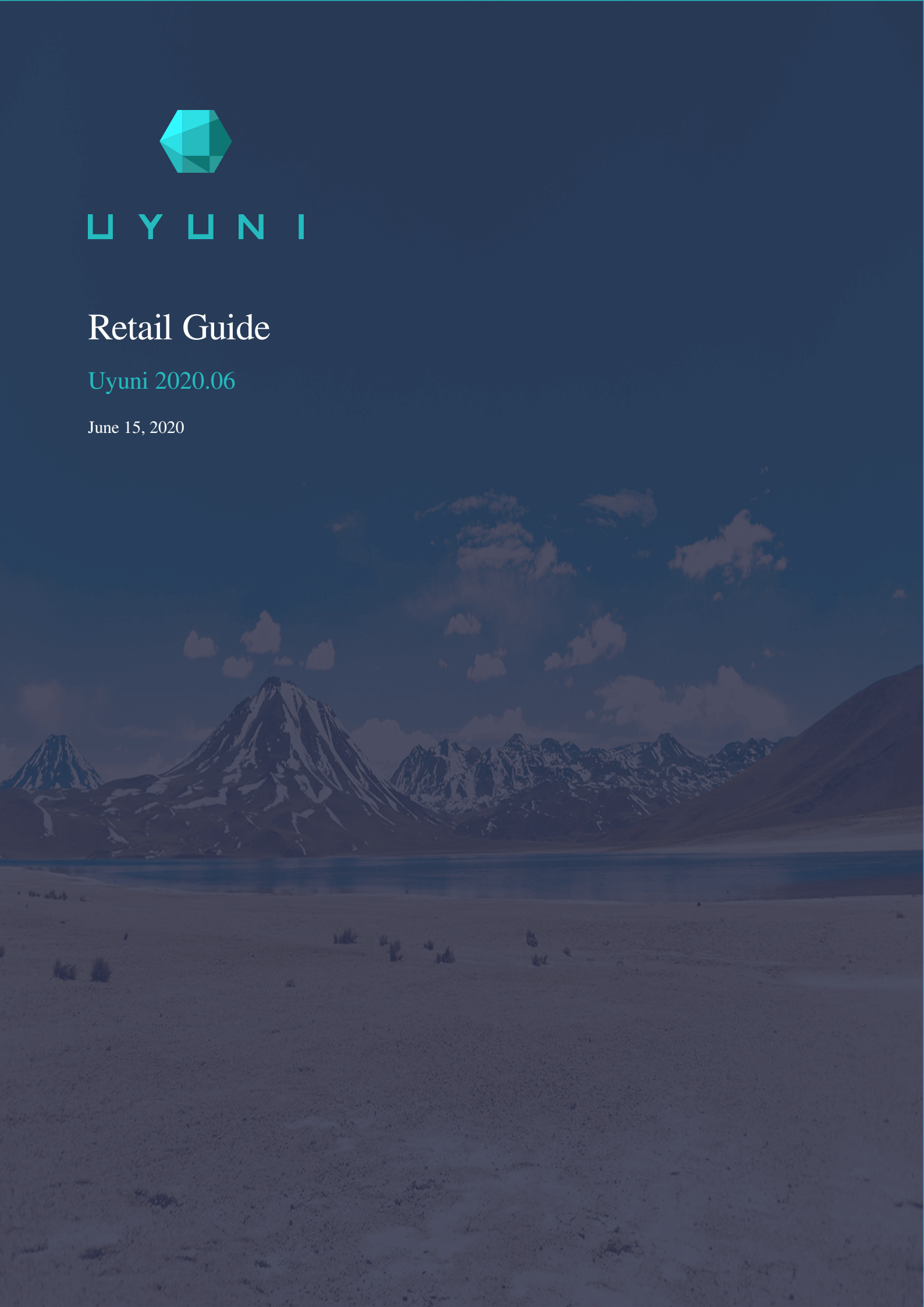

Retail Guide

Uyuni 2020.06

June 15, 2020

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Retail Guide

Publication Date: 2020-06-15

What is SUSE Manager for Retail?

SUSE Manager for Retail 2020.06 is an open source infrastructure management solution, optimized and tailored specifically for the retail industry. It uses the same technology as SUSE Manager, but is customized to address the needs of retail organizations.

SUSE Manager for Retail is designed for use in retail situations where customers can use point-of-service terminals to purchase or exchange goods, take part in promotions, or collect loyalty points. In addition to retail installations, it can also be used for novel purposes, such as maintaining student computers in an educational environment, or self-service kiosks in banks or hospitals.

SUSE Manager for Retail is intended for use in installations that include servers, workstations, point-of-service terminals, and other devices. It allows administrators to install, configure, and update the software on their servers, and manage the deployment and provisioning of point-of-service machines.

About this book

This document provides an overview of SUSE Manager for Retail, and guides you through initial installation and setup. It should be read in conjunction with the SUSE Manager documentation suite, available from https://documentation.suse.com/suma/4.0/.

For more information about managing your SUSE Manager for Retail environment, or to find out where to get help, see **[Retail › Retail-next ›]**.

Components

SUSE Manager for Retail is made up of various components. For more on how these components work together, see retail-network-arch.pdf.

The SUSE Manager Server

The SUSE Manager server contains information about infrastructure, network topology, and everything required to automate image deployment and perform day-to-day operations on branches and terminals. This can include database entries of registered systems, Salt pillar data for images, image assignments, partitioning, network setup, network services, and more.

Build Hosts

Build hosts can be arbitrary servers or virtual machines. They are used to securely build operating system images.

For more information on build hosts, see **[Administration › Image-management ›]**.

Branch Server

Branch servers should be physically located close to point-of-service terminals, such as in an individual store or branch office. Branch servers provide services for PXE boot, and act as an image cache, Salt broker, and proxy for software components (RPM packages). The branch server can also manage local networking, and provide DHCP and DNS services.

Point-of-Service Terminals

Point-of-Service (PoS) terminals can come in many different formats, such as point-of-sale terminals, kiosks, digital scales, self-service systems, and reverse-vending systems. Every terminal, however, is provided by a vendor, who set basic information about the device in the firmware. SUSE Manager for Retail accesses this vendor information to determine how best to work with the terminal in use.

In most cases, different terminals will require a different operating system (OS) image to ensure they work correctly. For example, an information kiosk has a high-resolution touchscreen, where a cashier terminal might only have a very basic display. While both of these terminals require similar processing and network functionality, they will require different OS images. The OS images ensure that the different display mechanisms work correctly.

The minimum memory requirement is 1 GB for hosts that need to run OS images built with Kiwi (PXE booted or not).

Hardware Requirements for PoS Terminals: . At least 1 GB of RAM. For more information, see the documentation of the underlying system (in this case: SUSE Linux Enterprise Server 12). . Disk space depending on the image size.

For more information on SUSE Manager for Retail PoS terminals, see documentation on SUSE Manager Salt clients ([**Client-configuration › Client-config-overview ›**]).

SUSE Manager for Retail supports PoS terminals that boot using both BIOS and UEFI. For UEFI booting terminals, you will need to configure the EFI partition in the Saltboot formula. For more information on EFI in the Saltboot formula, see **[Salt › Formula-saltboot ›]**.

Fitting It All Together

SUSE Manager for Retail uses the same technology as SUSE Manager, but is customized to address the needs of retail organizations.

Hardware Types

Because every environment is different, and can contain many different configurations of many different terminals, SUSE Manager for Retail uses hardware types to simplify device management.

Hardware types allow you to group devices according to manufacturer and device name. Then all devices of a particular type can be managed as one.

Branch System Groups

SUSE Manager for Retail uses system groups to organize the various devices in your environment.

Each branch requires a system group, containing a single branch server, and the PoS terminals associated with that server. Each system group is identified with a Branch ID. The Branch ID is used in formulas and scripts to automatically update the entire group.

Salt Formulas

SUSE Manager for Retail uses Salt formulas to help simplify configuration. Formulas are pre-written Salt states, that are used to configure your installation.

You can use formulas to apply configuration patterns to your hardware groups. SUSE Manager for Retail uses the Saltboot formula, which defines partitioning and OS images for terminals.

You can use default settings for formulas, or edit them to make them more specific to your environment.

For more information about formulas, see **[Retail › Retail-formulas-intro ›]**.

Saltboot

Saltboot is a collection of tools and processes that are used to bootstrap, deploy and validate SUSE Manager for Retail terminals.

Saltboot consists of:

- Initialization:

  The saltboot `initrd` is created during image building and is required for bootstrapping terminals.

- Saltboot state:

  The Salt state that contains the logic for the entire saltboot process.

- Partitioning pillars:

  The Salt pillar structure that describes how terminals are partitioned and what image is deployed on each terminal.

- Images and boot images pillars:

  When the image building feature in Uyuni successfully builds an image that contains the saltboot `initrd`, the image and boot image Salt pillars are created.

The saltboot process involves the Uyuni Server, a terminal running the saltboot `initrd`, and the branch server providing the saltboot services to the terminal.

For a detailed diagram explaining how the saltboot boot process works, see **[Retail › Retail-saltboot-diagram ›]**.

Installation

SUSE Manager for Retail and SUSE Manager for Retail Branch Server are installed using the SUSE Linux Enterprise Server Unified Installer.

Requirements

Before you install SUSE Manager for Retail, ensure your environment meets the minimum requirements. This section lists the requirements for a SUSE Manager for Retail installation. These requirements are in addition to the SUSE Manager requirements listed at **[Installation › General-requirements ›]**.

SUSE Manager for Retail is only supported on the x86_64 architecture.

Server Requirements

Table 1. Hardware Requirements for SUSE Manager Server

Hardware	Recommended
CPU	Minimum 4 dedicated 64-bit CPU cores
RAM:	*Test Server* Minimum 8 GB
	Base Installation Minimum 16 GB
	Production Server Minimum 32 GB
Disk Space:	`/` *(root)* 24 GB
	`/var/lib/pgsql` Minimum 50 GB
	`/srv` Minimum 50 GB
	`/var/spacewalk` Minimum 50 GB per SUSE product and 360 GB per Red Hat product

Branch Server Requirements

Table 2. Hardware Requirements for Branch Server

Hardware	Recommended
CPU	Minimum 2 dedicated 64-bit CPU cores
RAM:	*Test Server* Minimum 2 GB
	Production Server Minimum 8 GB
Disk Space:	`/` *(root)* Minimum 24 GB
	`/srv` Minimum 100 GB
	`/var/cache` Minimum 100 GB

Build Host Requirements

Table 3. Hardware Requirements for Build Host

Hardware	Recommended
CPU	Multi-core 64-bit CPU
RAM:	*Test Server* Minimum 2 GB
	Production Server Minimum 4 GB
Disk Space:	`/` *(root)* Minimum 24 GB
	`/var/lib/Kiwi` Minimum 10 GB

Network Requirements

- The SUSE Manager Server requires a reliable and fast WAN connection.
- The branch server requires a reliable WAN connection, to reach the SUSE Manager Server.
- If you are using a dedicated network, the branch server requires at least two network interfaces: one connected to the WAN with reachable SUSE Manager server, and one connected to the internal branch LAN.
- Terminals require a LAN connection to the branch server network.

POS Terminal UEFI Secure Booting Requirements

Secure boot from the network using UEFI PXE or UEFI HTTP is supported on both SUSE Linux Enterprise Server 12 and SUSE Linux Enterprise Server 15. Booting from a hard disk using UEFI Secure Boot is fully supported on SUSE Linux Enterprise Server 15 images only.

You cannot boot SUSE Linux Enterprise Server 12 images using UEFI secure boot from a hard disk. This is due to limitations with the legacy Kiwi service. You need to either disable UEFI secure boot, or upgrade your terminals to SUSE Linux Enterprise Server 15.

Install with the Unified Installer

SUSE Manager for Retail is a SUSE base product. This section describes how to install SUSE Manager for Retail from SUSE Linux Enterprise Server installation media with the Unified Installer.

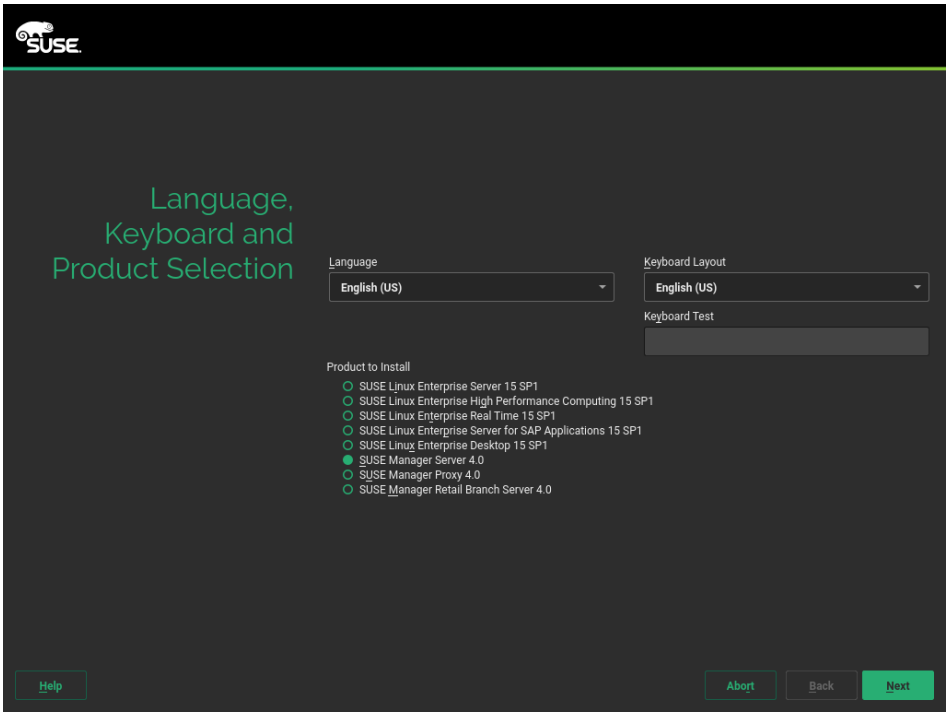
Before you begin the installation, check that your environment meets the requirements at **[Installation › General-requirements ›]**.

Install SUSE Manager for Retail

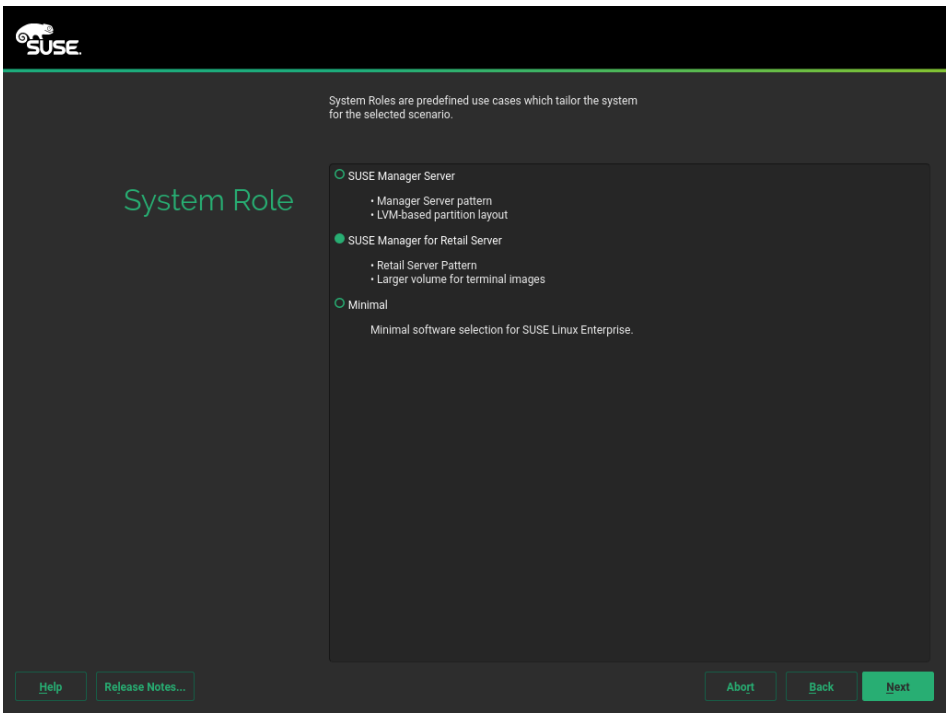
Procedure: Installing SUSE Manager for Retail Server from a DVD Image

1. Boot your server from the installation image. In case of trouble, you might need to adjust the boot order in the BIOS.

2. When prompted, select `Installation`.
3. In the `Language, Keyboard and Product Selection` screen, check the `SUSE Manager Server` checkbox, and click **[Next]**.



4. Read and agree to the End User Licence Agreement, and click **[Next]**.
5. In the `Registration` screen, check the `Register System via scc.suse.com` checkbox, enter your SUSE Customer Center credentials, and click **[Next]**.
6. OPTIONAL: In the `Add On Product` screen, select any additional or add-on products you require, and click **[Next]**.
7. In the `System Role` screen, check the `SUSE Manager for Retail Server` checkbox, and click **[Next]**.



8. In the `Suggested Partitioning` screen, accept the default values, or use the **[Guided Setup]** or **[Expert Partitioner]** options to customize your partitioning model, and click **[Next]**.
9. In the `Clock and Time Zone` screen, enter your region and timezone, and click **[Next]**.
10. In the `Local Users` screen, create a new user, and click **[Next]**.
11. In the `System Administrator "root"` screen, create the "root" user, and click **[Next]**.
12. In the `Installation Settings` screen ensure that SSH access is open. Review the settings and click **[Install]**.

Procedure: Running the Installation Script on the SUSE Manager Server

1. Use SSH to access the command prompt of the SUSE Manager Server.
2. Run the installation script:

```
yast susemanager_setup
```

3. Follow the prompts to set up your account. Take note of the passwords you set, you will need them later on.

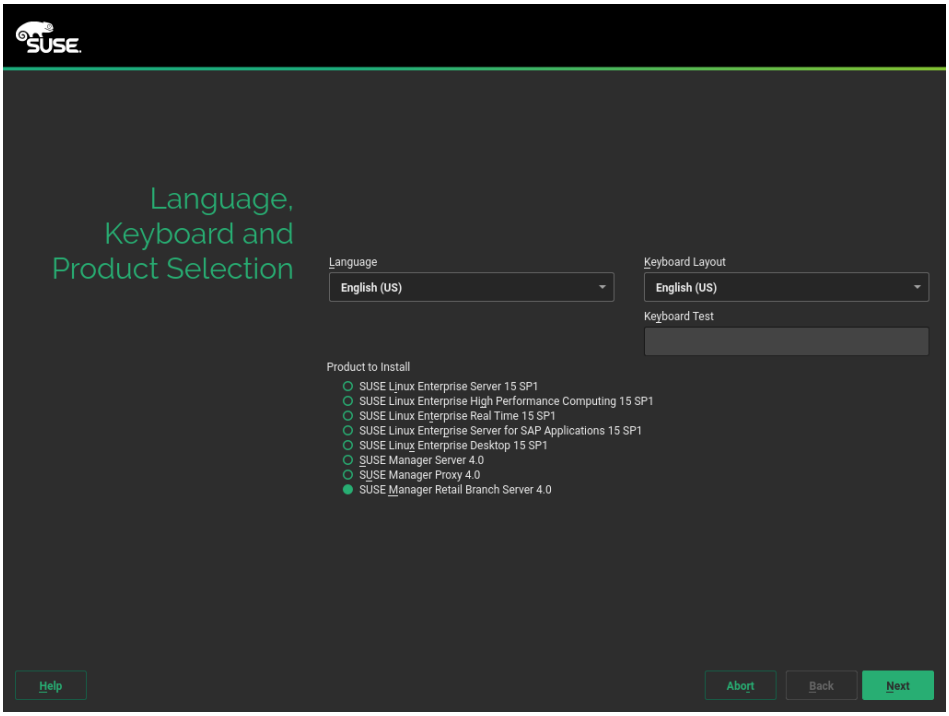
Continue with general SUSE Manager configuration and channel synchronization at **[Installation › Server-setup ›]**.

Install SUSE Manager for Retail Branch Server

Procedure: Installing the Branch Server from a DVD Image

1. Boot your server from the installation image. In case of trouble, you might need to adjust the boot order in the BIOS.

2. When prompted, select `Installation`.
3. In the `Language, Keyboard and Product Selection` screen, check the `SUSE Manager Retail Branch Server` checkbox, and click **[Next]**.



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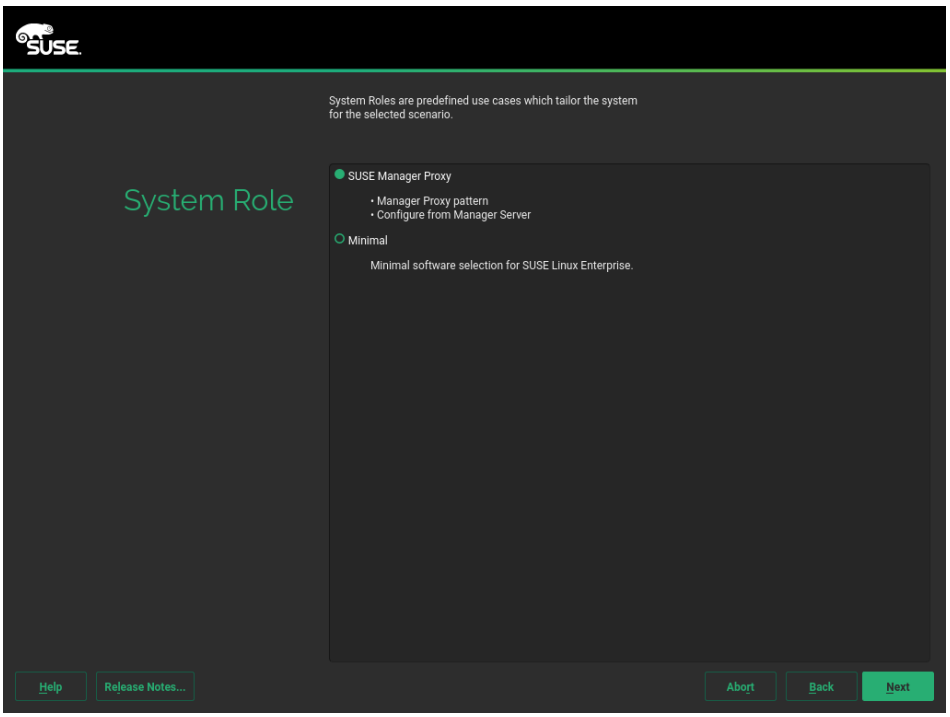
6. OPTIONAL: In the `Add On Product` screen, select any additional or add-on products you require, and click **[Next]**.
7. In the `System Role` screen, check the `SUSE Manager Proxy` checkbox, and click **[Next]**.



8. In the `Suggested Partitioning` screen, accept the default values, or use the **[Guided Setup]** or **[Expert Partitioner]** options to customize your partitioning model, and click **[Next]**.
9. In the `Clock and Time Zone` screen, enter your region and timezone, and click **[Next]**.
10. In the `Local Users` screen, create a new user, and click **[Next]**.
11. In the `System Administrator "root"` screen, create the "root" user, and click **[Next]**.
12. In the `Installation Settings` screen ensure that SSH access is open. Review the settings and click **[Install]**.

Procedure: Configuring and Registering the Branch Server

1. Create an activation key based on the `SLE-Product-SUSE-Manager-Retail-Branch-Server-4.1-Pool` base channel. For more information about activation keys, see **[Client-configuration › Clients-and-activation-keys ›]**.
2. In the `Child Channels` listing, select the recommended channels by clicking the `include recommended` icon:
    - SLE-Module-Basesystem15-SP2-Pool for x86_64 SMRBS 4.1
    - SLE-Module-Basesystem15-SP2-Updates for x86_64 SMRBS 4.1
    - SLE-Module-Server-Applications15-SP2-Pool for x86_64 SMRBS 4.1
    - SLE-Module-Server-Applications15-SP2-Updates for x86_64 SMRBS 4.1
    - SLE-Product-SUSE-Manager-Retail-Branch-Server-4.1-Updates for x86_64
3. Use this activation key in SUSE Manager Proxy registration at **[Installation › Proxy-registration ›]**.

Do not configure the branch server as a traditionally managed proxy. The branch server must be configured as a Salt client.

Cobbler TFTP is not currently supported on SUSE Manager for Retail. Do not configure the `susemanager-tftpsync-recv` tool on a SUSE Manager for Retail Branch Server.

Install SUSE Manager Build Host

Build hosts are regular SUSE Linux Enterprise Server installations registered to SUSE Manager as Salt minions. For more information how to install and register salt minions to SUSE Manager, see **[Client-configuration › Registration-overview ›]**.

For how to prepare a build host from an already registered Salt minion, see administration:image-management.pdf.

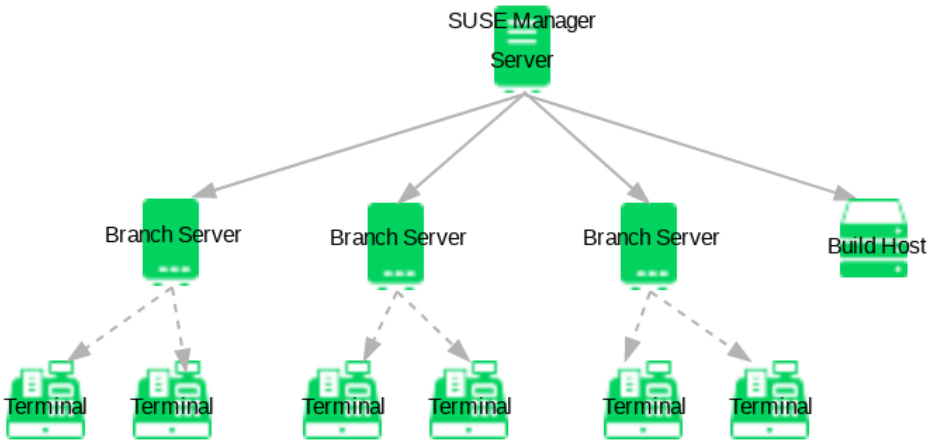
Supported base OS versions of SUSE Manager for Retail Build Hosts:

- SUSE Linux Enterprise Server12 SP3
- SUSE Linux Enterprise Server12 SP4
- SUSE Linux Enterprise Server11 SP3

Network Architecture

SUSE Manager for Retail uses a layered architecture:

- The first layer contains the SUSE Manager Server.
- The second layer contains one or more branch servers to provide local network and boot services. It also contains one or more build hosts.
- The final layer contains any number of deployed point-of-service terminals.



Branch servers should be physically located close to point-of-service terminals, such as in an individual store or branch office. We recommend you have a fast network connection between the branch server and its terminals. Branch servers provide services for PXE boot, and act as an image cache, Salt broker, and proxy for software components (RPM packages). The branch server can also manage local networking, and provide DHCP and DNS services.

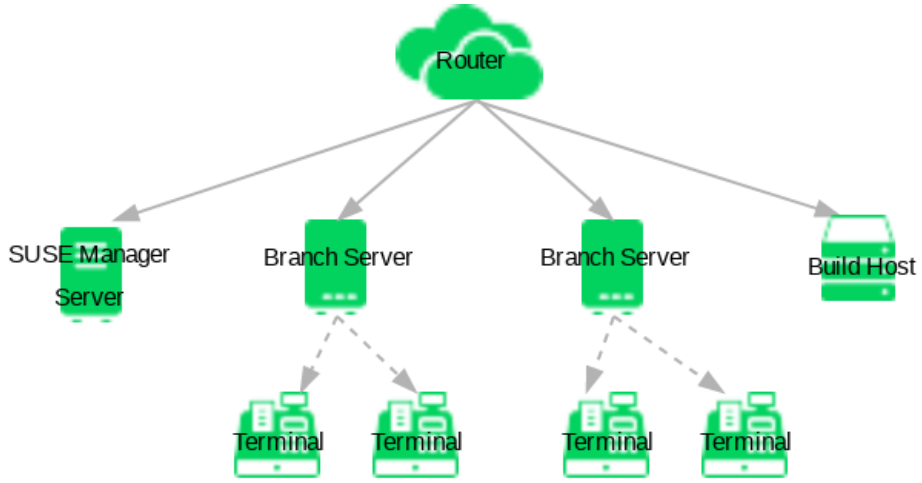
SUSE Manager for Retail Branch servers are implemented as enhanced SUSE Manager Proxy servers. For technical background information on SUSE Manager for Retail Branch servers, see also the documentation on SUSE Manager Proxy servers ([**Installation** › **Install-proxy-unified** ›]).

Branch Server Network Configuration

The branch server can operate in several different network configurations. The two most common configurations are a dedicated network, or a shared network.

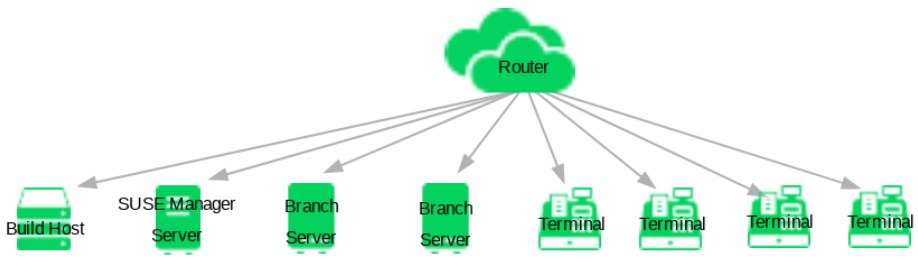
Dedicated Network Architecture

The branch server has a dedicated network interface card and terminals use an isolated internal branch network. In this configuration, the branch server manages the internal network and provides DHCP, DNS, PXE, FTP, and TFTP services.



Shared Network Architecture

The branch server and the terminals are connected to the same network as the SUSE Manager server. In this configuration, the branch server is not required to manage a network (DHCP and DNS services), but acts as a PXE boot server and provides FTP and TFTP services.



Setting up

To set up an SUSE Manager for Retail environment, you will need to have already installed and configured SUSE Manager Server, have one or more SUSE Manager for Retail branch server, and one or more SUSE Manager build host.

This section covers how to configure your SUSE Manager for Retail environment, including: * Prepare POS images * Configure services on the branch server * Synchronize POS images to the branch servers

The very first time you set up an SUSE Manager for Retail environment, you will need to perform all three steps. You will need to revisit some of these steps later on as you are working with SUSE Manager for Retail.

For example, the first time you configure the branch server, you will need to have images prepared for synchronization. If you are configuring more than one branch server, you can use the same images across different branch servers.

If you have an existing environment, and need to build new images, you do not need to re-initialize the branches. You will need to synchronize the images, and can skip setting up the services on the branch server.

Usually, POS images are rebuild when updated packages are available, and synchronized to the branch servers before the update window opens.

Prepare and Build Terminal Images

For information about SUSE Manager image building, see **[Administration › Image-management ›]**.

SUSE Manager for Retail POS images are images specifically tailored for SUSE Manager for Retail environment and designed to be deployed using PXE booting mechanism.

POS Image Templates

As starting point, SUSE provides basic templates at https://github.com/SUSE/manager-build-profiles/tree/master/OSImage. These templates need to be adapted for specific usecases, for example by including specific applications, configuration settings, and users.

By default, POS templates do not include a system user. You will not be able to login as a user to a system that has been installed with a SUSE provided template. However you can use Salt to manage clients without a system user. You can use Salt to install a system user after the terminal has been deployed.

SLES 11 SP 3 Terminals

POS Terminals based on SUSE Linux Enterprise Server 11 SP 3 can be deployed in much the same way as other terminals, with a few differences.

- You must use the SLES 11 template
- SLES 11 images need to be activated with the `SLES11 SP3 i586` and `SLEPOS 11 SP3 i586` channels

Ensure that SLES 11 images are built on the SLES 11 build host. Building on the incorrect build host will cause your build to fail.

If you are building images for SLES 11 using profiles from an HTTPS git repository that uses TLS 1.0 or greater, it will fail. SLES 11 does not support later versions of TLS. You will need to clone the repository locally in order to use it for building.

Configure Services on the Branch Server

Before you configure the branch server, ensure you have decided on networking topology, and know the minion ID of the branch server. For the information about the possible network topologies, see **[Retail › Retail-network-arch ›]**.

Configure branch server services from the SUSE Manager Server. The configuration is then applied to the selected branch server using Salt states. SUSE Manager Formulas with Forms functionality is used to configure branch server services, however there are multiple ways to configure them:

- SUSE Manager for Retail provided command line tool `retail_branch_init`
- SUSE Manager for Retail provided mass import command line tool `retail_yaml`
- SUSE Manager web UI and configuring formulas manually (for advanced users)

The branch server can be configured automatically using the `retail_branch_init` command, as shown in this section. If you prefer to manually configure the branch server, you can do so using formulas. For more information about formulas, see **[Retail › Retail-formulas-intro ›]**.

Procedure: Configuring Branch Server Formulas With a Helper Script

1. Branch server configuration is performed using the `retail_branch_init` command:

```
retail_branch_init <branch_server_minion_id>
```

   This command will configure branch server formulas with default values and for shared networking topology. For dedicated network topology run this command:

```
retail_branch_init <branch_server_minion_id> --dedicated-nic <network_device>
```

   You can customize network information as well, together with custom `branch prefix`. For example:

```
retail_branch_init <branch_server_minion_id> --dedicated-nic eth1
                                             --branch-prefix B001
                                             --server-domain <branch_server_subdomain>
                                             --branch-ip 192.168.86.1
                                             --netmask 255.255.255.0
```

You can use the `retail_branch_init --help` command for additional options.

2. Verify that your changes have been configured correctly by checking the SUSE Manager Web UI branch server system formulas.
3. Apply highstate on the branch server. You can do this through the Web UI, or by running this command:

```
salt <branch_server_minion_id> state.apply
```

Similar results can be achieved by using mass import command line tool.

Procedure: Configuring Branch Server Formulas With a Mass Import Tool

1. Prepare branch specific YAML file:

   For example, create branch.yaml file with content:

```
branches:
  <branch_server_minion_id>:
    branch_prefix: branch1
    server_name: branchserver1
    server_domain: example.com
    nic: eth1
    dedicated_nic: true
    configure_firewall: true
    branch_ip: 192.168.2.1
    netmask: 255.255.255.0
    dyn_range:
        - 192.168.2.10
        - 192.168.2.250
```

   For more information about mass import tool, see **[Retail › Retail-mass-config ›]**.

2. Import branch information from YAML file to SUSE Manager

```
retail_yaml --from-yaml branch.yaml
```

3. Verify that your changes have been configured correctly by checking the SUSE Manager Web UI branch server system formulas.
4. Apply highstate on the branch server.

Both `retail_branch_init` and `retail_yaml` commands override existing configuration settings of the specified branch server.

After the initial configuration done by command line tools, branch server configuration can be further adjusted in SUSE Manager Web UI through branch server formulas.

Required System Groups

SUSE Manager for Retail requires system groups for terminals and servers. Manually create these system groups during installation:

- `TERMINALS`
- `SERVERS`

Additionally, you will need to create a system group for each branch server, and each terminal hardware type in your environment. For more information about hardware type groups, see **[Retail › Retail-deploy-terminals ›]**.

Branch server groups are named after branch server prefixes, for example group name `B0001` for branch server prefix `B001`.

You can create system groups using the SUSE Manager Web UI. Navigate to **Systems › System Groups** and click **[Create System Group]**.

For more information about system groups, see **[Reference › Systems ›]**.

SUSE Manager for Retail command line tools create required system groups and branch group automatically.

Synchronize Images to the Branch Server

The OS image you use on the SUSE Manager server must be synchronized for use to the branch server. You can do this with the Salt `image-sync` state, part of the `Image Synchronization Formula`.

Procedure: Synchronizing Images to the Branch Server

1. On the SUSE Manager server, run this command:

```
salt <branch_server_minion_id> state.apply image-sync
```

2. The image details will be transferred to `/srv/saltboot` on the branch server.

You can also set synchronization to run automatically on the branch server. Configure the image synchronization formula to apply the highstate regularly. For more information about `Image Synchronization Formula`, see **[Salt › Formula-imagesync ›]**.

Deploy Terminals

When you have the SUSE Manager Server and Branch Server set up, you are ready to deploy point-of-service terminals by following these steps:

1. Create hardware type groups
2. Assign and configure the Saltboot formula for each hardware type group
3. Synchronize images to the branch server
4. Deploy images to the terminals

Each procedure is detailed in this section.

For other methods of booting terminals, including using a USB device, or booting over a wireless network, see **[Retail › Retail-deploy-terminals-other ›]**.

If you have many terminals, and would prefer this to be handled with a script, see **[Retail › Retail-mass-config ›]**.

Before terminals can be deployed, ensure you have prepared a Saltboot-based operating system image. For how to build OS images, see **[Administration › Image-management ›]**.

After you have registered new terminals, always check the SUSE Manager Web UI to ensure your terminals have connected successfully to the branch server, and not directly to the SUSE Manager Server by mistake.

Create A Hardware Type Group

Each terminal requires a specific hardware type, which contains information about the product name and terminal manufacturer. However, at the beginning, the SUSE Manager database does not have this information. To tell SUSE Manager what image to deploy on each terminal, you can set hardware type groups. After you have created your new hardware type group, you can apply the Saltboot formula to the group and configure it for your environment.

Hardware types allow you to group devices according to manufacturer and device name. Then, all devices of a particular type can be managed as one.

Empty profiles can be assigned to a hardware type group either before or after registration. If an empty profile is not assigned to a hardware type group before registration, it will be assigned to group that best matches the product information available to it.

For this procedure, you will require the system manufacturer name and product name for your terminal.

Procedure: Creating a Hardware Type Group

1. Determine the hardware type group name. Prefix the name with `HWTYPE:`, followed by the system manufacturer name and product name, separated by a hyphen. For example:

```
HWTYPE:POSVendor-Terminal1
```

2. In the SUSE Manager Web UI, navigate to **Systems › System Groups**, and click the **[Create Group]** button.
3. In the `Create System Group` dialog, create a new system group, using the hardware type group name you determined in step one of this procedure.

Only use colons, hyphens, or underscores in hardware type group names. Spaces and other non-alphanumeric characters will be removed when the name is processed.

Assign and Configure the Saltboot Formula for Each Hardware Type Group

Each hardware type group must have the Saltboot formula applied.

Procedure: Assigning the Saltboot Formula

1. Open the details page for your new hardware type group, and navigate to the `Formulas` tab.
2. Select the Saltboot formula and click **[Save]**.
3. Navigate to the **Formulas › Saltboot** tab.
4. Configure the Saltboot formula according to the instructions in **[Retail › Retail-formulas-intro ›]**.

Synchronize Images to the Branch Server

Procedure: Synchronizing Images to the Branch Server

1. On the SUSE Manager server, run this command:

```
salt <branch_server_salt_id> state.apply image-sync
```

Using a SUSE Linux Enterprise Server11 SP3 32-bit based images

If you have 32-bit machines included in your branch, then you must use a 32-bit boot image as a default boot image.

If 32-bit boot image is not used as a default boot image, 32-bit terminals will be unable to boot and operate properly.

You can check the available boot images and their architecture from the command line:

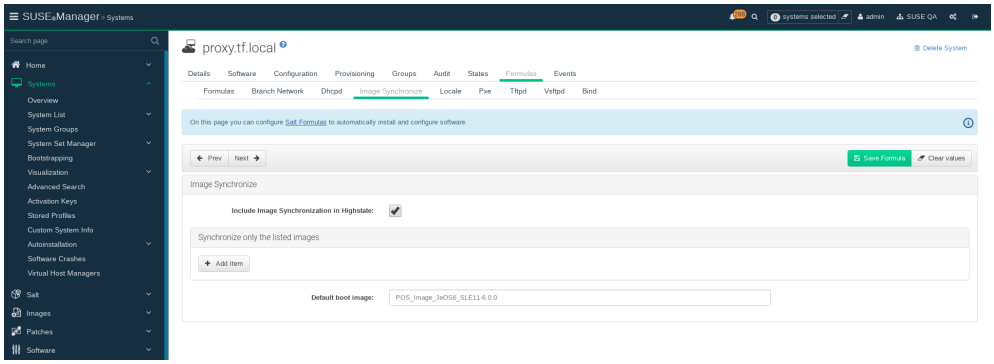
```
salt <branch_server_salt_id> pillar.item boot_images
```

Output:

```
POS_Image_JeOS6-6.0.0:
      ----------
      arch:
          x86_64
      ...
legacy-6.0.0:
      ----------
      arch:
          i686
```

In this example, the `legacy-6.0.0` boot image is 32-bit.

You can set the default boot image in the `Image Synchronization` formula on the branch server, by adding the chosen boot image name to the `Default boot image` field. For more information about `Image Synchronization` formula, see **[Salt › Formula-imagesync ›]**.



Deploy Images to the Terminals

When you have your bootstrap image ready, you can deploy the image to the terminals.

Procedure: Deploying Images to the Terminals

1. Power on your POS terminals.
2. The branch server will bootstrap the terminals according to the data you have provided.

Re-Deploy Images to the Terminals

You can instruct terminals to download and deploy images when they are restarted. This is achieved using a Salt state.

Procedure: Forcing a Terminal to Re-Deploy Images

1. On the Uyuni Server, at the command prompt, as root, apply this Salt state:

```
salt $terminal_minion_id state.apply saltboot.force_redeploy
```

2. Restart the terminal to pick up the changes.

If your terminal encounters a problem with the file system or the partition table, you might need to remove the partition table and reformat the terminal.

Re-partitioning a terminal removes all data stored on the terminal hard disk, including any persistent partitions.

Procedure: Forcing a Terminal to Repartition the Hard Disk

1. On the Uyuni Server, at the command prompt, as root, apply this Salt state:

```
salt $terminal_minion_id state.apply saltboot.force_repartition
```

2. Restart the terminal to pick up the changes.

Deploy Terminals - Other Methods

If you are not able to boot terminals from the network, you can create a live USB image and deploy terminals using a removable USB storage device. You can also bootstrap terminals across a wireless network.

After you have registered new terminals, always check the SUSE Manager Web UI to ensure your terminals have connected successfully to the branch server, and not directly to the SUSE Manager Server by mistake.

Deploy Terminals with a Removable USB Device

If you do not want to boot terminals from the network, you can create a live USB image and deploy terminals using a removable USB storage device. This is useful if you cannot boot your terminals from the network, or if you do not have a local SUSE Manager for Retail branch server providing network services.

You can prepare a bootable USB device with the image and tools required to deploy a POS terminal using a remote SUSE Manager for Retail branch server. POS devices booted using the USB device are assigned to the SUSE Manager for Retail branch server that created the USB device.

You can create the bootable USB device on the branch server directly, or on the SUSE Manager for Retail Server.

Procedure: Creating a Bootable USB Device

1. On the SUSE Manager for Retail branch server, at the command prompt, as root, create the POS image. You need to specify the size of the image, in megabytes. Ensure you allow at least 300 MB:

```
salt-call image_sync_usb.create <usb image name> <size in MB>
```

2. Insert the USB device into the SUSE Manager for Retail branch server machine, and copy the image to the new location:

```
dd bs=1M if=<usb image name> of=<path to usb device>
```

When you have the image on the USB drive, check that the terminals you want to deploy allow local booting. You can check this by editing the Saltboot formula in the SUSE Manager for Retail Web UI. For more information about the Saltboot formula, see **[Salt › Formula-saltboot ›]**.

Procedure: Deploying Images to the Terminals using USB

1. Insert the USB device into the terminal.
2. Power on the POS terminal.
3. Boot from the USB device to begin bootstrapping.

Bootstrap Terminals over a Wireless Network

For terminals that cannot be connected directly to the physical network, you can bootstrap them over a wireless network. Wireless networks do not support PXE booting, so you must perform the initial booting and initialization of the wireless connection on the terminal using a USB device.

For more information about using USB devices to boot, see **[Retail › Retail-deploy-terminals-other ›]**.

Bootstrapping across a wireless network could expose a security risk if you are using encrypted OS images. The boot `initrd` image and the partition that contains `/etc/salt` must be stored unencrypted on the terminal. This allows SUSE Manager for Retail to set up the wireless network. If this breaches your security requirements, you will need to use a separate production network, with network credentials managed by Salt, so that credentials are not stored on the terminal unencrypted.

Before you begin, you need to have created a bootable USB device. Ensure that the OS image you use to create the USB device has the `dracut-wireless` package included. For more information about using USB devices to boot, see **[Retail › Retail-deploy-terminals-other ›]**.

When you have created the USB device, you need to provide the wireless credentials to the terminal. You can do this in a number of ways:

- Directly during image build.
- Add it to the `initrd` file on the branch server.
- During terminal booting, using the kernel command line.

Procedure: Providing Wireless Credentials During Image Build

1. Ensure that the `dracut-wireless` package is included in the image template.
2. Set the wireless credentials by creating or editing the `etc/sysconfig/network/ifcfg-wlan0` file to the image template, with these details:

   ```
   # ALLOW_UPDATE_FROM_INITRD
   WIRELESS_ESSID=<wireless network name>
   WIRELESS_WPA_PSK=<wireless network password>
   ```

   If you want to use different credentials for bootstrapping to what is used during normal operation, you can remove the `ALLOW_UPDATE_FROM_INITRD` line.

3. Build the image.
4. Prepare a USB device using this image, and boot the terminal. For more information about using USB devices to boot, see **[Retail › Retail-deploy-terminals-other ›]**.

Procedure: Providing Wireless Credentials with initrd

1. Set the wireless credentials by creating or editing the `etc/sysconfig/network/ifcfg-wlan0` file, with these details:

```
# ALLOW_UPDATE_FROM_INITRD
WIRELESS_ESSID=<wireless network name>
WIRELESS_WPA_PSK=<wireless network password>
```

2. . Copy the file to `initrd` on the branch server:

```
echo ./etc/sysconfig/network/ifcfg-wlan0 | cpio -H newc -o | gzip >>
/srv/saltboot/boot/initrd.gz
```

3. Check that the terminals you want to deploy allow local booting. You can check this by editing the Saltboot formula in the SUSE Manager for Retail Web UI. For more information about the Saltboot formula, see **[Salt › Formula-saltboot ›]**.

Procedure: Providing Wireless Credentials During Terminal Boot

1. Mount the USB device on the terminal, and boot from it.
2. Append these commands to the kernel boot parameters:

```
WIRELESS_ESSID=<wireless_network_name>
WIRELESS_WPA_PSK=<wireless_network_password>
```

Change Wireless Credentials

After you have set the wireless credentials, you can change them as needed. The way to do this is different if you use one company-wide network, or if you have each branch server on its own separate network.

Procedure: Changing Wireless Credentials for Single Network

1. Rebuild the boot image with updated credentials.
2. Recreate the bootable USB device based on the new boot image.
3. Boot terminal from new USB device.

Procedure: Changing Wireless Credentials for Multiple Networks

1. In the `/srv/salt/` directory, create a salt state called `update-terminal-credentials.sls`, and enter the new wireless network credentials:

```
/etc/sysconfig/network/ifcfg-wlan0
  file.managed:
   - contents: |
       WIRELESS_ESSID=<wireless_network_name>
       WIRELESS_WPA_PSK=<wireless_network_password>
# regenerate initrd
  cmd.run:
  - name: 'mkinitrd'
```

2. Apply the Salt state to the terminal:

```
salt <terminal_salt_name> state.apply update-terminal-credentials
```

If you are using a separate network for the boot phase, the managed file might need to be renamed, or extended to `/etc/sysconfig/network/initrd-ifcfg-wlan0`.

Use Multiple Wireless Networks

You can configure terminals to use a different set of wireless credentials during the boot process, to what they use during normal operation.

If you provide wireless credentials using `initrd` files, you can create two different files, one for use during boot called `initrd-ifcfg-wlan0`, and the other for use during normal operation, called `ifcfg-wlan0`.

Alternatively, you can use custom Salt states to manage wireless credentials with `saltboot-hook`.

First of all, you need to set the wireless details for normal operation. This will become the default settings. Then you can specify a second Salt state with the wireless details for use during the boot procedure.

Procedure: Using Different Wireless Credentials for Production Network

1. Write a custom Salt state named `/srv/salt/saltboot_hook.sls` containing the wireless details for normal operation. This Salt state is applied by Saltboot after the system image is deployed.

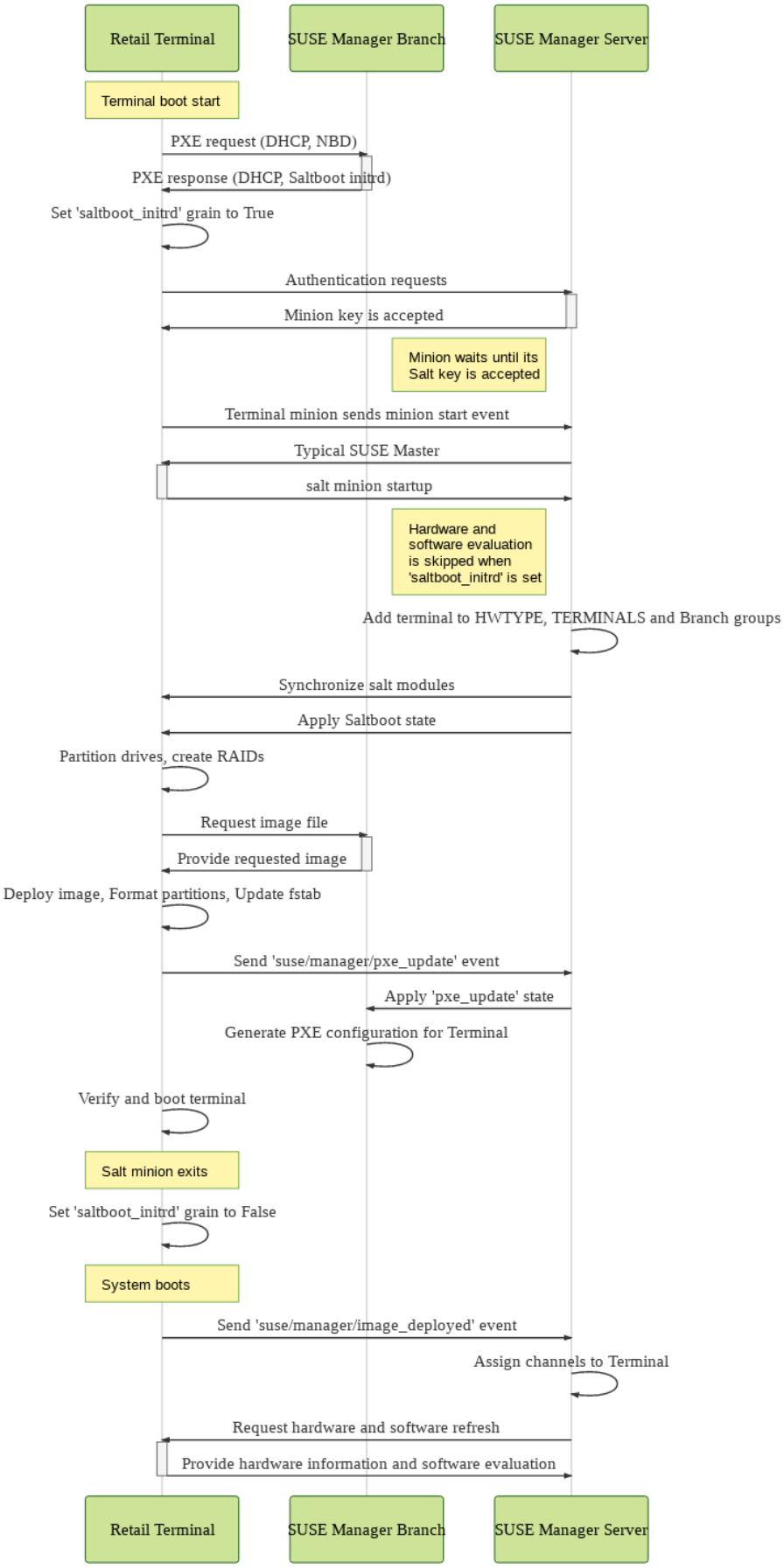
```
{% set root = salt['environ.get']('NEWROOT') %}
{{ root }}/etc/sysconfig/network/ifcfg-wlan0:
  file.managed:
   - contents: |
       WIRELESS_ESSID=<wireless_network_name>
       WIRELESS_WPA_PSK=<wireless_network_password>
    - require:
      - saltboot: saltboot_fstab
    - require_in:
      - saltboot: boot_system
```

The boot phase supports only WPA2 PSK wireless configuration. Salt-managed production configuration supports all features supported by all major operating systems.

Saltboot Diagram

The saltboot process involves the Uyuni Server, a terminal running the saltboot `initrd`, and the branch server providing the saltboot services to the terminal.

This sequence diagram explains how the three components interact with each other to boot a SUSE Manager for Retail terminal.


Retail Terminal
SUSE Manager Branch
SUSE Manager Server
Terminal boot start
PXE request (DHCP, NBD)
PXE response (DHCP, Saltboot initrd)
Set 'saltboot_initrd' grain to True
Authentication requests
Minion key is accepted
Minion waits until its Salt key is accepted
Terminal minion sends minion start event
Typical SUSE Master
salt minion startup
Hardware and software evaluation is skipped when 'saltboot_initrd' is set
Add terminal to HWTYPE, TERMINALS and Branch groups
Synchronize salt modules
Apply Saltboot state
Partition drives, create RAIDs
Request image file
Provide requested image
Deploy image, Format partitions, Update fstab
Send 'suse/manager/pxe_update' event
Apply 'pxe_update' state
Generate PXE configuration for Terminal
Verify and boot terminal
Salt minion exits
Set 'saltboot_initrd' grain to False
System boots
Send 'suse/manager/image_deployed' event
Assign channels to Terminal
Request hardware and software refresh
Provide hardware information and software evaluation
Retail Terminal
SUSE Manager Branch
SUSE Manager Server

Terminal Names

Terminals can be named according to certain parameters, which can make it easier to match the physical device with its record in the Uyuni Web UI.

Naming schemes available are `Hostname`, `FQDN`, and `HWType`. Naming scheme can be selected in the `Branch Network` formula. For more information, see **[Salt › Formula-branchnetwork ›]**.

By default, terminals are named according to the `Hostname` naming scheme with the `HWType` scheme as a fallback.

Naming by `HWType`

Terminal names that are derived from the hardware type use this format:

```
BranchID.Manufacturer-ProductName-SerialNumber-UniqueID
```

For example:

```
B002.TOSHIBA-6140100-41BA03X-c643
```

The `BranchID` is the unique identifier for the branch server that the terminal is connected to. You can configure this value in the **[Salt › Formula-branchnetwork ›]** settings for the branch server. You can disable this prefix by toggling the `Do not prefix salt client ID with Branch ID` checkbox in the **[Salt › Formula-branchnetwork ›]**.

The `Manufacturer`, `ProductName`, and `SerialNumber` are provided by the terminal hardware BIOS. If the terminal does not provide a serial number, it will be omitted from the terminal name.

The `UniqueID` is the first four characters of a generated machine identification number. Added unique ID is a requirement for successful terminal deployment. Without unique ID, subsequent terminal registration will fail.

Naming by `Hostname`

Terminal names that are derived from the hostname use this format:

```
BranchID.Hostname-UniqueID
```

For example:

```
B002.terminal-c643
```

The `BranchID` is the unique identifier for the branch server that the terminal is connected to. You can configure this value in the **[Salt › Formula-branchnetwork ›]** settings for the branch server. You can disable this prefix by toggling the `Do not prefix salt client ID with Branch ID` checkbox in the **[Salt › Formula-branchnetwork ›]**.

The `Hostname` is the plain hostname (without domain part) of the terminal.

The `UniqueID` is the first four characters of a generated machine identification number. You can disable this behaviour by toggling the `Do not append unique suffix to the salt client ID` checkbox in the **[Salt › Formula-branchnetwork ›]**.

Naming by `FQDN`

Terminal names that are derived from the Fully Qualified Domain Names (FQDN) use this format:

```
BranchID.FQDN-UniqueID
```

For example:

```
B002.terminal.example.com-c643
```

The `BranchID` is the unique identifier for the branch server that the terminal is connected to. You can configure this value in the **[Salt › Formula-branchnetwork ›]** settings for the branch server. You can disable this prefix by toggling the `Do not prefix salt client ID with Branch ID` checkbox in the **[Salt › Formula-branchnetwork ›]**.

The `FQDN` is the fully-qualified domain name of the terminal.

The `UniqueID` is the first four characters of a generated machine identification number. You can disable this behaviour by toggling the `Do not append unique suffix to the salt client ID` checkbox in the **[Salt › Formula-branchnetwork ›]**.

Assign Hostnames to Terminals

If you want terminal names to be derived from the hostname, you will need to ensure your terminals have a static hostname. This requires a static IP address to be able to resolve the static hostname.

There are a number of different ways to assign hostnames to terminals. This section describes how to do this when DNS and DHCP services are managed by the branch server.

Procedure: Assigning IP Address and Hostname with Formulas

1. In the DHCP formula settings, navigate to `Hosts with Static IP Address` and click **[Add Item]**. For more information on the DHCP formula, see **[Salt › Formula-dhcpd ›]**.
2. In the `Hostname` field, type the hostname of the branch server.

3. In the `IP Address` field, type the static IP address for the terminal. Ensure the IP address is within the range used by the branch server.
4. In the `Hardware Type and Address` field, type the hardware type and address in this format:

```
ethernet <terminal_MAC_address>
```

5. OPTIONAL: For multiple terminals, click **[Add Item]** and fill in the details for each terminal.
6. Click **[Save Formula]** to save the changes.
7. In the Bind formula settings, navigate to the A records of the appropriate non-reverse zone, and click **[Add Item]**. For more information on the bind formula, see **[Salt › Formula-bind ›]**.
8. In the `Hostname` field, type the hostname of the branch server.
9. In the `IP Address` field, type the static IP address you assigned to the terminal in the DHCP formula settings.
10. OPTIONAL: For multiple terminals, click **[Add Item]** and fill in the details for each terminal.
11. Click **[Save Formula]** to save the changes.
12. Apply the highstate on the branch server to apply the changes.

If the terminal was previously registered using a name based on the hardware type instead of the hostname, you will need to delete the previous registration. When you re-register the terminal, use the new terminal name.

Procedure: Assigning IP Address and Hostname with YAML

1. At the command prompt on the branch server, export a YAML configuration file:

```
retail_yaml --to-yaml retail.yaml
```

2. Open the YAML file and navigate to the end of the branch server section. Add a new `terminals` section if it does not already exist.
3. Add the IP address, MAC address, and hardware type for the terminal, using this format:

```
$hostname:
        IP: <IP_Address>
        hwAddress: <MAC_Address>
        hwtype: <HWTYPE_Group_name_without_HWTYPE:_prefix>
```

4. Import the modified YAML file:

```
retail_yaml --from-yaml retail.yaml
```

5. Apply the highstate on the branch server to apply the changes.

If the terminal was previously registered using a name based on the hardware type instead of the hostname, you will need to delete the previous registration. When you re-register the terminal, use the new terminal name.

For more information about using YAML configuration files, see **[Retail › Retail-mass-config ›]**.

Offline Use

If the Uyuni Server is offline, you can still perform some operations on the terminals. This is useful if the connection between the branch server and the Uyuni Server is unstable or has low bandwidth. This feature uses caching to perform updates.

Offline features and features relying on caching are available only for Uyuni Server 4.0 and above.

Offline Terminal Reboot

If the Uyuni Server is offline, and a terminal is rebooted, it will fall back to a previously installed image.

This will occur in these situations:

- If the Saltboot formula has not started within a specified time (default value is 60 seconds).
- If the terminal does not acknowledge that the Saltboot formula has started.
- If the root partition is specified on the kernel command line (handled by the PXE formula), is mountable (and is not encrypted), and contains `/etc/ImageVersion` (which is created by Kiwi).

You can adjust the timeout value by changing the `SALT_TIMEOUT` kernel parameter. The parameter is measured in seconds, and defaults to `60`.

```
SALT_TIMEOUT = 60
```

For more about kernel parameters, see **[Salt › Formula-pxe ›]**.

Cached Terminal Updates

If there is low bandwidth between the branch server and the terminal, or for optimization of terminal update process, POS images can be cached in advance on the terminal and the upgrade performed on the terminals later on.

This functionality requires the terminal to have a dedicated service partition. A service partition is a partition mounted as `/srv/saltboot`. This partition must be created before the system partition and large enough to store a POS image. To ensure that terminals will always have such a partition, use the

Saltboot formula for terminal hardware type to specify the partition details. For more information, see **[Salt › Formula-saltboot ›]**.

When the service partition is set up on the terminal, a POS image can be downloaded in advance by applying the `saltboot.cache_image` state:

```
salt $TERMINALID state.apply saltboot.cache_image
```

This can be done regularly to ensure that terminals always have an uptodate POS image downloaded.

When the terminal is rebooted and an uptodate POS image is found in the service partition, the terminal will automatically use this cached image for system redeployment.

Rate Limiting Terminals

Salt is able to run commands in parallel on a large number of terminals. This can potentially create heavy load on your infrastructure. You can use rate-limiting parameters to control the load in your environment.

For more information about rate limiting on terminals, see **[Salt › Salt-rate-limiting ›]**.

Troubleshooting

Sometimes when attempting to reboot a terminal after attempting to apply the Saltboot formula, the terminal will hang at the boot screen. This can be caused by a presence ping timeout value being set at a value that is too low. You can adjust the presence ping timeout value to fix this problem.

For more information about rate limiting on terminals, see **[Salt › Salt-rate-limiting ›]**.

Introduction to Retail Formulas

Formulas are pre-written Salt states, that are used to configure your SUSE Manager for Retail installation.

You can use the Uyuni Web UI to apply common Uyuni formulas. For the most commonly used formulas, see **[Salt › Formulas-intro ›]**.

All formulas must be accurately configured for your SUSE Manager for Retail installation to function correctly. If you are unsure of the correct formula configuration details, run the `retail_branch_init` command before you begin to create the recommended formula configuration. You can then manually edit the formulas as required.

Branch Server Formulas

Branch servers are configured using formulas. Formulas can be configured using SUSE Manager Web UI, or the SUSE Manager XMLRPC API. To fully configure SUSE Manager for Retail, these formulas need to be enabled and configured on the branch server:

- Branch network formula, see **[Salt › Formula-branchnetwork ›]**
- Bind formula, see **[Salt › Formula-bind ›]**
- DHCPD formula, see **[Salt › Formula-dhcpd ›]**
- PXE formula, see **[Salt › Formula-pxe ›]**
- TFTP formula, see **[Salt › Formula-tftpd ›]**
- VSFTP formula, see **[Salt › Formula-vsftpd ›]**

Optionally, you can also enable the image synchronization formula. For more information, see **[Salt › Formula-imagesync ›]**.

Badly configured formulas can result in the branch server failing to work as expected. Due to the generic nature of formulas it is difficult to do overall validation. We recommend that you configure the branch server using the SUSE Manager for Retail command line utilities, and use individual formula settings for further tuning if required. For more information, see **[Retail › Retail-install-setup ›]**.

If a formula uses the same name as an existing Salt state, the two names will collide, and could result in the formula being used instead of the state. Always check the names of states and formulas to avoid name collisions.

When you have made changes to your formula, ensure you apply the highstate. The highstate propagates your changes to the appropriate services.

Administration

This sections contains notes on administering your SUSE Manager for Retail installation. For general administration tasks, see the Uyuni documentation at https://documentation.suse.com/suma/4.0/.

Mass Configuration

Mass configuration is possible with branch servers and terminals.

Branch Server Mass Configuration

Branch servers are configured individually using formulas. If you are working in an environment with many branch servers, you might find it easier to configure branch servers automatically with a pre-defined configuration file, rather than configuring each one individually.

Before working with the mass configuration tool, back up the existing branch servers configuration.

The Mass configuration tool overwrites the existing configuration with data specified in the provided YAML file.

The Mass configuration tool does not support all possible formula configurations. Always make sure on a small sample, that the mass configuration tool can configure systems as expected.

Configure Multiple Branch Servers

Configuring multiple branch servers requires the `python-susemanager-retail` package, which is provided with SUSE Manager for Retail. Install the `python-susemanager-retail` package on the Uyuni server.

Procedure: Configuring Multiple Branch Servers

1. Create a YAML file describing the infrastructure you intend to install. For an example YAML file, see retail-mass-config-yaml.pdf.
2. On a clean SUSE Manager installation, import the YAML file you have created:

   ```
   retail_yaml --from-yaml filename.yaml
   ```

   See the `retail_yaml --help` output for additional options.
3. In the SUSE Manager Web UI, check that your systems are listed and displaying correctly, and the formulas you require are available.
4. Create activation keys for each of your branch servers, connect them using bootstrap, and configure them as proxy servers. For more information, see **[Retail › Retail-install-unified ›]**.

5. In the `States` tab, click **[Apply Highstate]** to deploy your configuration changes for each branch server.

If you need to change your configuration, you can edit the YAML file at any time, and use the `retail_yaml --from-yaml` command to upload the new configuration.

Use empty profiles together with activation keys to onboard all the systems of your infrastructure. Use an activation key to assign the channels listed in **[Retail › Retail-install-setup ›]**.

Terminal Mass Configuration

If you are working in an environment with many terminals, you might find it easier to configure the terminals automatically with a pre-defined configuration file, rather than configuring each terminal individually.

You will need to have your infrastructure planned out ahead of time, including the IP addresses, hostnames, and domain names of branch servers and terminals. You will also require the hardware (MAC) addresses of each terminal.

The settings specified in the configuration file cannot always be successfully applied. In cases where there is a conflict, Uyuni will ignore the request in the file. This is especially important when designating hostnames. You should always check that the details have been applied as expected after using this configuration method.

Configure Multiple Terminals

Procedure: Configuring Multiple Terminals

1. Create a YAML file describing the infrastructure you intend to install, specifying the hardware address for each terminal. For an example YAML file, see retail-mass-config-yaml.pdf.
2. On a clean Uyuni installation, import the YAML file you have created:

   ```
   retail_yaml --from-yaml filename.yaml
   ```

   See the `retail_yaml --help` output for additional options.
3. In the SUSE Manager Web UI, check that your systems are listed and displaying correctly, and the formulas you require are available.
4. Create activation keys for each of your branch servers, connect them using bootstrap, and configure them as proxy servers. For more information, see **[Retail › Retail-install-unified ›]**.
5. In the `States` tab, click **[Apply Highstate]** to deploy your configuration changes for each branch server.
6. Connect your terminals according to your infrastructure plan.

If you need to change your configuration, you can edit the YAML file at any time, and use the `retail_yaml --from-yaml` command to upload the new configuration.

Export Configuration to Mass Configuration File

If you already have a configuration that you would like to export to a YAML file, use:

```
retail_yaml --to-yaml filename.yaml
```

This can be a good way to create a basic mass configuration file. However, it is important to check the file before using it, because some mandatory configuration entries may be missing.

When you are designing your configuration and creating the YAML file, ensure the branch server ID matches the fully qualified hostname, and the Salt ID. If these do not match, the bootstrap script could fail.

Example YAML File for Mass Configuration

You can use the `retail_yaml` command to import configuration parameters from a manually prepared YAML file. This section contains YAML example file with comments.

Listing 1. Example: YAML Mass Terminal Configuration File

```
branches:
# there are 2 possible setups: with / without dedicated NIC
#
# with dedicated NIC
  branchserver1.branch1.cz:     # salt ID of branch server
    branch_prefix: branch1      # optional, default guessed from salt id
    server_name: branchserver1  # optional, default guessed from salt id
    server_domain: branch1.cz   # optional, default guessed from salt id
    nic: eth1                   # nic used for connecting terminals, default taken from hw
info in SUMA
    dedicated_nic: true         # set to true if the terminals are on separate network
    salt_cname: branchserver1.branch1.cz      # hostname of salt master / broker for
terminals, mandatory
    configure_firewall: true    # modify firewall configuration
    branch_ip: 192.168.2.1      # default for dedicated NIC: 192.168.1.1
    netmask: 255.255.255.0      # default for dedicated NIC: 255.255.255.0
    dyn_range:                  # default for dedicated NIC: 192.168.1.10 - 192.168.1.250
        - 192.168.2.10
        - 192.168.2.250
# without dedicated NIC
# the DHCP formula is not used, DHCP is typically provided by a router
# the network parameters can be autodetected if the machine is already connected to SUSE
Manager
  branchserver2.branch2.cz:     # salt ID of branch server
    branch_prefix: branch2      # optional, default guessed from salt id
    server_name: branchserver2  # optional, default guessed from salt id
    server_domain: branch2.cz   # optional, default guessed from salt id
    salt_cname: branchserver2.branch1.cz      # FQDN of salt master / broker for terminals,
mandatory
    branch_ip: 192.168.2.1      # optional, default taken from SUMA data if the machine is
registered
    netmask: 255.255.255.0      # optional, default taken from SUMA data if the machine is
registered
```

```
    exclude_formulas:           # optional, do not configure listed formulas
      - dhcp                    # without dedicated NIC the dhcp service is typically
provided by a router
    hwAddress: 11:22:33:44:55:66 # optional, required to connect pre-configured entry with
particular machine
                                 # during onboarding
    terminals:                      # configuration of static terminal entries
      hostname1:                    # hostname
        hwAddress: aa:aa:aa:bb:bb:bb # required as unique id of a terminal
        IP: 192.168.2.50            # required for static dhcp and dns entry
        saltboot:                   # optional, alternative 1: configure terminal-specific
pillar data
          partitioning:             # partitioning pillar as described in saltboot
documentation
            disk1:
              device: /dev/sda
              disklabel: msdos
              partitions:
                p1:
                  flags: swap
                  format: swap
                  size_MiB: 2000.0
                p2:
                  image: POS_Image_JeOS6
                  mountpoint: /
              type: DISK
      hostname2:                    # hostname
        hwAddress: aa:aa:aa:bb:bb:cc # required as unique id of a terminal
        IP: 192.168.2.51            # required for static dhcp and dns entry
        hwtype: IBMCORPORATION-4838910 # optional, alternative 2: assign the terminal to
hwtype group
        # if neither of hwtype nor saltboot is specified, a group is assigned according to
hwtype
        # reported by bios on the first boot
hwtypes:
  IBMCORPORATION-4838910:      # HWTYPE string (manufacturer-model) as returned by bios
    description: 4838-910       # freetext description
    saltboot:
      partitioning:             # partitioning pillar as described in saltboot documentation
        disk1:
          device: /dev/sda
          disklabel: msdos
          partitions:
            p1:
              flags: swap
              format: swap
              size_MiB: 1000.0
            p2:
              image: POS_Image_JeOS6
              mountpoint: /
          type: DISK
  TOSHIBA-6140100:
    description: HWTYPE:TOSHIBA-6140100
    saltboot:
      partitioning:
        disk1:
          device: /dev/sda
          disklabel: msdos
          partitions:
            p1:
              flags: swap
              format: swap
              size_MiB: 1000.0
            p2:
              image: POS_Image_JeOS6
              mountpoint: /
          type: DISK
```

Delta Images

If you have very large images that you need to synchronize to the branch server, you can use delta images to save network bandwidth.

A delta image contains only the differences between two regular images. If there are only a few changes between two images, the delta image can be very small. Synchronizing a delta image to the branch consumes less network bandwidth but it requires some extra hardware resources on the branch server to rebuild the installable image.

Building Delta Images

The `retail_create_delta` tool creates a delta image on the Uyuni server. The tool uses `xdelta3` internally.

Use the name and the version strings of the target and the source image as parameters to the command. The format of the parameters must be `<NAME>-<VERSION>` and they must correspond to the image names and versions available in the pillar. For example, if the pillar contains:

```
images:
  POS_Image_JeOS6:
    6.0.0:
      ...
    6.0.1:
      ...
  POS_Image_Graphical6:
    6.0.0:
      ...
```

Then the `retail_create_delta` command is:

```
retail_create_delta POS_Image_JeOS6-6.0.1 POS_Image_JeOS6-6.0.0
```

This command will generate the delta image between version 6.0.0 and version 6.0.1. The resulting delta file is saved in `/srv/www/os-images` and the corresponding pillar file in `/srv/susemanager/pillar_data/images/`.

Tuning Delta Generation

Performance tuning is possible with the `-B <VALUE>` option, which is passed to `xdelta3`. With higher values you achieve smaller deltas at the cost of higher memory requirements. For more information, see the `xdelta3` documentation (`man xdelta3`).

Image Synchronizing to the Branch Server

When an image is synchronized to the branch server, the `image-sync-formula` first checks whether the source image is available on the branch server. If the source image is available, the delta will be

downloaded to save network bandwidth.

Retail Migration

This section provides instructions for migrating SUSE Linux Enterprise Point of Service 11, SUSE Manager for Retail 3.1, or SUSE Manager for Retail 3.2 to SUSE Manager for Retail 4.1.

Before You Migrate

This document is intended to guide you through migration your SUSE Linux Enterprise Point of Service or older SUSE Manager for Retail installation (3.1 or 3.2) to the newest version of SUSE Manager for Retail.

This document is divided into scenarios. Pick the scenario that best suits your environment, and follow the instructions in that section to migrate your installation.

Ensure your existing installation is fully updated, and that you have performed a backup, before you begin your migration.

Prepare to Migrate from SUSE Linux Enterprise Point of Service

SUSE Linux Enterprise Point of Service cannot be upgraded directly to SUSE Manager for Retail, so the migration process requires you to perform some manual configuration. To assist you in the migration, as much information as possible about the existing hardware configuration and network infrastructure is recorded. Then this information is used for rebuilding the new SUSE Manager for Retail installation.

In some cases, this will require a lengthy downtime to perform the migration. If you are not able to manage downtime, you can install new servers and run them in parallel to the existing ones while you perform the migration. This is especially relevant for large installations.

It is possible to run a SLEPOS Admin server and a SUSE Manager server in parallel. In such a scenario, branches that have been migrated will run on the SUSE Manager server, while those that have not yet been migrated can continue to run on the SLEPOS Admin server. This includes all operations, such as adding new terminals, or building and deploying new images.

However, if you run network services (especially DHCP) on the branch servers, you will not be able to run both old and new branch servers in parallel on the same branch, because they can conflict with each other. This can result in multiple terminals having the same IP address, or terminals randomly assigned to different branch servers. If you need to migrate in this environment, and you want to configure a new branch server while the branch is still running on old infrastructure, make sure that the new branch server is not connected to the network with the terminals.

If your branch server does not provide DHCP services, you can configure the new one in parallel and, when you are ready, change the configuration of your DHCP server from the old to the new branch server.

Migrate SUSE Linux Enterprise Point of Service 11 to SUSE Manager for Retail

This section describes migrating from an existing SUSE Linux Enterprise Point of Service 11 installation to a new SUSE Manager installation. You can perform this migration all at once by creating a data dump in a single file, and then moving it to the new server.

Alternatively, you can perform the migration in stages by creating a data dump for each branch, and moving them to the new server one by one. Importing and deploying the converted data can also be done in one or multiple steps, depending on your environment.

Migration with Complete Data Dump

In this procedure, you create a single data dump in an XML file, convert it to YAML, and migrate it to the new infrastructure all at once.

1. Install a SUSE Manager for Retail server 2020.06. For more information, see **[Retail › Retail-install-unified ›]**.
2. On the SLEPOS Admin server export all the data stored in LDAP to an XML file. Run this command as an administrator:

   ```
   posAdmin --export --type xml --file dumpfile.xml
   ```

   The resulting `dumpfile.xml` file will contain global information, with parts about images, hardware and its partitioning, and the description of the branch servers with networking data, services, and attached terminals.

3. Move the XML file to the newly created SUSE Manager server, and convert it to YAML:

   ```
   retail_migration dumpfile.xml retail.yml
   ```

4. Review the generated YAML file (`retail.yml`) and adjust it as necessary. Consider `HWTYPE` group naming and image name and version changes in the partitioning data. Group names must not exceed the 56 character limit. You can shorten the names as needed, and the image names must match the images in SUSE Manager. The `--save-mapping` option can help you with this task.

   Also check whether there are duplicate MAC addresses of the terminals in the generated YAML file. Choose which entry you want to keep. If there are duplicate MAC addresses, importing the YAML file will fail.

SUSE Linux Enterprise Point of Service images will not be migrated. You must rebuild the images using the OS image building functionality. For more information about building images, see **[Administration › Image-management ›]**.

5. Import the complete data (YAML) with:

```
retail_yaml --from-yaml retail.yml
```

   You can see statistical data while importing. Then check the results in the Web UI. In **Main Menu › Systems › Systems › All**, find empty profiles, and in **Main Menu › Systems › Groups**, the groups for the hardware configuration, the branches, servers, and terminals.

To finalize the branch server migration, you must install the branch server machines as Salt clients and bootstrap them as proxies. For more information about proxy installation, see **[Retail › Retail-install ›]**. For more information about using an activation key to assign the required channels, see **[Retail › Retail-install-setup ›]**. After onboarded to SUSE Manager, the branch servers machines are connected with the empty profiles (by FQDN), and so they will get the Retail configuration.

After all the branches are migrated, shutdown and remove the old SLEPOS Admin Server.

Migration with Branch by Branch Data Dump

In this procedure, you migrate the SLEPOS infrastructure and the branches one by one, first exporting and then importing.

1. Install a SUSE Manager for Retail server 2020.06 For more information, see **[Retail › Retail-install-unified ›]**.
2. On every branch server:

```
posAdmin --export --type xml --file dumpfile.xml
```

   These dumps will contain only the LDAP data of the branch, and any global data.

3. Similarily, you can export the LDAP data of every branch if you run the command on the Admin server with the branch credentials explicitly specified:

```
posAdmin --export --type xml --file dumpfile.xml --user $branch_dn \
    --password $password
```

   For background information about SLEPOS branch server configuration, see https://documentation.suse.com/sle-pos/11-SP3/html/SLEPOS-guide/cha.slepos_branchserv.html.

4. Review the generated YAML file (`retail.yml`) and adjust it as necessary. Consider `HWTYPE` group naming and image name and version changes in the partitioning data. You can shorten the names as needed, and the image names must match the images in SUSE Manager. The `--save-mapping` option can help you with this task.

   Check whether there are duplicate MAC addresses of the terminals in the generated YAML file.

Choose which entry you want to keep. As long as there are duplicate MAC addresses, SUSE Manager will refuse importing the YAML file.

SUSE Linux Enterprise Point of Service images will not be migrated. You must rebuild the images using the OS image building functionality. For more information about building images, see **[Administration › Image-management ›]**.

The data can be imported branch by branch. For each branch perform the following steps:

1. Run the import command for one branch after the other:

   ```
   retail_yaml --from-yaml retail.yml --branch <branch_name>
   ```

   Repeat the command for every branch.

2. To finalize each branch server migration, you must install the branch server machine as a Salt-based client and bootstrap it as a proxy. For more information about proxy installation, see Installing and Registering. For more information about using an activation key to assign the required channels, see Configuring Server. After onboarded to SUSE Manager for Retail, the branch server machine is connected with the empty profile (by FQDN), and so it will get the Retail configuration.
3. Apply Highstate on the branch server; this will happen automatically if `Configuration File Deployment` is enabled.
4. Boot the terminals of the branch.

After all the branches are migrated, shut down and remove the old SLEPOS Admin Server.

Converting XML to YAML

When you perform a migration using one of the methods in this chapter, one of the steps takes the XML data dump file from SUSE Linux Enterprise Point of Service, and converts it to a YAML file for SUSE Manager for Retail. The tool that performs this conversion has additional features, which are outlined in this section.

To validate the XML file before conversion, and print any errors:

```
retail_migration dumpfile.xml
```

To write a mapping file called `map.yml`:

```
retail_migration dumpfile.xml  --save-mapping map.yml
```

The mapping file contains two dictionaries: . `images`, which maps old SUSE Linux Enterprise Point of

Service images to new images built in SUSE Manager. . `groups`, which maps legacy SUSE Linux Enterprise Point of Service `scCashRegister` objects to SUSE Manager `HWTYPE` groups. Group names must not exceed the 56 character limit.

The mapping file should be edited as required for your environment.

To perform a conversion using a mapping file:

```
retail_migration dumpfile.xml  retail.yml --mapping map.yml
```

If you are performing a branch-by-branch migration, the resulting `retail.yml` file will contain a new version of SUSE Linux Enterprise Point of Service LDAP data. If you want to preserve any global changes in your SUSE Manager for Retail settings, remove the `global` hardware types from the resulting `retail.yml` file before importing it. Alternatively, you can import `retail.yml` using this command to import only the new systems and groups defined in the file, and leave any existing configuration settings untouched:

```
retail_yaml --only-new
```

Upgrade SUSE Manager for Retail Branch Server

This section describes upgrading a SUSE Manager for Retail Branch Server to the next SP (service pack).

SUSE Manager for Retail Branch Server is a client system such as a Uyuni Proxy with additional SUSE Manager for Retail features.

Upgrade the Uyuni Server before starting the SUSE Manager for Retail upgrade.

Procedure: Upgrading the SUSE Manager for Retail Branch Server

1. For general information about upgrading a proxy client, see **[Upgrade › Proxy-intro ›]**.
2. After the proxy upgrade is complete, apply the highstate on the SUSE Manager for Retail Branch Server. When applying the highstate, the retail functionality will also be updated.

What Next?

This document covers only a sub-section of information about your SUSE Manager for Retail installation. If you need further information or support, try one of these options.

More Documentation

For SUSE Manager documentation, visit https://documentation.suse.com/suma/4.0/.

For legacy SUSE Linux Enterprise Point of Service documentation, see https://documentation.suse.com/sle-pos/11-SP3/. For legacy SUSE Manager for Retail documentation, see https://documentation.suse.com/suma-retail/3.2/. Note, however, that SUSE Manager for Retail documentation supersedes this information.

Support

For personalized support, log in to your SUSE Customer Center account at https://scc.suse.com/login.

For assistance with planning and installing your SUSE Manager for Retail environment, contact the SUSE Consulting team.