

**SUSE Manager**

# SUSE Manager for Managed Services Providers

How MSPs Can Streamline Systems Lifecycle Management

SUSE Manager

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# SUSE Manager for Managed Services Providers

## How MSPs Can Streamline Systems Lifecycle Management

**Date:** 2025-08-28

### **Summary**

SUSE Manager can enable managed services providers (MSPs) to streamline IT systems management with a single tool that provides systems asset management, systems provisioning, and automated software management to keep systems up-to-date and secure.

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# 1 Introduction

The Linux footprint of enterprise IT landscapes continues to grow. This growth can be particularly problematic for managed services providers (MSPs), who may need to manage systems lifecycles for many clients. As an MSP, you need a management tool that can scale with your business needs.

SUSE Manager 4.3 is an enterprise, open source management solution for software-defined infrastructure. It is designed to help enterprises reduce complexity and regain control of IT assets with a single tool. SUSE Manager provides you with systems asset management, systems provisioning, and automated software management to help you keep all your systems up-to-date and secure.

SUSE Manager easily scales to satisfy your technical and business requirements without compromising on operational performance. It gives you the features and automation in a single tool. Thus, you can seamlessly manage a broad spectrum of Linux systems on a variety of hardware architectures and hypervisors, and container, IoT, and cloud platforms. With SUSE Manager, you can manage systems lifecycle management, streamline operations, and manage your growing IT landscape.

## 1.1 Scope

You will learn how to deploy SUSE Manager to support systems lifecycle management for multiple, downstream customers. The hub and peripheral architecture described here enables managed services providers and large enterprises to consolidate certain management operations while maintaining the advantages of separate peripheral servers for each customer.

## 1.2 Audience

Platform engineers and systems administrators of MSPs and large enterprises - who are responsible for delivering systems lifecycle management for multiple customers, organizations, or business units - will find useful guidance in this document.

You should have a basic familiarity with SUSE Manager and with typical procedures for provisioning and patching Linux systems to get the most out of this document.

## 1.3 Prerequisites


For this guide, you need at least two systems. These can be bare metal or virtual machines. These will be your SUSE Manager hub and peripheral servers. If you want to explore registering client systems for management, add one or more additional systems.

For this guide, the recommended configuration for each server is:

- CPU: 8 CPU cores
- RAM: 64 GB
- Storage: 100 GB



### Important

For a typical production deployment, be sure to review [SUSE Manager Hardware requirements](https://documentation.suse.com/suma/4.3/en/suse-manager/installation-and-upgrade/hardware-requirements.html) (<https://documentation.suse.com/suma/4.3/en/suse-manager/installation-and-upgrade/hardware-requirements.html>) .

When sizing servers for SUSE Manager, the most important variables are CPU, RAM, and disk storage. This can be critical when implementing the hub and peripheral solution for the real world. Import and export operations involve a lot of SQL transactions, which can be CPU and memory intensive. And, you can have significant storage requirements for the database (located in `/var/lib/pgsql`), depending on the size and complexity of your IT landscape.

SUSE offers [Consulting Services](https://www.suse.com/services/) (<https://www.suse.com/services/>)  that can help you assess your needs and provide proper sizing recommendations.

Additionally, you need a way to transfer data between the servers. Ideally, this could be through a shared (NFS) file system, but you can also copy the data across the network (such as with [rsync](#)) or use a removable disk such as a USB storage device.


## 2 Solution design

Managing a large and growing IT footprint can be a challenge for any enterprise. Managed services providers (MSPs) must do this for multiple customers. A single SUSE Manager server could be used to manage all customer systems. But there are key concerns with this approach, such as:

### Scaling

SUSE Manager is designed as a single server that can manage up to 10000 clients. An MSP with multiple large customers could reach this limit quickly. To accommodate this, SUSE Manager can be scaled horizontally by adding SUSE Manager servers.

### Separation of entitlements

SUSE Manager uses customer credentials to access software entitlements from upstream providers, such as the [SUSE Customer Center \(SCC\)](https://scc.suse.com/) (<https://scc.suse.com/>) . It is not a good idea to mix the entitlements of multiple customers in a single environment, as it would be difficult to keep track of which managed systems are entitled to which products.

### Access control and user isolation

In situations where customers would expect access to SUSE Manager, an MSP would need some way to isolate each customer's users so they can only see and manage their own systems. The MSP could install a dedicated SUSE Manager server for each client. This would address isolation, but it is somewhat inefficient because of the need to manage each of these servers independently.

SUSE Manager empowers MSPs and large enterprises to address these concerns through:

- Content lifecycle management
- Hub and peripherals
- Inter-Server Synchronization

Each of these is discussed further below.

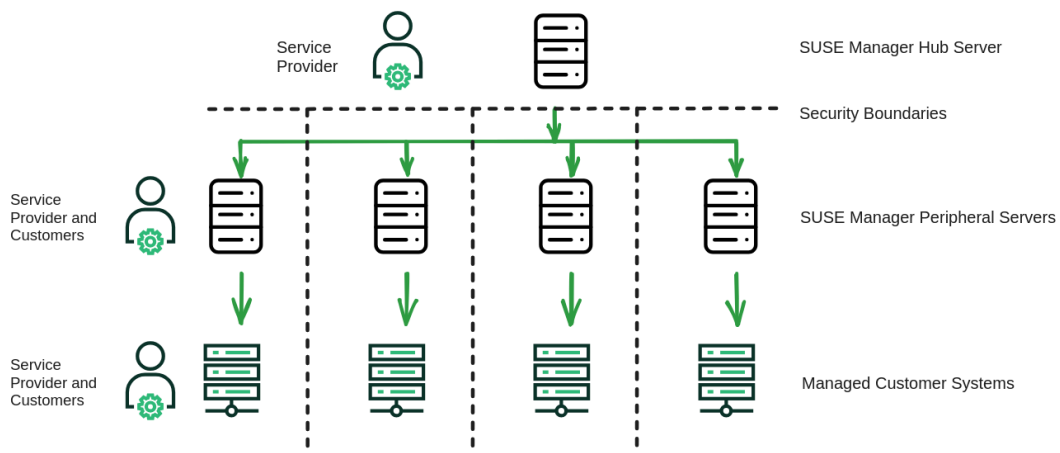
### 2.1 Content lifecycle management

Content lifecycle management involves creating clones of software channels at particular points in time and assigning these to different systems. This is used to create multi-stage lifecycles where patches are passed from vendor channels to a development environment, from there to

a test stage, and then to production. MSPs can create separate lifecycles for each customer. This ensures that each customer receives only the patches that are appropriate to its respective software lifecycle needs even though the patches may be based on the same upstream channels.

## 2.2 Hub and peripherals

SUSE Manager Hub (<https://documentation.suse.com/suma/4.3/en/suse-manager/specialized-guides/large-deployments/multi-server.html>) was introduced to manage very large deployments by allowing horizontal scaling to multiple servers.



In this hub and peripheral topology, one SUSE Manager server acts as the central (or **hub**) server for one or more **peripheral** SUSE Manager servers. Any number of client systems can be registered to the server. Each peripheral server is an independent SUSE Manager server. By dedicating a peripheral server for each customer, an MSP can address concerns about separation of customers while still allowing centralized control.


### ! Important

Pay special attention to the security boundaries shown in the diagram above. End customers may have access to their own SUSE Manager servers if they want. However, it is imperative that no customer be given access to the hub server because this server has control over all of the peripheral servers. A customer who can access the hub would be able to access other customers' systems.

For each peripheral server, you need to create activation keys, bootstrap, repositories, system groups, users, and so on. Similarly, any custom Salt states you create must be manually copied to the appropriate peripheral. SUSE provides a set of Salt modules, states, and formulas that can automate this process.

It is important to understand that the hub and peripheral concept was developed primarily to provide horizontal scaling. For this guide, it is being used to provide isolation between systems and any benefits from scaling are incidental to this use case.

## 2.3 Inter-Server Synchronization (ISS)

With multiple SUSE Manager servers in a hub and peripheral architecture, you need to ensure that content and permissions stay aligned. [Inter-Server Synchronization \(ISS\)](https://documentation.suse.com/suma/4.3/en/suse-manager/administration/iss_v2.html#_install_iss_packages) ([https://documentation.suse.com/suma/4.3/en/suse-manager/administration/iss\\_v2.html#\\_install\\_iss\\_packages](https://documentation.suse.com/suma/4.3/en/suse-manager/administration/iss_v2.html#_install_iss_packages))  allows you to connect two or more SUSE Manager servers and keep them up-to-date. Since only the hub needs access to an external source (such as SCC), a side benefit is that peripheral servers do not require Internet access.


## 3 Creating the hub server

At the center of the architecture is the SUSE Manager hub server. This server follows standard installation and setup processes. SUSE Manager can be deployed onto bare metal or virtual machines, running on-premises or in cloud environments. However, for the hub server, you must also enable the Hub XMLRPC API service.

1. Install SUSE Manager on the designated hub system.

Follow the steps detailed in the [SUSE Manager Installation and Upgrade Guide](https://documentation.suse.com/suma/4.3/en/suse-manager/installation-and-upgrade/installation-and-upgrade-overview.html) (<https://documentation.suse.com/suma/4.3/en/suse-manager/installation-and-upgrade/installation-and-upgrade-overview.html>) .

2. Set up SUSE Manager.

Follow the guidance in [SUSE Manager Server Setup](https://documentation.suse.com/suma/4.3/en/suse-manager/installation-and-upgrade/server-setup.html) (<https://documentation.suse.com/suma/4.3/en/suse-manager/installation-and-upgrade/server-setup.html>) , where you create your main administration account and organization.

3. To make this a hub server, you need to install and enable the Hub XMLRPC API service.





## Note

Commands shown here should be issued as the root user on the server.

- a. On the hub server, install the `hub-xmlrpc-api` package.

The package is available in the SUSE Manager repositories, so can be installed with a simple command.

```
zypper install hub-xmlrpc-api
```

- b. Set the Hub XMLRPC API service to start automatically at boot time, and start it immediately:

```
systemctl enable hub-xmlrpc-api.service  
systemctl start hub-xmlrpc-api.service
```

- c. Check that these parameters in the `/etc/hub/hub.conf` configuration file are correct:

- `HUB_API_URL`: URL to the Hub Server XMLRPC API endpoint.  
Use the default value.
- `HUB_CONNECT_TIMEOUT`: the maximum number of seconds to wait for a response when connecting to a Server.  
Use the default value in most cases.
- `HUB_REQUEST_TIMEOUT`: the maximum number of seconds to wait for a response when calling a Server method.  
Use the default value in most cases.
- `HUB_CONNECT_USING_SSL`: use HTTPS instead of HTTP for communicating with peripheral Servers.



## Note

Using secure communications is recommended.

To use HTTPS to connect to peripheral servers, you must:

1. Set the `HUB_CONNECT_USING_SSL` parameter to `true`
2. Ensure that the SSL certificates for all the peripheral servers are installed on the hub server.

Do this by copying the `RHN-ORG-TRUSTED-SSL-CERT` certificate file from each peripheral server's "`http://<server-url>/pub/`" directory to `/etc/pki/trust/anchors/`, then run `update-ca-certificates`.

- d. Restart services to activate any configuration changes you make.

```
systemctl restart hub-xmlrpc-api.service
```


## 4 Onboarding a customer

To onboard a new customer, you start by adding the customer's SUSE Customer Center (SCC) credentials to the hub server. You do this for each customer. Then SUSE Manager can provide you with centralized access to all subscribed products.

Alternatively, if you (as the service provider) are using your own subscriptions to provide access under an MSP agreement with SUSE, then you only need to add that subscription to the hub.

## Setup Wizard


HTTP Proxy Organization Credentials Products Pay-as-you-go



Add a new credential

**What are Organization Credentials?**

Organization credentials (Mirror credentials) are your access to product downloads.











**Where do I find my Organization Credentials?**

You can find them in the [Customer Center](#).

[< Prev](#) [Next >](#) 2 of 4

When the SCC credentials have been added, you have a centralized view of all products that are available through the hub and the ability to replicate entitlements from the hub to peripheral servers.

<input checked="" type="checkbox"/>	>	SUSE Linux Enterprise Server 15 SP4 x86_64	x86_64		<input checked="" type="checkbox"/> include recommended
<input type="checkbox"/>	>	SUSE Linux Enterprise Server for SAP Applications 15 SP4 ppc64le	ppc64le		<input checked="" type="checkbox"/> include recommended
<input type="checkbox"/>	>	SUSE Linux Enterprise Server for SAP Applications 15 SP4 x86_64	x86_64		<input checked="" type="checkbox"/> include recommended
<input type="checkbox"/>	>	SUSE Manager Proxy 4.3 x86_64	x86_64		<input checked="" type="checkbox"/> include recommended
<input type="checkbox"/>	>	SUSE Manager Retail Branch Server 4.3 x86_64	x86_64		<input checked="" type="checkbox"/> include recommended
<input type="checkbox"/>	>	SUSE Manager Server 4.3 ppc64le	ppc64le		<input checked="" type="checkbox"/> include recommended
<input type="checkbox"/>	>	SUSE Manager Server 4.3 s390x	s390x		<input checked="" type="checkbox"/> include recommended
<input checked="" type="checkbox"/>	>	SUSE Manager Server 4.3 x86_64	x86_64		<input checked="" type="checkbox"/> include recommended
Page 1 of 1					

Follow [Synchronizing Products from SUSE Customer Center \(https://documentation.suse.com/suma/4.3/en/suse-manager/installation-and-upgrade/server-setup.html#\\_synchronizing\\_products\\_from\\_suse\\_customer\\_center\)](https://documentation.suse.com/suma/4.3/en/suse-manager/installation-and-upgrade/server-setup.html#_synchronizing_products_from_suse_customer_center) to onboard a customer.

## Important

To properly synchronize content lifecycle channels later, do not create a separate organization for each new customer.

## 5 Creating a peripheral server

Peripheral servers are SUSE Manager servers you can dedicate to a customer. Creating a peripheral server follows the normal SUSE Manager installation and setup processes. However, instead of configuring the SCC connection, you configure the peripheral server to obtain SCC content from the hub.

1. Install SUSE Manager on the designated hub system.

Follow the steps detailed in the [SUSE Manager Installation and Upgrade Guide](https://documentation.suse.com/suma/4.3/en/suse-manager/installation-and-upgrade/installation-and-upgrade-overview.html) (<https://documentation.suse.com/suma/4.3/en/suse-manager/installation-and-upgrade/installation-and-upgrade-overview.html>) .

2. Set up SUSE Manager.

Follow the guidance in [SUSE Manager Server Setup](https://documentation.suse.com/suma/4.3/en/suse-manager/installation-and-upgrade/server-setup.html) (<https://documentation.suse.com/suma/4.3/en/suse-manager/installation-and-upgrade/server-setup.html>) .




### Important

Your main administration user and organization should match those you created on the hub server. This enables Inter-Server Synchronization of content to work correctly. This limitation may be removed in a future version of SUSE Manager.

## 6 Registering a peripheral server

Peripheral servers must be registered to the hub server as Salt clients. When you register a peripheral server, you must assign it to the appropriate SUSE Manager software channel as its base channel. The best way to do this is with activation keys. You can create a specific activation key and assign the appropriate channel as the base channel with the key.

Register a peripheral server to the hub using one of the [Client Registration Methods](https://documentation.suse.com/suma/4.3/en/suse-manager/client-configuration/registration-methods.html) (<https://documentation.suse.com/suma/4.3/en/suse-manager/client-configuration/registration-methods.html>) .



### Note

You should create an activation key specifically for peripheral servers, especially if you will have other types of clients registered to your hub.

To register a peripheral with the SUSE Manager Web UI, you can follow these steps:

1. In the SUSE Manager Web UI, navigate to *Systems > Bootstrapping*.
2. In the *Host* field, type the fully qualified domain name (FQDN) of the client to be bootstrapped.
3. In the *SSH Port* field, type the SSH port number to use to connect to and bootstrap the client. The default SSH port number is 22.
4. In the *User* field, type the user name to log in to the client. The default user name is root.
5. To bootstrap the client with SSH, in the *Authentication* field, check *SSH Private Key*, and upload the SSH private key to use.  
If your SSH private key requires a passphrase, type it into the *SSH Private Key Passphrase* field.
6. To bootstrap the client with a password, in the *Authentication* field, check *Password*, and type the client password.
7. In the *Activation Key* field, select the activation key that is associated with the peripheral servers.
8. *Disable SSH Strict Key Host Checking* is selected by default.  
This allows the bootstrap process to automatically accept SSH host keys without requiring you to manually authenticate each one.
9. Check the *Manage System Completely via SSH* check box.



### Important

If you select this option, the client is configured to use SSH for its connection to the server, and no other connection method is configured.

10. Click *Bootstrap* to begin registration.


## Bootstrap Minions

You can add systems to be managed by providing SSH credentials only. SUSE Manager will prepare the system remotely and will perform the registration.

Host:

SSH Port:

User:

 The user will have an effect only during the bootstrap process. Further connections will be made by the user specified in `rhncf`. The default user for the key `'ssh_push_sudo_user'` is `'root'`. This user is set after SUSE Manager's SSH key is deployed during the bootstrap procedure.

Authentication Method: ☒ Password ☐ SSH Private Key

Password:

Activation Key:

Reactivation Key:

Proxy:

☒ Disable SSH strict host key checking during bootstrap process

☒ Manage system completely via SSH (will not install an agent)

When the bootstrap process has completed, your client is listed in the Web UI at *Systems > System List*. The peripheral server can now be managed as a standard Salt client of the hub and patched in the normal way.

## 7 Synchronizing content

You need to ensure that your SUSE Manager servers stay aligned on content. This is accomplished using Inter-Server Synchronization.

### 7.1 Installing Inter-Server Synchronization

To use Inter-Server Synchronization (ISS), you need to install the `inter-server-sync` package on hub and peripheral SUSE Manager servers.

Do this by issuing the following command on each server:

```
zypper install inter-server-sync
```

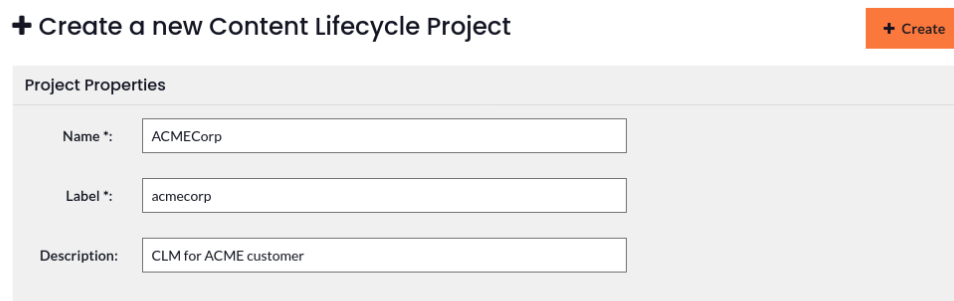
## 7.2 Building customer-specific content lifecycle management

Content lifecycle management (CLM) allows you to customize and test software before deploying to production systems. As an MSP, each of your customers may have different software needs, testing requirements, and deployment schedules. It can be quite challenging to manage CLM for all of your customers.

SUSE Manager provides the flexibility you need to define and manage content lifecycles for your business and your customers. You begin by creating customer-specific software channels. These are then assigned to appropriate, managed clients.

For example, suppose you have a customer called ACME Corp. You can create a Content Lifecycle Project only for this customer as follows:

1. In the SUSE Manager Web UI, navigate to *Content Lifecycle > Projects*.
2. Click *Create Project*
3. In the *Name* field, type a name for this project.
4. In the *Label* field, type the name that will be used internally.
5. In the *Description* field, you can add a more verbose explanation.



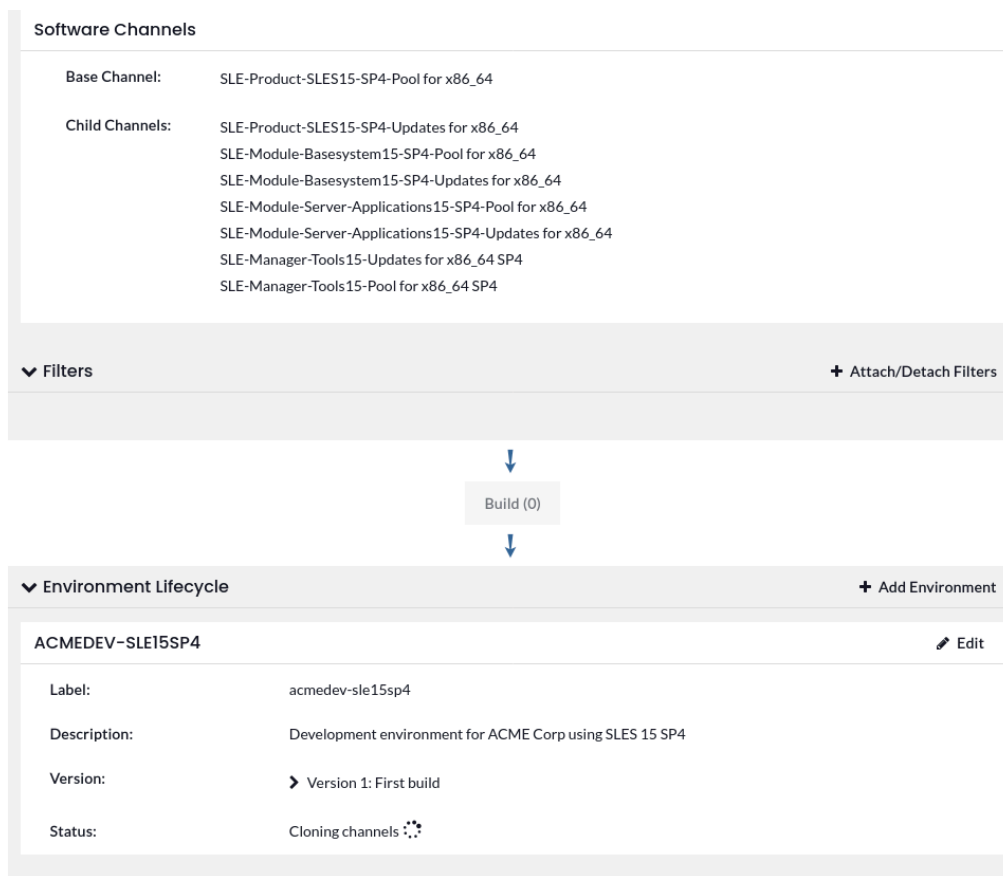
**+ Create a new Content Lifecycle Project** + Create

**Project Properties**

Name *	ACMECorp
Label *	acmecorp
Description:	CLM for ACME customer

You can now proceed to build the CLM for this customer in the usual manner by adding sources and environments in the usual manner. To learn more, see [Content Lifecycle Management \(https://documentation.suse.com/suma/4.3/en/suse-manager/administration/content-lifecycle.html\)](https://documentation.suse.com/suma/4.3/en/suse-manager/administration/content-lifecycle.html).





## 7.3 Exporting and importing content

After defining customer-specific channels as part of your content lifecycle management (CLM), use the `inter-server-sync` command to export these channels from the SUSE Manager hub to a directory. This directory and its contents needs to be transferred to the peripheral server. The easiest way to do this is to use a shared file system.

The example below shows how to export the development environment from the ACME Corp customer's CLM to an NFS file system mounted at `/mnt/shared` on the hub and peripheral servers.



### Note

Exporting can take considerable time to run and is very CPU intensive. It copies all of the required packages and creates all of the SQL commands needed to recreate the channel structure and contents on the importing server.

## 1. Export the CLM on the hub server.

- a. On the hub server command line, change to the shared directory.

```
cd /mnt/shared
```

- b. Initiate the export.

```
inter-server-sync export --channel-with-children acmecorp-acmedev-sle15sp4-sle-product-sles15-sp4-pool-x86_64
```



### Tip

The `inter-server-sync export` command outputs to the current directory by default. You could specify an output directory with the `--outputDir` flag. Get detailed help on the export command with `inter-server-sync export -h`.

- c. Verify that the export succeeded by viewing the contents of the directory.

```
ls -l
```

```
total 457384
-rw-r--r-- 1 root root      540 Jul 11 13:38 exportedChannels.txt
drwxr-x--- 1 root root        8 Jul 11 13:03 packages
-rw----- 1 root root 468349180 Jul 11 13:38 sql_statements.sql.gz
-rw-r--r-- 1 root root       44 Jul 11 13:38 version.txt
```

## 2. Import the CLM on the peripheral server.

- a. On the peripheral server command line, change to the shared directory.

```
cd /mnt/shared
```

- b. Initiate the import.

```
inter-server-sync import
```



### Tip

Get detailed help on the ISS import command with `inter-server-sync import -h`.



## Note

There is no need to specify channel names because that is implicit in the SQL statements. You simply need to refer to the directory that contains the exported content and, by default, that is the current directory.

## 8 Registering clients

Clients are the end-point systems you want to manage. SUSE Manager is compatible with a wide range of client technologies. For a full list supported clients and features, see [Supported Clients and Features \(https://documentation.suse.com/suma/4.3/en/suse-manager/client-configuration/supported-features.html\)](https://documentation.suse.com/suma/4.3/en/suse-manager/client-configuration/supported-features.html).

There are three ways to register clients to a SUSE Manager server:

- through the Web UI (<https://documentation.suse.com/suma/4.3/en/suse-manager/client-configuration/registration-webui.html>)
- with a bootstrap script (<https://documentation.suse.com/suma/4.3/en/suse-manager/client-configuration/registration-bootstrap.html>)
- on the command line (Salt) (<https://documentation.suse.com/suma/4.3/en/suse-manager/client-configuration/registration-bootstrap.html>)

For bootstrap and command line methods, you must first create an [activation key \(https://documentation.suse.com/suma/4.3/en/suse-manager/client-configuration/activation-keys.html\)](https://documentation.suse.com/suma/4.3/en/suse-manager/client-configuration/activation-keys.html).




## Important

For all methods, date and time on the client must be synchronized with the SUSE Manager server.

For details on client configuration, see the [Client Configuration Guide \(https://documentation.suse.com/suma/4.3/en/suse-manager/client-configuration/client-config-overview.html\)](https://documentation.suse.com/suma/4.3/en/suse-manager/client-configuration/client-config-overview.html).

## 9 Working with Salt modules and formulas

Salt is a remote execution engine, configuration management, and orchestration system used by SUSE Manager. Salt uses execution and state modules to define, apply, and orchestrate configuration of your devices. You use Salt states to manage users, system groups, activation keys, and so on.

SUSE Manager provides a set of modules called Uyuni configuration modules, that you can use to configure both SUSE Manager and [Uyuni \(https://www.uyuni-project.org/\)](https://www.uyuni-project.org/)  Servers. You can use the Uyuni configuration modules and create your own custom Salt State (SLS) files. Salt states are defined on the hub level and can be applied to the peripheral servers.



### Important

Activation keys make reference to channels, so you need to import appropriate content first.

You can use Uyuni configuration modules to configure:



- Organizations
- Users
- User permissions
- System groups
- Activation Keys

The Uyuni configuration modules are available in the `uyuni-config-modules` package. Install this package on the SUSE Manager hub server by logging in as root and issuing the command:

```
zypper in uyuni-config-modules
```

This package also installs detailed API descriptions, indications on pillar settings, and examples. You can find these in `/usr/share/doc/packages/uyuni-config-modules/`.

## 9.1 Understanding the Hub XMLRPC API namespaces

The Hub XMLRPC API (<https://documentation.suse.com/suma/4.3/en/suse-manager/specialized-guides/large-deployments/hub-namespaces.html>)  allows you to control all of the peripheral servers programmatically from the hub. It operates in a similar way to the standard SUSE Manager API (<https://documentation.suse.com/suma/4.3/api/suse-manager/index.html>) .

In *Section 3, “Creating the hub server”*, you installed the `hub-xmlrpc-api` package and enabled and started the service. With the service running, you can connect to it at port 2830 using any XMLRPC-compliant client libraries.


Verify that the service is running on your hub server.

```
systemctl status hub-xmlrpc-api.service
```

The Hub XMLRPC API exposes the same methods that are available from the server’s XMLRPC API, with a few differences in parameter and return types. Additionally, the Hub XMLRPC API supports some hub-specific end points which are not available in the SUSE Manager API.

The Hub XMLRPC API supports three different namespaces:

- The `hub` namespace is used to target the Hub XMLRPC API Server itself. It supports Hub-specific XMLRPC endpoints which are primarily related to authentication.
- The `unicast` namespace is used to target a single server registered in the hub. It redirects any call transparently to one specific server and returns any value as if the server’s XMLRPC API end point was used directly.
- The `multicast` namespace is used to target multiple peripheral servers registered in the hub. It redirects any call transparently to all the specified servers and returns the results in the form of a map.

See the *SUSE Manager documentation* (<https://documentation.suse.com/suma/4.3/en/suse-manager/index.html>)  for further details.

## 9.2 Reporting

Every SUSE Manager peripheral server has its own reporting (PostgreSQL) database, where information is collected for that server and its registered clients. The hub server aggregates and stores information collected from all the peripheral servers in its own reporting database. This gives you easy access to data from all clients under management.

SUSE Manager provides some preconfigured reports that you can leverage for a variety of tasks, such as taking inventory of subscribed systems, users, and organizations. You can also use an external reporting tool to create fully customized reports.



### Tip

Connect to an external reporting tool only through a user account with read-only permissions.

For more on reporting, see [Reports Generation \(https://documentation.suse.com/suma/4.3/en/suse-manager/administration/reports.html\)](https://documentation.suse.com/suma/4.3/en/suse-manager/administration/reports.html).


## 10 Summary

SUSE Manager is the enterprise, open source solution that helps you maintain control of your IT landscape. SUSE Manager provides systems asset management, systems provisioning, and automated software management to help you keep all your systems up-to-date and secure. Seamlessly manage a broad spectrum of Linux systems on a variety of hardware architectures, hypervisors, container, IoT, and cloud platforms. And easily scale your landscape to satisfy your technical and business requirements.

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