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-5.1-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 Multi-Linux 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 SL Micro with SCC.

```
transactional-update register -r <REGCODE> -e <your_email>
```

- b. Register SUSE Multi-Linux Manager with SCC.

```
transactional-update register -p Multi-Linux-Manager-Server/5.1/ppc64le -r  
<REGCODE>
```

- c. Apply all available updates using transactional-update pkg 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 Multi-Linux Manager

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

- b. Provision persistent storage for SUSE Multi-Linux Manager

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

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

For more information, see **Installation and Upgrade Guide › Container Deployment › Persistent Volumes**.

To continue with deployment, see **Installation and Upgrade Guide › Container Deployment › 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. Switch to new client tools channels

SUSE Multi-Linux Manager 5.1 introduced a new, rebranded set of client tools for all supported operating systems.

This change requires some manual steps when upgrading from earlier versions to 5.2.

Users performing a new product synchronization will not notice any differences. However, for products synchronized before the upgrade, you must synchronize the new client tools channels after migration.

Channels previously named SUSE Manager Client Tools for XYZ (with labels such as `manager-tools-*`), used in SUSE Manager 4.3 or 5.0, are no longer available in version 5.2. Although these old channels remain assigned to existing clients after migration, their corresponding repositories have been removed.

To ensure continued updates for client tools, you must:

- Mirror the new SUSE Multi-Linux Manager Client Tools for XYZ channels for the relevant products and assign them to the appropriate clients.
- Update any CLM projects, activation keys, or AutoYaST profiles that reference the old client tools channels to use the new ones.

This workflow demonstrates how to automate the synchronization of the new client tools channels and switch existing entities to use them via the XML-RPC API.

The process involves two main steps:

1. Synchronize the new client tools channels.
2. Update entities such as activation keys and CLM projects to use the new channels.

9.1. Use case / Situation

This workflow is intended for administrators managing SUSE Multi-Linux Manager 5.2. It helps automate the process of syncing new channels and updating activation keys and CLM projects, including project promotion, through the API, eliminating the need for manual operations in the Web UI.

By following this workflow, you can create a Python script that:

- Synchronizes the new client tools channels.
- Lists all available activations keys/ CLM projects.
- Removes old client tools channels and attaches the new ones.
- Builds and promotes project environments.

9.2. Outcome

After completing this workflow, new client tools will be synced and activation key and CLM projects will be fully switched to the new client tools channels.

9.3. Preparation

Before you start, ensure that:

- You have administrator access to SUSE Multi-Linux Manager.
- A working Python environment is available.

This workflow is divided into two major steps:

1. Synchronizing the new client tools channels.
2. Updating CLM projects and activation keys to use these new channels.

9.4. Step-by-step workflow

9.4.1. Step 1: Synchronize new client tools channels

The first step ensures that all new client tools channels are synchronized for already installed base products. This is achieved by listing all installed products via the XML-RPC API and identifying the matching client tools extensions.

9.4.1.1. Workflow overview

The synchronization logic consists of two main operations:

1. List all installed products and their associated extensions.
2. Add the client tools channels (SLE-M-T family) that are not yet synchronized.

These operations use the following XML-RPC methods:

- `sync.content.listProducts(key)` - Returns a list of all available products and their extensions.
- `sync.content.addChannel(key, channelLabel, "")` - adds a specific channel for synchronization.

9.4.1.1.1. Sample implementation

```
def find_extensions_of_synced_products(client, key):  
    """Retrieve all extensions of installed products."""
```

```

all_extensions = []
products = client.sync.content.listProducts(key)
for product in products:
    if product.get('status', '').lower() == 'installed':
        extensions = product.get('extensions', [])
        all_extensions.extend(extensions)
return all_extensions

def add_client_tools_channels(client, key, extensions, dry_run):
    """Add all new client tools channels that are not yet synced."""
    for ext in extensions:
        if "Client Tools" in ext.get('friendly_name', ''):
            for ch in ext.get('channels', []):
                if ch.get('family') == 'SLE-M-T' and not ch.get('optional', False):
                    if ch.get('status', '').lower() == 'installed':
                        continue
                    label = ch.get('label')
                    client.sync.content.addChannel(key, label, '')

```

1. Detect installed products using `client.sync.content.listProducts(key)`.
2. Iterate through product extensions to locate those containing “Client Tools” in their `friendly_name`.
3. For each client tools extension:
 - Check if the channel’s family equals SLE-M-T.
 - Skip if the channel is already installed (`status = installed`).
 - Otherwise, add the channel using `client.sync.content.addChannel(key, label, '')`.

This will ensure that all required client tools channels are added automatically before updating CLM projects or activation keys in Step 2. Once the channels have been added, they will be picked up by the next scheduled repository synchronization job.



If you want to trigger an immediate synchronization, you can schedule the **Single Run Schedule** task from the `mgr-sync-refresh-bunch` task family. This forces the server to refresh and synchronize all newly added channels right away.

Based on this workflow, a helper utility script named `sync_client_tools` has been created in the [Uyuni contrib repository](#) that one can use.

9.4.2. Step 2: Update CLM projects and activation keys

Once the new client tools channels are synchronized, the next step is to update your Content Lifecycle Management projects and activation keys so that they reference the new channels instead of the old ones.

This ensures that clients continue receiving updates from the correct repositories.

9.4.2.1. Workflow overview

This step consists of the following main tasks:

1. Identify CLM projects that still reference the old client tools channels.
2. Detach old (manager-tools) channels and attach the new (managertools) channels.
3. Rebuild and promote the CLM project environments in the correct order.
4. Update related activation keys to reference the new channels.

9.4.2.1.1. Sample implementation

1. List all projects and select the one to process. For initial testing, use a single project such as `clm-project-example`:

```
projects = client.contentmanagement.listProjects(key)
for p in projects:
    if p['label'] == 'clm-project-example': # Adjust to process all projects if
        needed
        project_label = p['label']
```

Testing with a single project helps prevent large-scale accidental updates.

2. Retrieve project sources and identify both old (manager-tools) and new (managertools) client tools channels:

```
sources = client.contentmanagement.listProjectSources(key, project_label)
old_tools = [s['channelLabel'] for s in sources if 'manager-tools' in
s.get('channelLabel', '').lower()]
new_tools = [s['channelLabel'] for s in sources if 'managertools' in
s.get('channelLabel', '').lower()]
```

These lists will be used to detach outdated channels and attach the new ones.

3. For each old channel detected, call the `detachSource` endpoint:

```
if old_tools:
    for old in old_tools:
        client.contentmanagement.detachSource(key, project_label, 'software', old)
```

It is strongly recommended to run in dry-run mode first to validate which channels would be removed.

4. If the new client tools channels are not already attached, identify the matching base channel, list its child channels, and attach those with `managertools` in the label :

```
if not new_tools:
```

```

source_labels = [s.get('channelLabel', '') for s in sources]
base_channel_label = next((lbl for lbl in source_labels if lbl in base_channels),
None)

if base_channel_label:
    children = client.channel.software.listChildren(key, base_channel_label)
    managertools_labels = [s['label'] for s in children if 'managertools' in
s.get('label', '').lower()]
    if managertools_labels:
        for label in managertools_labels:
            client.contentmanagement.attachSource(key, project_label,
'software', label)

```

Ensure the new client tools channels are already mirrored and synchronized before attachment.

5. Once sources are updated, list the project environments in sequence:

```
all_envs = client.contentmanagement.listProjectEnvironments(key, project_label)
```

The returned list is ordered, and promotions should follow that order.

Build the first environment, then promote subsequent ones with short pauses between each to ensure completion.

```

if not all_envs:
    return

first_env_label = all_envs[0]['label']

for i, env in enumerate(all_envs):
    env_label = env['label']
    is_first_env = (env_label == first_env_label)

    if is_first_env:
        description = "Build for new client tools channels."
        client.contentmanagement.buildProject(key, project_label, description)
    else:
        client.contentmanagement.promoteProject(key, project_label, env_label)

    if not dry_run and i < len(all_envs) - 1:
        log("Waiting 30 seconds before next promotion...")
        time.sleep(30)

```

After CLM projects are updated, ensure that any activation keys referencing old client tools channels are switched to the new channels as well. You can use the following API calls

- `activationkey.listActivationKeys(key)`
- `activationkey.removeChildChannels(key, key_label, channels)`
- `activationkey.addChildChannels(key, key_label, channels)`

to automate this process.

Based on this workflow, a helper utility script named `migrate_to_new_client_tools` has been created in the [Uyuni contrib repository](#) to simplify and automate the migration process. It can significantly reduce manual effort, but it should be used with caution. Always test the script in **dry-run** mode and on a **single entity first** (for example, one CLM project or one activation key) before running it across all projects.



The provided script example based on this workflow use some helper functions, mainly the following:

- `log(message)` – Prints or logs messages during execution.
- `dry_run_log(message)` – Logs intended actions when running in dry-run mode, without performing real API calls.
- `wait_for_completion(client, key, project_label, env_label)` – Waits for build or promotion tasks to complete, ensuring that the process finishes successfully before proceeding.

These helper functions are not part of the XML-RPC API but are necessary for structured output, error handling, and safe automation. Without them, the script would execute API calls without clear feedback or control flow, which could lead to incomplete or unsafe project promotions.



It is recommend to run your script in dry-run mode first to review the planned changes and test with a single project before applying it to all.

Chapter 10. Customize Apache Configuration

This workflow shows you how to add custom configuration to SUSE Multi-Linux Manager components, specifically the Apache HTTP server, within a containerized environment. It ensures that your custom configurations are stored in a persisted volume and are not overwritten during image updates.

10.1. Use case

This workflow is beneficial when:

- You need to overwrite or extend the default Apache configuration.
- You need to ensure that configuration changes persist after a container image update.
- You want to add specific tuning configurations to the server.

10.2. Outcome

After completing this workflow, your custom Apache configuration will be active and will persist through future updates or restarts of the SUSE Multi-Linux Manager containers.

10.3. Preparation

Before you start, you should have:

- Root access to the SUSE Multi-Linux Manager Server host.
- Knowledge of the specific Apache directives you wish to apply.

10.4. Step-by-step workflow instructions



You should only add new configuration files, and not modify the existing configuration files provided by the image.

Procedure: Adding custom Apache configuration files

1. Open a terminal on your SUSE Multi-Linux Manager Server.
2. Access the server container shell by running the following command:

```
mgrctl term
```

3. Navigate to the configuration directory. You must create your new configuration file in the path `/etc/apache2/conf.d`, as this folder is

persisted.

4. Create your new configuration file (for example, `custom_tuning.conf`) and add your required Apache directives.
5. Once you have saved your file, exit the container with command:

```
exit
```

6. Restart the SUSE Multi-Linux Manager services to apply the changes:

```
mgradm restart
```

10.5. Related topics

- For more information on general server setup, see **Common Workflows Guide › Workflow Install from Raw Image**.

Chapter 11. 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.

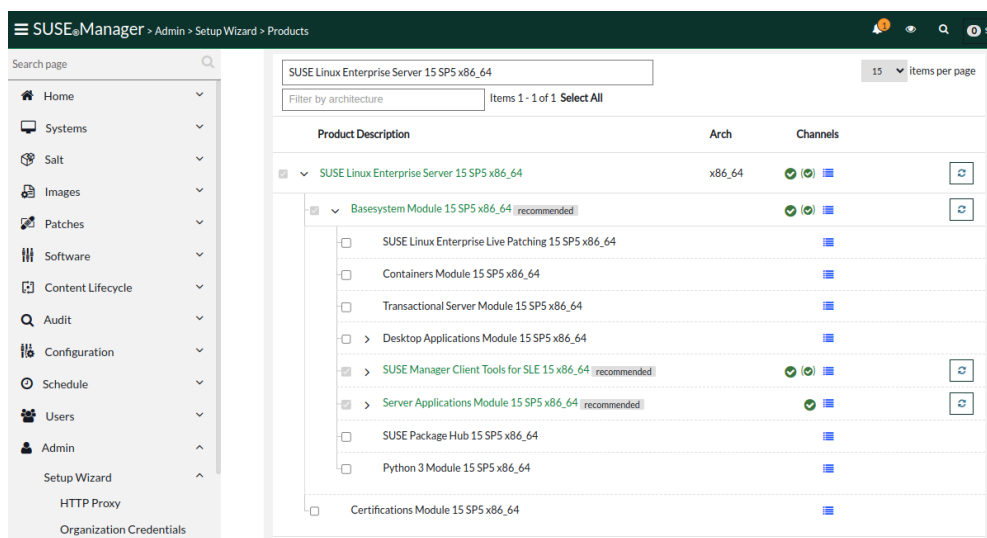
This document describes and illustrates in detail the product upgrade using the Web UI.



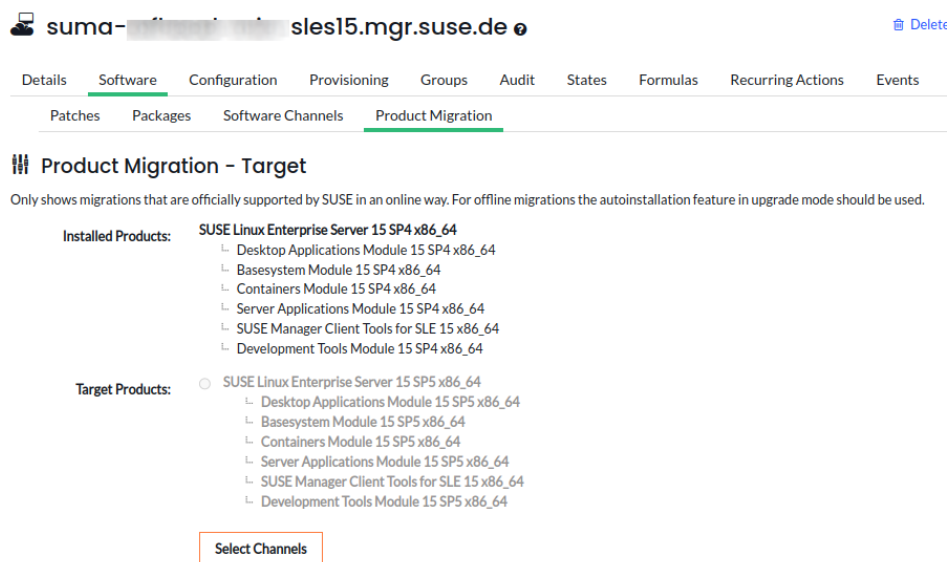
Product versions used are not reflective of the actual latest versions available. They are used for illustration purposes only. As an example, the following procedure describes the upgrade to version 15 SP5 from and older version 15. If you are targeting a different version, select the corresponding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

Procedure: Upgrading Product to a Newer Version Using Web UI

1. Log in to SUSE Multi-Linux 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.



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



1. Select SUSE Linux Enterprise Server 15 SP5 x86_64. This will expand further.
2. Select Target Base Channel as SLE-Product-SLES15-SP5-Pool for x86_64. Keep Allow Vendor Change unchecked.
3. Click **[Schedule Migration]**. The message will be highlighted It is better to do a dry run first so continuing with dry run first.
4. 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.
5. 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.
6. When the upgrade is complete, check the status in **Events › History**.
7. On the SUSE Multi-Linux Manager Web UI side, verify the successfully completed product upgrade by going to **Systems › Registered client › Details**.
8. On the client side you can verify it by running:

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

9. 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/"
```

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