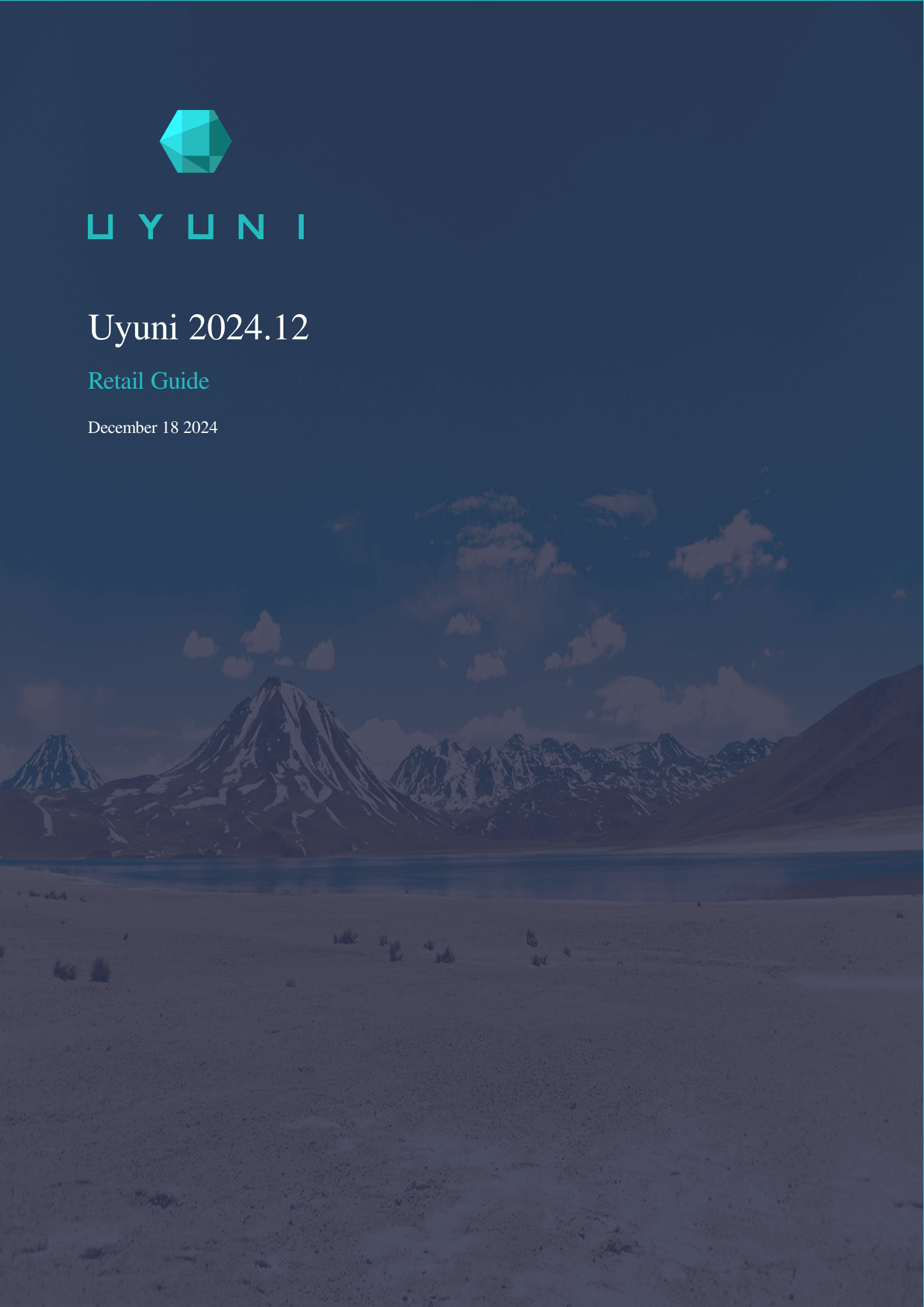

Uyuni 2024.12

Retail Guide

December 18 2024

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Retail Guide Overview

Updated: 2024-12-18

Uyuni for Retail 2024.12 is an open source infrastructure management solution, optimized and tailored specifically for the retail industry. It uses the same technology as Uyuni, but is customized to address the needs of retail organizations.

Uyuni 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 other purposes, such as maintaining student computers in an educational environment, or self-service kiosks in banks or hospitals.

Uyuni 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.

This guide provides an overview of Uyuni for Retail, and its initial installation and setup.

It should be read in conjunction with the Uyuni documentation suite, available from https://www.uyuni-project.org/uyuni-docs.

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

Chapter 1. Components

Uyuni for Retail is made up of various components. For more on how these components work together, see **Retail › Retail-network-arch**.

1.1. The Uyuni Server

The Uyuni 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.

1.2. 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**.

1.3. Branch Servers

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.

- For monitoring, you can install Prometheus server on the Branch servers.
- For visualization and analysis, you can install Grafana with multiple data sources on a dedicated host. For more information about Prometheus and Grafana, see **Administration › Monitoring**.

1.4. 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. Uyuni 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.

Uyuni 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 **Specialized-guides › Salt**.

1.5. Fitting It All Together

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

1.5.1. Hardware Types

Because every environment is different, and can contain many different configurations of many different terminals, Uyuni 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.

1.5.2. Branch System Groups

Uyuni 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.

1.5.3. Salt Formulas

Uyuni 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. Uyuni 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**.

1.5.4. Saltboot

Saltboot is a collection of tools and processes that are used to bootstrap, deploy and validate Uyuni 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**.

Chapter 2. Retail Requirements

Before you install Uyuni for Retail, ensure your environment meets the minimum requirements. This section lists the requirements for the Uyuni for Retail installation. These requirements are in addition to the Uyuni requirements listed at **Installation-and-upgrade › General-requirements**.

Uyuni for Retail is tested on x86-64 architecture.

2.1. Server Requirements

Table 1. Hardware Requirements for Uyuni 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

2.2. 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

2.3. 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

2.4. Network Requirements

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

2.5. POS Terminal Requirements

Table 4. Hardware Requirements for Terminals

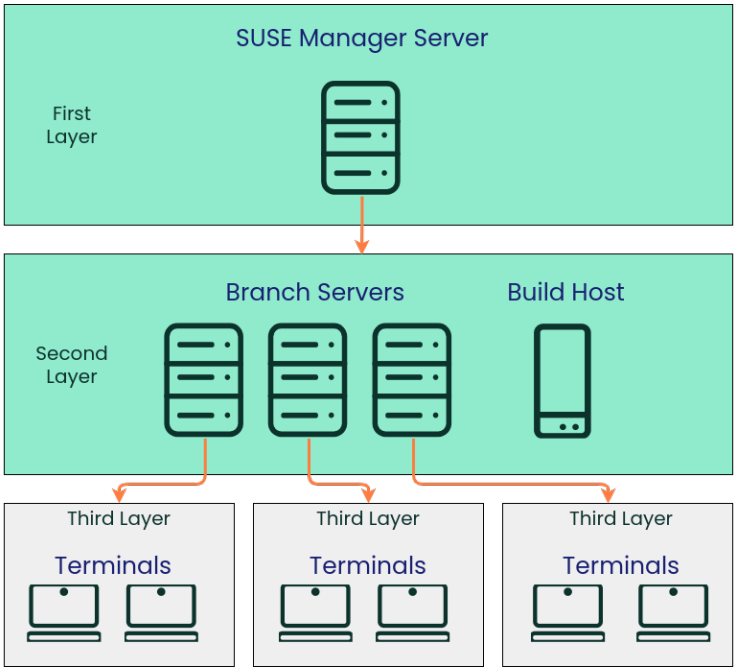
Hardware	Recommended
RAM:	Minimum 1 GB for hosts that need to run OS images built with Kiwi (PXE booted or not)
Disk Space:	Disk space depends on size of the OS image

For more information on Uyuni for Retail POS terminals, see documentation on Uyuni Salt clients (**Client-configuration › Client-config-overview**).

Chapter 3. Network Architecture

Uyuni for Retail uses a layered architecture:

- The first layer contains the Uyuni 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 servers can also manage local networking, and provide DHCP and DNS services.

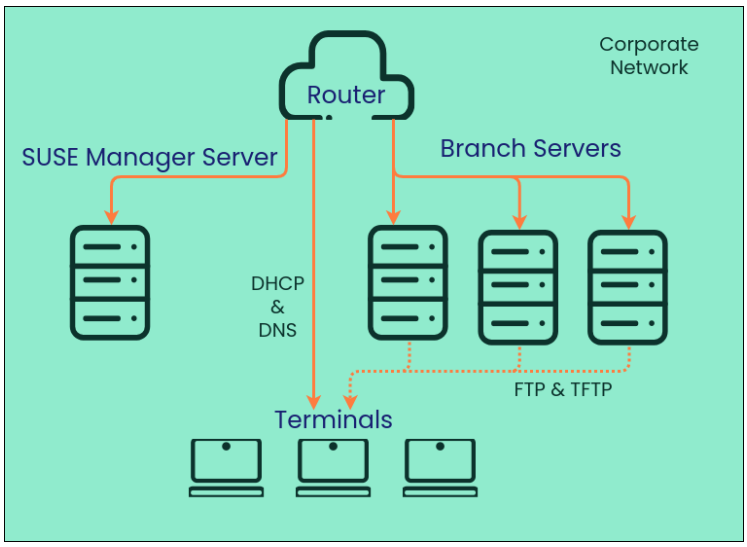
Uyuni for Retail Branch Servers are implemented as enhanced Uyuni Proxies. For technical background information on Uyuni Proxies, see **Installation-and-upgrade › Container-deployment**.

3.1. Branch Server Network Configuration

You can use branch servers in different network configurations, depending on your installation requirements.

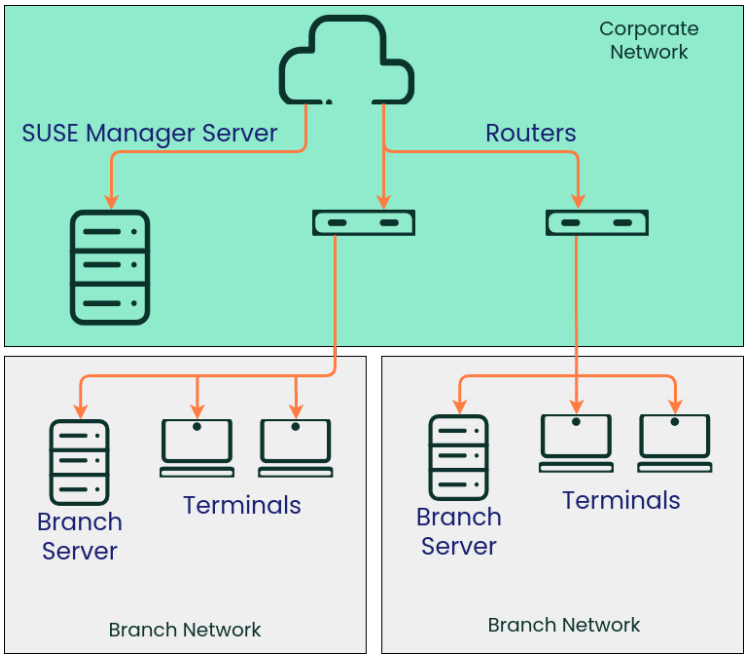
3.1.1. Shared Network Architecture

The branch server and the terminals are connected to the same network as the Uyuni Server. In this configuration, external routers provide DHCP and DNS services to the branch servers and the terminals, and the branch server provides PXE, HTTP and TFTP services to the terminals in their branch network.



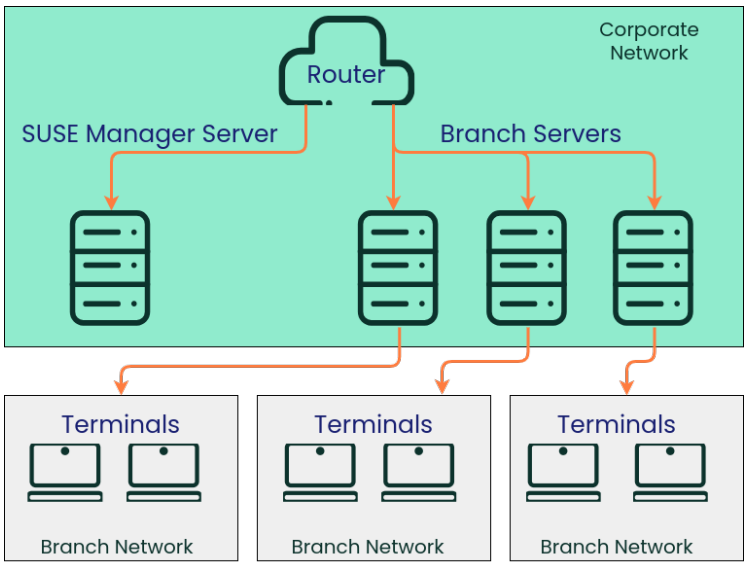
3.1.2. Externally Managed Dedicated Network Architecture

The branch servers are in separate branch networks, along with the terminals they manage. In this configuration, external routers provide DHCP and DNS services to the branch servers and the terminals, and the branch server provides proxy, PXE, HTTP and TFTP services to the terminals in their branch network.



3.1.3. Dedicated Network Architecture (using 4.3 branch server)

The branch servers are in the same network as the Uyuni Server, and terminals use an isolated branch network. In this configuration, the branch servers are in the corporate network, and provide all DHCP, DNS, PXE, HTTP and TFTP services to the terminals in the branch networks.


Corporate
Network
Router
SUSE Manager Server
Branch Servers
Terminals
Branch Network
Terminals
Branch Network
Terminals
Branch Network

Chapter 4. Retail Installation

Uyuni Retail Server and Uyuni Retail Branch Server are already part of Uyuni Server and Proxy containers.

4.1. Install Uyuni Retail Server with openSUSE

Uyuni for Retail Server can be installed on openSUSE.

For general requirements, see **Installation-and-upgrade › Uyuni-install-requirements**.

For more information about the latest version and updates of openSUSE Leap, see https://doc.opensuse.org/release-notes/.

4.1.1. Install Uyuni on openSUSE Leap

You install Uyuni as an add-on to openSUSE Leap.

Procedure: Installing Uyuni on openSUSE Leap

1. As the base system, install openSUSE Leap with all available service packs and package updates applied.
2. Configure a resolvable fully qualified domain name (FQDN) with **yast › System › Network Settings › Hostname/DNS**.
3. Set variables to use to create repository:

```
repo=repositories/systemsmanagement:/
repo=${repo}Uyuni:/Stable/images/repo/Uyuni-Server-POOL-x86_64-Media1/
```

4. Add the repository for installing the Uyuni Server software as `root`:

```
zypper ar https://download.opensuse.org/$repo uyuni-server-stable
```

5. Refresh metadata from the repositories as `root`, and confirm the import of new GPG key into the keyring:

```
zypper ref
```

6. Install the pattern for the Uyuni Server as `root`:

```
zypper in patterns-uyuni_server
```

7. Install the pattern for the Uyuni for Retail product as `root`:

```
zypper in patterns-uyuni_retail
```

8. Reboot the Uyuni for Retail Server.

Continue with the server setup as described in **Installation-and-upgrade › Uyuni-server-setup**.

4.2. Retail Uyuni Server Setup

This section covers Uyuni for Retail Server setup, using these procedures:

- Set up Uyuni with YaST
- Create the main administration account
- Add Software Channels
- Check Synchronization Status
- Trust GPG Keys on Clients
- Register the Branch Server and Terminals as Clients

4.2.1. Set up Uyuni with YaST

This section guides you through Uyuni setup procedures.

Procedure: Uyuni Setup

1. On the Uyuni Server, at the command prompt, as root, start YaST:

```
yast2
```

2. Navigate to **Network Services › Uyuni Setup** to begin set up.
3. From the introduction screen, select **Uyuni Setup › Set up Uyuni from scratch** and click [Next] to continue.
4. Type an email address to receive status notifications and click [Next] to continue. Uyuni can sometimes send a large volume of notification emails. You can disable email notifications in the Web UI after setup, if you need to.
5. Type your certificate information and provide a password. Passwords must be at at least seven characters in length, and must not contain spaces, single or double quotation marks (' or "), exclamation marks (!), or dollar signs ($). Always store your passwords in a secure location. You must have the certificate password to set up the Uyuni Proxy.

```
Click btn:[Next] to continue.
```

6. Navigate to **Uyuni Setup › Database Settings** screen, type a database username and password, and click [Next] to continue. Passwords must be at at least seven characters in length, and must

not contain spaces, single or double quotation marks (' or "), exclamation marks (!), or dollar signs ($). Always store your passwords in a secure location.

```
Click btn:[Next] to continue.
```

7. Click [Yes] to begin the setup process.
8. When setup is complete, click [Next] to continue. Take note of the address to access the Uyuni Web UI.
9. Click [Finish] to complete Uyuni setup.

4.2.2. Create the Main Administration Account

This section covers how to create your organization's main administration account for Uyuni.

The main administration account has the highest authority within Uyuni. Ensure you keep access information for this account secure. We recommend that you create lower level administration accounts for organizations and groups. Do not share the main administration access details.

Procedure: Setting Up the Main Administration Account

1. In your web browser, enter the address for the Uyuni Web UI. This address was provided after you completed setup. For more information, see retail:retail-uyuni-server-setup.pdf.
2. Sign in to the Web UI, navigate to the **Create Organization › Organization Name** field, and enter your organization name.
3. In the **Create Organization › Desired Login** and **Create Organization › Desired Password** fields, enter your username and password.
4. Complete the `Account Information` fields, including an email for system notifications.
5. Click [Create Organization] to finish creating your administration account.

When you have completed the Uyuni Web UI setup, you are taken to the **Home › Overview** page.

4.3. Retail Uyuni Branch Server

This section covers Uyuni for Retail Branch Server installation and setup, using these procedures:

- Add Software Channels
- Check Synchronization Status
- Trust GPG Keys on Clients
- Register the Branch Server and Terminals as Clients

The Uyuni for Retail Branch Server is a Uyuni Proxy with additional Retail features. For proxy installation procedures, see **Installation-and-upgrade › Container-deployment**.

Then continue with the following sections.

4.3.1. Add Software Channels

Before you register Uyuni branch servers and terminals to your Uyuni Server, check that you have the openSUSE product enabled, and the required channels are fully synchronized.

The products you need for this procedure are:

Table 5. openSUSE Channels - CLI

OS Version	**openSUSE Leap 15.4**
Base Channel	opensuse_leap15_4
Client Channel	opensuse_leap15_4-uyuni-client
Updates Channel	opensuse_leap15_4-updates
Non-OSS Channel	opensuse_leap15_4-non-oss
Non-OSS Updates Channel	opensuse_leap15_4-non-oss-updates
Backports Updates Channel	opensuse_leap15_4-backports-updates
SLE Updates Channel	opensuse_leap15_4-sle-updates

Procedure: Adding Software Channels at the Command Prompt

1. At the command prompt on the Uyuni Server, as root, use the `spacewalk-common-channels` command to add the appropriate channels:

```
spacewalk-common-channels \
<base_channel_name> \
<child_channel_name_1> \
<child_channel_name_2> \
... <child_channel_name_n>
```

2. Synchronize the channels:

```
mgr-sync refresh --refresh-channels
```

4.3.2. Check Synchronization Status

Procedure: Checking Synchronization Progress

1. In the Uyuni Web UI, navigate to **Software** › **Manage** › **Channels**, then click the channel associated to the repository.
2. Navigate to the `Repositories` tab, then click `Sync` and check `Sync Status`.

Procedure: Checking Synchronization Progress from the Command Prompt

1. At the command prompt on the Uyuni Server, as root, use the `tail` command to check the synchronization log file:

```
tail -f /var/log/rhn/reposync/<channel-label>.log
```

2. Each child channel generates its own log during the synchronization progress. You will need to check all the base and child channel log files to be sure that the synchronization is complete.

openSUSE channels can be very large. Synchronization can sometimes take several hours.

4.3.3. Trust GPG Keys on Clients

By default, some operating systems do not trust the GPG key for the Uyuni client tools. The clients can be successfully bootstrapped without the GPG key being trusted. However, you will not be able to install new client tool packages or update them until the keys are trusted.

Procedure: Trusting GPG Keys on Clients

1. On the Uyuni Server, at the command prompt, check the contents of the `/srv/www/htdocs/pub/` directory. This directory contains all available public keys. Take a note of the key that applies to the client you are registering.
2. Open the relevant bootstrap script, locate the `ORG_GPG_KEY=` parameter and add the required key. You do not need to delete any previously stored keys. For example:

```
uyuni-gpg-pubkey-0d20833e.key
```

3. If you are bootstrapping clients from the Uyuni Web UI, you will need to use a Salt state to trust the key. Create the Salt state and assign it to the organization. You can then use an activation key and configuration channels to deploy the key to the clients.

4.3.4. Create Activation Key for a Branch Server and the Retail Terminal Images

The branch server is based on the Uyuni Proxy. Its activation key must contain these child channels:

- openSUSE Leap 15.5 Updates (x86_64)
- Uyuni Client Tools for openSUSE Leap 15.5 (x86_64)
- Uyuni Proxy Stable for openSUSE Leap 15.5 (x86_64)

The activation key for retail terminal images based on openSUSE Leap 15.5 must contain these child channels:

- openSUSE Leap 15.5 Updates (x86_64)

- Uyuni Client Tools for openSUSE Leap 15.5 (x86_64)

For more information about creating activation keys, see **Client-configuration › Activation-keys**.

4.3.5. Register the Branch Server and Terminals as Clients

You register both the branch server and the terminals as openSUSE clients. To register your openSUSE clients, you need a bootstrap repository. By default, bootstrap repositories are automatically created, and regenerated daily for all synchronized products. You can manually create the bootstrap repository from the command prompt, using this command:

```
mgr-create-bootstrap-repo --with-custom-channels
```

For more information on registering your clients, see **Client-configuration › Registration-overview**.

4.3.5.1. Register the Branch Server

A retail branch server is registered as an openSUSE proxy. The proxy can be bootstrapped using the Web UI, or at the command prompt. Ensure you use the activation key you created for the proxy.

- For more information about proxies, see **Installation-and-upgrade › Container-deployment**.
- For more information about activation keys, see **Client-configuration › Activation-keys**.

Procedure: Setting Up the Uyuni Proxy

1. Check that the `Uyuni Proxy Stable for openSUSE Leap 15.5 (x86_64)` channel is assigned to the proxy on the system profile page.
2. At the command prompt on the proxy, as root, install the proxy pattern:

   ```
   zypper in -t pattern uyuni_proxy
   ```

3. Finalize the proxy setup:

   ```
   configure-proxy.sh
   ```

   ```
   [command]``configure-proxy.sh`` is an interactive script.
   ```

4. OPTIONAL: If you want to use the same system also as a build host, navigate to the client's system profile and check `OS Image Build Host` as a `Add-On System Types`.
5. Configure the proxy to become a branch server. On the Uyuni for Retail Server, for example, run:

```
retail_branch_init <branch_server_minion_id> --dedicated-nic eth1 \
    --branch-ip 192.168.7.5 \
    --netmask 255.255.255.0 \
    --dyn-range 192.168.7.100 192.168.7.200 \
    --server-domain branch.example.org \
    --branch-prefix uyuni
```

```
For additional options,  use the [command]``retail_branch_init --help``
command.
```

4.4. Set Up the Uyuni for Retail Environment

To set up the Uyuni for Retail environment, you will need to have already installed and configured:

- Uyuni Server
- one or more Uyuni for Retail branch server containerized proxy
- one or more Uyuni build hosts
- network stack depending on selected network architecture, see **Retail › Retail-network-arch**

This section covers how to configure your Uyuni for Retail environment, including:

- Prepare POS images
- Prepare system groups for Saltboot
- Configure services for Saltboot

The very first time you set up the Uyuni for Retail environment, you will need to perform all configuration steps in order. You will need to revisit some of these steps later on as you are working with Uyuni for Retail.

For example, the first time you configure the branch server group, you will need to have images prepared already. If you are configuring more than one branch server, the same images are reused across different branch server groups.

If you have an existing environment, and need to build new images, you do not need to re-initialize the branches.

4.4.1. Prepare and Build Terminal Images

For information about Uyuni image building, see **Administration › Image-management**.

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

4.4.1.1. 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.

POS image templates and resulting images do not set a system user password. You will not be able to login as a system user to a system that has been installed with a SUSE provided template without customization. However you can use Salt to manage clients without a system user password. You can use Salt to set up a system user password after the terminal has been deployed.

4.4.1.2. Validate POS Image Registration

After POS image is successfully built and inspected by Uyuni, you can validate that POS boot image was correctly registered by following procedure.

Procedure Validate POS boot image

1. On Uyuni command line execute following command:

```
mgrctl exec cobbler distro list
```

2. Your POS image should be listed with organization number before image name

4.4.2. Branch Identification

For every branch server choose `branch id`.

As a `branch id` select any alphanumerical string with up to 64 characters.

4.4.3. Required System Groups

Uyuni for Retail requires:

- branch system group for every branch server proxy, using `branch id` as its name
- hardware type system group for every used hardware type, using `HWTYPE:` prefix in its name

For more information about hardware type groups, see **Retail › Retail-deploy-terminals**.

Missing mandatory system group will cause terminal bootstrap to fail.

Uyuni for Retail also recognizes two optional groups for better overview:

- `TERMINALS`
- `SERVERS`

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

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

During terminal bootstrap terminal automatically joins:

- branch system group based on received `branch_id`. This will make branch group formulas available to the terminal.
- HWType group based on SMBios information received from terminal. This will make Saltboot partitioning pillar available to the terminal.
- `TERMINALS` if this group exists.

In case you plan to use the branch server container host as a monitoring server with Prometheus, be aware that Prometheus demands additional hardware resources. For more information about installing Prometheus, see **Administration › Monitoring**.

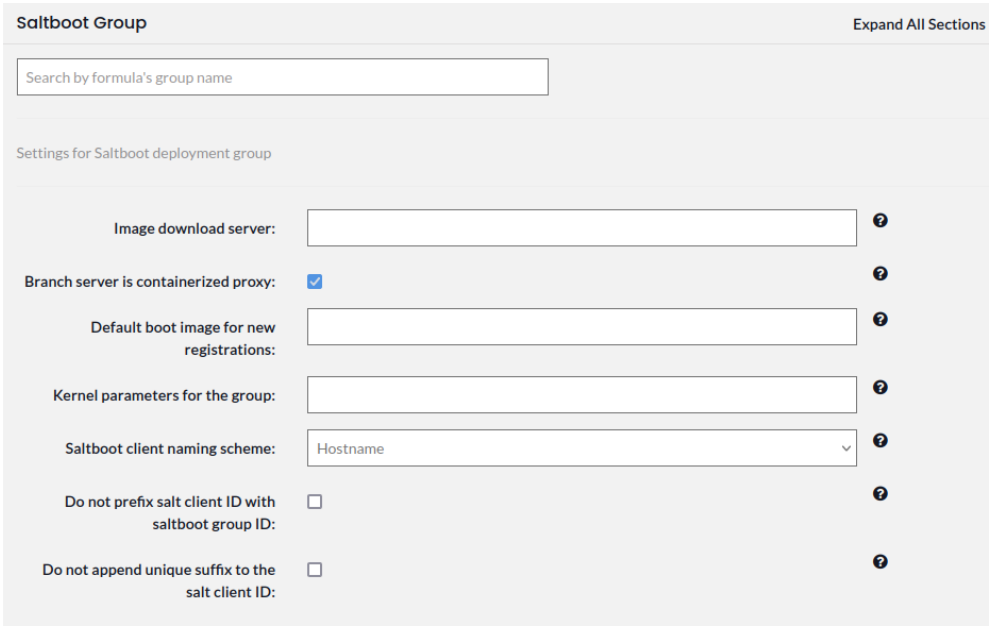
In case you plan to use the branch server container host with Ansible software, be aware that Ansible demands additional hardware resources. For more information about installing Ansible, see **Administration › Ansible-integration**.

4.4.3.1. Saltboot group

Before configuring Saltboot group, make sure you already have at least one POS image available.

Containerized Uyuni for Retail is configured using so called `Saltboot Group`.

Saltboot Group is a branch groups, system group with branch id as its name created in previous step, with `Saltboot Group` formula enabled.



`Saltboot Group` formula is a successor of `Branch Network formula`, `PXE formula` and `TFTP formula` previously used in Uyuni for Retail setups.

To connect `Saltboot group` with containerized proxy fill `Image Download Server` entry with Fully Qualified Domain Name (`FQDN`) of the containerized proxy.

4.4.4. Configure Network Services for Saltboot

Saltboot technology is used to deploy POS images to the terminals. Saltboot consists of saltboot enabled initrd (build as part of POS images) and saltboot Salt states.

This section covers general information about generic Saltboot requirements. For configuration examples, see **Retail › Example-configurations**.

4.4.4.1. Enable PXE Network Boot in the Terminal Network

Saltboot is usually used in network boot environment. For this to work `DHCP` service for the network terminal is connected to must have `PXE` or sometimes called `BOOTP` support enabled.

Example 1. Example of ISC DHCP server configuration with PXE booting enabled

```
if substring (option vendor-class-identifier, 0, 10) = "HTTPClient" {
  option vendor-class-identifier "HTTPClient";
  filename "<FQDN of branch server proxy>/saltboot/shim.efi";
}
else {
  if option arch = 00:07 {
     filename "grub/shim.efi";
     next-server <IP address of branch server proxy>;
  }
  else {
    filename "pxelinux.0";
    next-server <IP address of branch server proxy>;
  }
}
```

Notice two important options, `next-server` which is set to the branch server IP address and `filename` set to the `pxelinux.0` for BIOS based system and `grub/shim.efi` for UEFI systems with SecureBoot support.

Uyuni for Retail branch proxy uses different `filename` then previous non-containerized branch server.

For containerized branch proxy set `filename` to the `pxelinux.0` for BIOS based system and `grub/shim.efi` for UEFI systems with SecureBoot.

4.4.5. Terminal Partitioning and Image Selection

Saltboot requires instructions how to partitioning terminal harddisk and what image to deploy. This is done individually for each hardware type of terminals. For more information about hardware types and partitioning, see **Retail › Retail-deploy-terminals**.

Above mentioned steps are mandatory minimum for successful Saltboot deployment. For configuration examples, see **Retail › Example-configurations**.

4.4.6. Synchronize Images to the Branch Server

Uyuni for Retail 2024.12 no longer need manual image synchronization, all images are available to all clients automatically.

This may not be always desired, for example to allow images gradual deployments across all branches. For a way how to limit image deployment, see **Retail › Retail-best-practices**.

4.5. Set Up the Uyuni for Retail Environment with non-containerized 4.3 branch server

To set up the Uyuni for Retail environment, you will need to have already installed and configured:

- Uyuni for Retail Server
- one or more Uyuni for Retail branch server proxies, or containerized proxy
- one or more Uyuni build hosts

This section covers how to configure your Uyuni for Retail environment, including:

- Prepare POS images
- Prepare system groups
- Configure services for Saltboot
- Synchronize POS images to the branch servers

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

4.5.1. Prepare and Build Terminal Images

For information about Uyuni image building, see **Administration › Image-management**.

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

4.5.1.1. 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.

4.5.2. Branch Identification and Architecture Topology

Before you configure the branch server, ensure you have decided on networking topology and you choose `branch id`.

For information about the possible network topologies, see **Retail › Retail-network-arch**.

As a `branch id` select any alphanumerical string with up to 64 characters.

4.5.3. Required System Groups

Uyuni for Retail requires:

- branch system group for every branch server proxy, using `branch id` as its name
- hardware type system group for every used hardware type, using `HWTYPE:` prefix in its name

For more information about hardware type groups, see **Retail › Retail-deploy-terminals**.

Missing mandatory system group will cause terminal bootstrap to fail.

Uyuni for Retail also recognizes two optional groups for better overview:

- `TERMINALS`
- `SERVERS`

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

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

During terminal bootstrap terminal automatically joins:

- branch system group based on received `branch_id`. This will make branch group formulas available to the terminal.
- HWType group based on SMBios information received from terminal. This will make Saltboot partitioning pillar available to the terminal.
- `TERMINALS` if this group exists.

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

In case you plan to use the branch server as a monitoring server with Prometheus, be aware that Prometheus demands additional hardware resources. For more information about installing Prometheus, see **Administration › Monitoring**.

In case you plan to use the branch server with Ansible software, be aware that Ansible demands additional hardware resources. For more information about installing Ansible, see **Administration › Ansible-integration**.

4.5.4. Configure Services for Saltboot

Saltboot technology is used to deploy POS images to the terminals. Saltboot consists of saltboot enabled initrd (build as part of POS images) and saltboot Salt states.

This section covers general information about generic Saltboot requirements. For configuration examples, see **Retail › Example-configurations**.

4.5.4.1. Enable PXE Network Boot in the Terminal Network

Saltboot is usually used in network boot environment. For this to work `DHCP` service for the network terminal is connected to must have `PXE` or sometimes called `BOOTP` support enabled.

Example 2. Example of ISC DHCP server configuration with PXE booting enabled

```
if substring (option vendor-class-identifier, 0, 10) = "HTTPClient" {
  option vendor-class-identifier "HTTPClient";
  filename "<FQDN of branch server proxy>/saltboot/shim.efi";
}
else {
  if option arch = 00:07 {
     filename "boot/shim.efi";
     next-server <IP address of branch server proxy>;
  }
  else {
    filename "boot/pxelinux.0";
    next-server <IP address of branch server proxy>;
  }
}
```

Notice two important options, `next-server` which is set to the branch server IP address and `filename` set to the `boot/pxelinux.0` for BIOS based system and `boot/shim.efi` for UEFI systems with SecureBoot support.

Containerized branch proxy uses different `filename` then regular branch server.

For containerized branch proxy set `filename` to the `pxelinux.0` for BIOS based system and `grub/shim.efi` for UEFI systems with SecureBoot.

4.5.4.2. Saltboot Service Discovery

Saltboot requires some information where the Salt master is and from where to download the image. Saltboot tries multiple discoveries to obtain this information, described below.

For successful terminal deployment, both service discoveries must be successful. Depending on your architecture, choose what strategy works for you best.

4.5.4.2.1. Salt Master Discovery

During Saltboot initrd start, integrated Salt client needs to find branch server proxy to connect to. This discovery is trying following steps:

- `MASTER` kernel command line option is set, then this is used as Salt master
- resolve `salt` CNAME, if successful then resolved value is used as Salt master
- use `salt` as a Salt master

Once Salt master is determined, Salt client configuration is generated and started.

Using fully qualified domain name in `MASTER` or `salt` CNAME is important.

If used fully qualified domain name is different from fully qualified domain name of branch server proxy known to Uyuni, Saltboot may work correctly, however proxy detection of terminal will not work.

4.5.4.2.2. Download Server Discovery

Before POS image is downloaded to the terminal, download server discovery is done to find where to download image from:

- `saltboot_download_server` pillar is set for terminal, then its value is used
- `saltboot:download_server` pillar is set for terminal, then its value is used
- resolve `ftp` hostname

Value obtained by download server discovery is then used together with POS image pillar to fetch correct image from correct location.

4.5.4.3. Terminal Partitioning and Image Selection

Last piece for Saltboot is to provide partitioning for terminal. This is done individually for each hardware type of terminals. For more information about hardware types, see **Retail › Retail-deploy-terminals**.

Above mentioned steps are mandatory minimum for successful Saltboot deployment. For configuration examples, see **Retail › Example-configurations**.

4.5.5. Synchronize Images to the Branch Server

The OS image you use on the Uyuni 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 Uyuni 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 **Specialized-guides › Salt**.

Chapter 5. Deploying Terminals

This section covers how to integrate terminals into your Uyuni for Retail environment. You can prepare the Uyuni for Retail installation for image deployment. Finally, you can deploy terminals using network boot and other methods.

5.1. Deployment basics

When you have the Uyuni 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. 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**.

Terminals can be either x86-64 or arm64 architecture.

If you have many terminals, you can handle them with a script. For more information, see **Retail › Retail-mass-config**.

Before terminals can be deployed, ensure you have prepared a Saltboot-based operating system image. For more information about building OS images, see **Administration › Image-management**.

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

5.1.1. 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 Uyuni database does not have this information. To tell Uyuni what image to deploy on each terminal, you can set hardware type groups. After you have created a 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 Uyuni 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.

5.1.2. 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. For more information about the Saltboot formula, see **Specialized-guides › Salt**.

5.1.3. Synchronize Images to the Branch Server

Manual synchronization of images is needed only when using non-containerized Uyuni for Retail 4.3 branch server.

Image synchronization downloads system and boot images from the Uyuni Server to the Uyuni for Retail branch server. This may involve updating default boot image for not yet registered terminals.

Default boot image can be set in the `Image Synchronize formula`. If default boot image is not set, boot image with highest version is used as default boot image. This behaviour can be disabled by unchecking `Use Latest Boot Image` checkbox in the `Image Synchronize formula`.

Procedure: Synchronizing Images to the Branch Server

1. On the Uyuni server, run this command:

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

5.1.4. 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.

5.1.5. Customize the Terminal Image Download Process

You can change the terminal boot process using Salt pillars. Two Salt pillars allow you to change the protocol and server used to download the image.

- The `saltboot_download_protocol` pillar specifies which protocol should be used to download the image to the terminal. This overrides the default protocol specified in the image pillar. Allowed values are `http`, `https`, `ftp`, or `tftp`.
- The `saltboot_download_server` pillar specifies which server to use to download the image. This overrides the default hostname specified in the image pillar.

In this example, the download server must be prepared by the `image_sync` state before you begin.

Example: Changing the Saltboot Image Download Protocol

This example changes the protocol used for all terminals.

1. Create the `top.sls` file with content:

```
base:
  '*':
    - saltboot_proto
```

2. Create the `saltboot_proto.sls` file with content:

```
saltboot_download_protocol: http
# can be http, https, ftp, tftp
```

3. Move these files to the container:

```
mgrctl cp top.sls server:/srv/pillar/
mgrctl cp saltboot_proto.sls server:/srv/pillar/
```

Example: Changing the Saltboot Image Download Location

This example changes the download location for all terminals on a specified branch server.

1. Create the `top.sls` file with content:

```
base:
  'minion_id_prefix:$branch_prefix':
     - match: grain
     - $branch_prefix
```

2. Create the `$branch_prefix.sls` file with content:

```
saltboot_download_server: $download_server_fqdn
```

3. Move these files to the container:

```
mgrctl cp top.sls server:/srv/pillar/
mgrctl cp $branch_prefix.sls server:/srv/pillar/
```

5.2. 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.

Hardware type groups must be created and images must be synchronized before continuing. For more information, see **Retail › Retail-deploy-terminals**.

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

5.2.1. 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 Uyuni 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 Uyuni for Retail branch server. You can create the bootable USB device on the branch server

directly, or on the Uyuni for Retail Server.

POS devices booted using the USB device are assigned to the Uyuni for Retail branch server that created the USB device.

Procedure: Creating a Bootable USB Device

1. On the Uyuni 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 Uyuni 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 Uyuni for Retail Web UI. For more information about the Saltboot formula, see **Specialized-guides › Salt**.

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.

5.2.2. Deploy Terminals over a Wireless Network

For terminals that cannot be connected directly to the physical network, you can deploy 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 Uyuni 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 Uyuni for Retail Web UI. For more information about the Saltboot formula, see **Specialized-guides › Salt**.

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>
```

5.2.2.1. 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`.

5.2.2.2. 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.

5.3. Deploy Terminals and Auto-Accept Keys

You can configure Uyuni to automatically accept the keys of newly deployed terminals. This is achieved using Salt grains.

Automatically accepting keys is less secure than manually checking and accepting keys. Only use this method on trusted networks.

There are three different ways you can configure auto-signed grains:

- Configure Saltboot to send automatically signed grains once and then delete them. To do this, append the Saltboot configuration to an existing `initrd`. For more information, see retail:retail-deploy-terminals-auto.pdf.
- Choose to keep the automatically signed grains on the Salt client. To do this, include the configuration file in the image source before the client image is built. After booting, the auto-signed grain is stored on the client as a regular Salt grain. For more information, see retail:retail-deploy-terminals-auto.pdf.
- Configure Saltboot during PXE boot using kernel parameters. For more information, see retail:retail-deploy-terminals-auto.pdf.

When you have configured Saltboot using one of these methods, you need to configure the Uyuni Server to accept them. For more information, see retail:retail-deploy-terminals-auto.pdf.

5.3.1. Configure the Server to Auto-Accept

When you have configured Saltboot using one of these methods, you need to configure the server to accept them. The server stores the autosign keys in a file within the `/etc/salt/master.d/` directory, which is preserved in `etc-salt` volume. You can enable auto-signing by creating an auto-sign file that contains the key you created when you configured Saltboot.

Procedure: Configuring the Server to Auto-Accept

1. At the command prompt of the Uyuni container host, as root, enter the server container:

```
mgrctl term
```

2. Inside the container, execute the following steps:

   a. In directory `/etc/salt/master.d/`, create file `autosign_grains.conf` and specify `autosign_grains_dir`:

```
echo "autosign_grains_dir: /etc/salt/autosign_grains" \
  > /etc/salt/master.d/autosign_grains.conf
```

   b. Create a file at `/etc/salt/autosign_grains/autosign_key`, that contains the auto-sign key you specified with Saltboot (replace `<AUTOSIGN_KEY>` with the key:

```
mkdir /etc/salt/autosign_grains
echo "<AUTOSIGN_KEY>" > /etc/salt/autosign_grains/autosign_key
```

   For multiple keys, put each one on a new line.

For more information about configuring the server to automatically accept grains, see https://docs.saltproject.io/en/latest/topics/tutorials/autoaccept_grains.html.

5.3.2. Configure Saltboot to Keep Auto-Signed Grains

Use different procedure for SLE 15 and SLE 12.

Procedure: Configuring Saltboot to Keep Auto-Signed Grains (SLE 15)

1. In the location where the image source is built, such as a build host or source repository, create a configuration file called `etc/salt/minion.d/autosign-grains.conf`.
2. Edit the new configuration file with these details. You can use any value you like as the auto-sign key:

```
# create the grain
grains:
    autosign_key: <AUTOSIGN_KEY>

# send the grain as part of auth request
autosign_grains:
    - autosign_key
```

Procedure: Configuring Saltboot to Keep Auto-Signed Grains (SLE 12)

1. In the location where the image source is built, such as a build host or source repository, create a configuration file called `etc/salt/minion.d/autosign-grains.conf`. This must be outside of the `root` directory provided by the template. This way you prevent the inclusion of unwanted files in the `initrd`.
2. Edit the new configuration file with these details. You can use any value you like as the auto-sign key:

```
# create the grain
grains:
    autosign_key: <AUTOSIGN_KEY>

# send the grain as part of auth request
autosign_grains:
    - autosign_key
```

3. Create a tarball of this directory:

```
tar -czf autosign-grains.tgz etc
```

4. Edit the `config.xml` template file. In the `<packages type="image">` element, add:

```
<archive name="autosign.tgz" bootinclude="true"/>
```

5. Save the file and rebuild the image.

5.3.3. Configure Saltboot to Auto-Sign During PXE Boot

Procedure: Configuring Saltboot to Auto-Sign During PXE Boot

1. Configure the PXE formula to specify these kernel parameters during booting:

```
SALT_AUTOSIGN_GRAINS=autosign_key:<AUTOSIGN_KEY>
```

2. PXE boot the Salt client. The formula creates the `./etc/salt/minion.d/autosign-grains-onetime.conf` configuration file and passes it to `initrd`.

5.4. Forced Saltboot image redeployment

Systems provisioned by Saltboot are usually redeployed or repartitioned automatically when a new image is available, or Saltboot partitioning changes.

Occasionally, however, it is needed to force Saltboot to redeploy an image or repartition disk, even when automation would not do so. For these situations, Saltboot offers three ways to force redeployment or repartitioning:

- Force Saltboot redeployment using Salt grains
- Force Saltboot redeployment using custom info values
- Force Saltboot redeployment using Saltboot API call
- Force Saltboot redeployment by custom pillar

Repartitioning of a terminal removes all data stored on the terminal hard disk, including any persistent partitions.

5.4.1. Force Saltboot redeployment using Salt grains

Saltboot redeployment grains have no side effects, and do not require any further configuration. The limitation is that terminal must be accessible by `salt`.

Procedure: Forcing Saltboot to redeploy image

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

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

2. Restart the terminal to pick up the changes.

Procedure: Forcing a Saltboot to repartition the hard disk

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

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

2. Restart the terminal to pick up the changes.

5.4.2. Force Saltboot redeployment using custom info values

Saltboot custom values remove the limitation on terminal being reachable by `salt`, however there are configuration steps.

Custom info keys and values can be also managed using API or `spacecmd` command. For more information, see **Reference › Spacecmd**.

Procedure: Create custom info key for image redeployment

1. In the Uyuni Web UI, navigate to **Systems › Custom System Info**.
2. Click `Create Key` to create new `Custom Info Key`.
3. As `Key Label` fill in `saltboot_force_redeploy`.
4. As `Description` fill in `Force redeploy Saltboot image`.
5. Click `Create Key`.

Creating `saltboot_force_redeploy` custom key is a one time operation. When created, it is available for repeated use.

Procedure: Assign custom value for image redeployment

1. Navigate to the `Overview` page of the system you want to redeploy.
2. Select tab `Custom Info`.
3. Click on `Create Value`.
4. From the list of available keys click `saltboot_force_redeploy`.
5. As `Value` type `True`.
6. Click `Update Key`.
7. Reboot the terminal to pick up the changes.

After terminal finishes booting, Saltboot redeployment custom info setting is automatically reset to prevent repeated redeployment.

Procedure: Create custom info key for disk repartitioning

1. Navigate to menu::Systems[Custom System Info] page.
2. Click `Create Key` to create new `Custom Info Key`.
3. As `Key Label` fill in `saltboot_force_repartition`.
4. As `Description` fill in `Force terminal disk repartition`.
5. Click `Create Key`.

Creating `saltboot_force_repartition` custom key is one time operation. Once created, it is available for repeated use.

Procedure: Assign custom value for disk repartitioning

1. Navigate to the `Overview` page of the system you want to redeploy.
2. Select tab `Custom Info`.
3. Click on `Create Value`.
4. From the list of available keys click `saltboot_force_repartition`.

5. As `Value` type `True`.
6. Click `Update Key`.
7. Reboot the terminal to pick up the changes.

5.4.3. Force Saltboot redeployment using Saltboot API call

After terminal finishes booting, Saltboot redeployment setting is automatically reset to prevent repeated redeployment.

An API call `system.setPillar` can be used to set specific Saltboot options through Salt pillar data. Uyuni Saltboot integration is using `tuning-saltboot` pillar category to manage Saltboot tuning, including forced redeployment or disk repartition. Using this pillar category allows Uyuni to reset Saltboot flag once the terminal is booted up.

Procedure: Forcing Saltboot to redeploy image using API call using spacecmd command

1. In the console run following the command, and replace `$terminal_minion_id` with the actual terminal minion id:

```
spacecmd api -- -A '$terminal_minion_id,tuning-saltboot,{"saltboot":
{"force_redeployment": "True"}}' system.setPillar
```

Procedure: Forcing Saltboot to repartition disk using API call using spacecmd command

1. In the console run the following command, replace `$terminal_minion_id` with the actual terminal minion id:

```
spacecmd api -- -A '$terminal_minion_id,tuning-saltboot,{"saltboot":
{"force_repartition": "True"}}' system.setPillar
```

Procedure: Check Saltboot tuning options

1. In the console run the following command, and replace `$terminal_minion_id` with the actual terminal minion id:

```
spacecmd api -- -A '$terminal_minion_id,tuning-saltboot'
system.getPillar
```

Make sure to use `tuning-saltboot` as pillar category in the API call.

5.4.4. Force Saltboot redeployment by custom pillar

Pillars specified outside of Uyuni database cannot be reset automatically. Without manual intervention, the terminal will download a new image on each reboot.

Procedure: Force a Saltboot to redeploy image using Saltboot pillar

1. Create new file `/srv/salt/pillar/force_redeploy.sls` with content:

```
saltboot:
  force_redeploy: True
```

2. Create new file or update existing file named `/srv/salt/pillar/top.sls` with content:

```
base:
  '$terminal_minion_id':
    - force_redeploy
```

3. Reboot the terminal to pick up the changes.
4. After the terminal finishes booting, remove modifications made in `/srv/salt/pillar/top.sls` file.

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.

Procedure: Force Saltboot to repartition disk using Saltboot pillar

1. Create new file `/srv/salt/pillar/force_repartition.sls` with content:

```
saltboot:
  force_repartition: True
```

2. Create new file or update existing file named `/srv/salt/pillar/top.sls` with content:

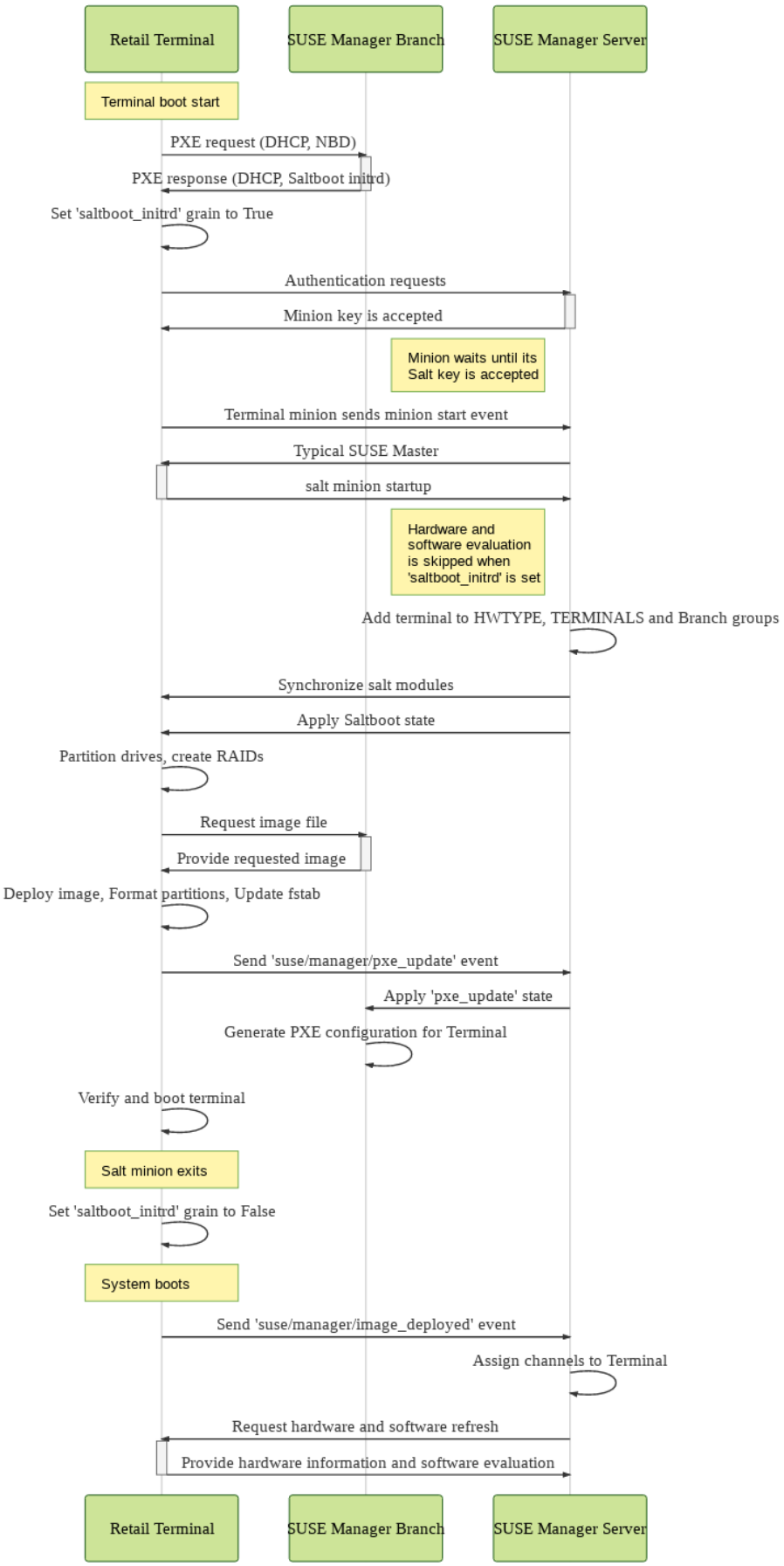
```
base:
  '$terminal_minion_id':
    - force_repartition
```

3. Reboot the terminal to pick up the changes.
4. After the terminal finishes booting, remove modifications made in `/srv/salt/pillar/top.sls` file.

5.5. Terminal Boot Process (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 terminal.



5.6. 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 **Specialized-guides › Salt**.

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

5.6.1. 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 **Specialized-guides › Salt** 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 **Specialized-guides › Salt**.

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.

5.6.2. 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 **Specialized-guides › Salt** 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 **Specialized-guides › Salt**.

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 behavior by toggling the `Do not append unique suffix to the salt client ID` checkbox in the **Specialized-guides › Salt**.

5.6.3. 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 **Specialized-guides › Salt** 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 **Specialized-guides › Salt**.

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 behavior by toggling the `Do not append unique suffix to the salt client ID` checkbox in the **Specialized-guides › Salt**.

5.6.4. 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 **Specialized-guides › Salt**.
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 **Specialized-guides › Salt**.
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**.

5.7. 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.

5.7.1. 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 **Specialized-guides › Salt**.

5.7.2. Cached Terminal Updates

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

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 **Specialized-guides › Salt**.

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.

5.8. 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 **Specialized-guides › Salt**.

5.8.1. 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 **Specialized-guides › Salt**.

Chapter 6. Introduction to Retail Formulas

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

You can use the Uyuni Web UI to apply common Uyuni formulas. For the most commonly used formulas, see **Specialized-guides › Salt**.

All formulas must be accurately configured for your Uyuni for Retail installation to function correctly.

6.1. Branch Server Formulas

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

The following formulas can be used for connecting Uyuni Proxy 4.3 with Uyuni 5.0:

- Branch network formula, see **Specialized-guides › Salt**
- PXE formula, see **Specialized-guides › Salt**
- TFTP formula, see **Specialized-guides › Salt**

In addition, Bind and DHCPd formulas can be used, but not on the branch server because SLE Micro does not have Bind and DHCPd in the repositories.

- Bind formula, see **Specialized-guides › Salt**
- DHCPD formula, see **Specialized-guides › Salt**

Optionally, you can also enable the image synchronization formula. For more information, see **Specialized-guides › Salt**.

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 Uyuni 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. This 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.

6.2. Partitioning and Image Deployment Formula

Use the Saltboot formula to specify disk partitioning, and to select which image should be deployed. For more information about the Saltboot formula, see **Specialized-guides › Salt**.

Chapter 7. Image Pillars

If the built image type is PXE, a Salt pillar is also generated.

Image pillars are stored in the database and Salt subsystem can access details about the generated image. Details include where the image files are located and provided, image checksums, information needed for network boot, and more.

The generated pillar is available to all connected clients.

This is an example of image pillar:

```
{
  "images": {
    "POS_Image_JeOS7": {
      "7.1.0-1": {
        "url": "https://ftp/saltboot/image/POS_Image_JeOS7.x86_64-7.1.0-
1/POS_Image_JeOS7.x86_64-7.1.0",
        "arch": "x86_64",
        "hash": "7368c101e96826053c6efde0588cf365",
        "size": 1548746752,
        "sync": {
          "url": "https://manager.example.com/os-images/1/POS_Image_JeOS7-
7.1.0-1/POS_Image_JeOS7.x86_64-7.1.0",
          "hash": "7368c101e96826053c6efde0588cf365",
          "local_path": "image/POS_Image_JeOS7.x86_64-7.1.0-1"
        },
        "type": "pxe",
        "fstype": "ext3",
        "filename": "POS_Image_JeOS7.x86_64-7.1.0",
        "inactive": false,
        "boot_image": "POS_Image_JeOS7-7.1.0-1"
      }
    }
  },
  "boot_images": {
    "POS_Image_JeOS7-7.1.0-1": {
      "arch": "x86_64",
      "name": "POS_Image_JeOS7",
      "sync": {
        "initrd_url": "https://manager.example.com/os-
images/1/POS_Image_JeOS7-7.1.0-1/POS_Image_JeOS7.x86_64-7.1.0.initrd",
        "kernel_url": "https://manager.example.com/os-
images/1/POS_Image_JeOS7-7.1.0-1/POS_Image_JeOS7.x86_64-7.1.0-5.14.21-
150400.24.55-default.kernel",
        "local_path": "POS_Image_JeOS7.x86_64-7.1.0-1"
      },
      "initrd": {
        "url": "https://ftp/saltboot/boot/POS_Image_JeOS7.x86_64-7.1.0-
1/POS_Image_JeOS7.x86_64-7.1.0.initrd",
        "hash": "d38b74a373bc6c9def1f069a8533d99f",
        "size": 118252253,
        "version": "7.1.0",
        "filename": "POS_Image_JeOS7.x86_64-7.1.0.initrd"
      },
      "kernel": {
        "url": "https://ftp/saltboot/boot/POS_Image_JeOS7.x86_64-7.1.0-
1/POS_Image_JeOS7.x86_64-7.1.0-5.14.21-150400.24.55-default.kernel",
        "hash": "946dac0a19125d78e282afe0e3ebf0b6",
        "size": 11444416,
        "version": "5.14.21-150400.24.55-default",
        "filename": "POS_Image_JeOS7.x86_64-7.1.0-5.14.21-150400.24.55-
default.kernel"
      },
      "basename": "POS_Image_JeOS7.x86_64-7.1.0"
    }
  }
}
```


Under the `Images` section, there is a specific image called `POS_Image_JeOS7` with a version `7.1.0-1.` It provides various details such as the image URL for download, architecture, hash, size, synchronization information, image type (in this case, PXE), file system type, file name, and an inactive flag to exclude it from auto-selection. Additionally, it references the corresponding boot image named `POS_Image_JeOS7-7.1.0-1.`

The `boot_images` section contains information about the boot image `POS_Image_JeOS7-`

`7.1.0-1.` It specifies the details about kernel and `initrd`.

Image pillar can be modified via API. This example retrieves the image pillar for a given image ID, and changes the `Inactive` flag to `True` and writes it back.

```
#!/usr/bin/env python3
from xmlrpc.client import ServerProxy

MANAGER_URL = "http://manager.example.com/rpc/api"

MANAGER_LOGIN = "admin"
MANAGER_PASSWORD = "adminpass"

IMAGE_ID=15

client = ServerProxy(MANAGER_URL)
key = client.auth.login(MANAGER_LOGIN, MANAGER_PASSWORD)

pillar = client.image.getPillar(key, IMAGE_ID)
[(name, version_dict)] = pillar['images'].items()
[(version, image_data)] = version_dict.items()
image_data['inactive'] = True
client.image.setPillar(key, IMAGE_ID, pillar)

client.auth.logout(key)
```

Chapter 8. Administration

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

8.1. Mass Configuration

Mass configuration is possible with branch servers and terminals.

Mass configuration tool was not yet adapted for containerized saltboot workflow.

8.1.1. Branch Server Mass Configuration

Branch servers are configured individually using formulas. If you are working in an environment with many branch servers, it often helps 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.

8.1.1.1. Configure Multiple Branch Servers

Configuring multiple branch servers requires the `python-susemanager-retail` package, which is provided with Uyuni 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 › Retail-mass-config-yaml**.
2. On a clean Uyuni for Retail 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 Uyuni Web UI, check that your systems are listed correctly. Also check that the formulas

you require are available.

4. Create activation keys for each of your branch servers, register them using bootstrap, and configure them as proxy servers.
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**.

8.1.2. Terminal Mass Configuration

If you are working in an environment with many terminals, it often helps to configure terminals automatically with a pre-defined configuration file, rather than configuring each one 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.

8.1.2.1. 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 › Retail-mass-config-yaml**.
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 Uyuni 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.
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.

8.1.3. 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.

8.2. 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 a 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
```

8.3. 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.

8.3.1. 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 in the database.

8.3.2. 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`).

8.3.3. 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. Only if the source image is available, the delta will be downloaded to save network bandwidth.

Chapter 9. Upgrade Uyuni for Retail Branch Server

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

The Uyuni for Retail Branch Server is a client system similar to the Uyuni Proxy, with additional Uyuni for Retail features.

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

Procedure: Upgrading the Uyuni for Retail Branch Server

1. For general information about upgrading a proxy client, see the release notes and the proxy sections of the Installation and Upgrade Guide.
2. After the proxy upgrade is complete, apply the highstate on the Uyuni for Retail Branch Server. When applying the highstate, the retail functionality will also be updated.

Chapter 10. Example configurations

This section contains some example configurations using various configuration techniques.

10.1. Configurations Using Uyuni for Retail Branch Proxy 5.0 and Later

- **Retail › Containerized-saltboot**

  Configuration of Saltboot using containerized proxy.

10.2. Configurations Using Uyuni for Retail Branch Proxy 4.3

- **Retail › Dedicated-with-formulas-43**

  Manual configuration of all branch services using formulas with forms to configure Saltboot with dedicated network for POS terminals.

- **Retail › Dedicated-with-scripts**

  Automatic configuration of all branch services using Uyuni for Retail scripts to configure Saltboot with dedicated network for POS terminals.

- **Retail › Shared-central-dns**

  Configuration of basic branch services using formulas with forms to configure Saltboot in shared network environment.

- **Retail › Containerized-saltboot**

  Configuration of Saltboot using containerized proxy.

10.3. Set Up the Uyuni for Retail Environment using containerized proxy

To set up the Uyuni for Retail environment, you will need to have already installed and configured:

- Uyuni for Retail Server 4.3 or newer
- one or more Uyuni for Retail containerized proxies
- one or more Uyuni build host

This section covers how to configure your environment using containerized Uyuni Proxy for `Saltboot` deployment.

Containerized workflow requires POS images build using Uyuni Server 4.3 or newer. Older images will not work.

Containerized workflow not longer implicitly configure DHCP for PXE booting. See **Specialized-guides › Salt** how to use DHCP formula to configure DHCP server.

Without using DHCP formula, make sure your DHCP server has correct PXE booting setting pointing to containerized proxy. See below for example.

10.3.1. Assumptions

In this example we are going to use branch id `B0001`.

As a terminal we assume to have one terminal with hardware manufacturer `TerminalOEM` and model `T1000`.

For POS image we assume to have one with name `POS_Image_JeOS7`.

10.3.2. Create required system groups

Follow guide **Reference › Systems** to create the system groups:

- `TERMINALS`
- `HWType:TerminalOEM-T1000`
- `B0001`

First group is generic optional group for collecting all POS terminals. Second group is hardware type group for our POS terminal. Third group is mandatory branch group.

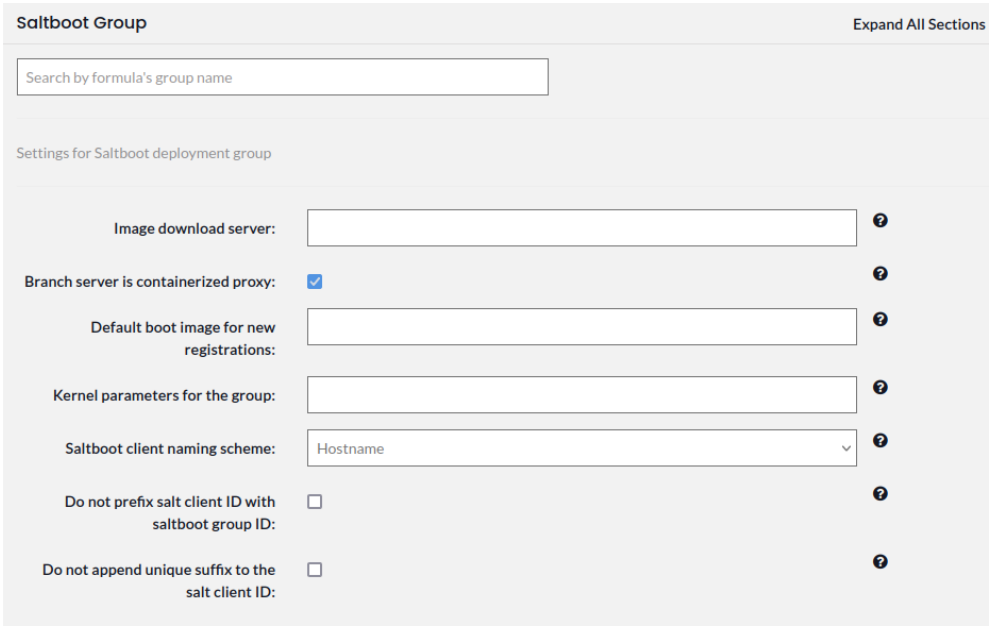
For more information about Saltboot groups, see **Retail › Retail-install-setup**.

We assign `Saltboot Group` formula to group `B0001` we just created. With this, our branch group is converted to `Saltboot Group`.

10.3.3. Saltboot group

Containerized Uyuni for Retail is configured in `Saltboot Group`.

Saltboot Groups are branch groups, system group with branch id as its name, with `Saltboot Group` formula enabled.



`Saltboot Group` formula is a successor of `Branch Network formula`, `PXE formula` and `TFTP formula` used in regular Uyuni for Retail setups.

Name of the `Saltboot group` is automatically used as a `branch id`, an identifier for group of machines booted through particular containerized Uyuni Proxy.

All `Saltboot` deployed machines though containerized proxy will automatically became members of its `Saltboot group`.

To connect `Saltboot group` with containerized proxy fill `Image Download Server` entry with Fully Qualified Domain Name (`FQDN`) of the containerized proxy.

With this, mandatory configuration is finished. The rest of configuration is optional.

10.3.3.1. Default boot image

Configure `Default boot image for new registrations` to specify what boot image should be booted by not yet registered POS terminal. This is useful when stable boot image is wanted for initial deployments. Without this setting, newest built boot image is used as default boot image.

If `Default boot image for new registrations` is set, option to set its version appears under name `Default boot image version` where specific image version can be set.

10.3.3.2. Kernel option for the Saltboot group

Option `Kernel parameters for the group` can be used to pass extra kernel options to all POS terminals registered withing this Saltboot group.

10.3.3.3. Naming scheme for new registrations

Last three options are related to how will be newly registered machine visible in Uyuni Server.

See **Retail › Retail-terminal-names** for explanation of possible configurations.

10.3.4. Comparing containerized and non-containerized workflows

External DHCP service must be used with containerized Saltboot.

For more information about how to enable PXE booting in DHCP service, see **Retail › Retail-install-setup**.

Containerized workflow relies on updated image building in Uyuni Server 4.3 where PXE images are no longer collected as bundle, but kernel, initrd and filesystem image are collected individually.

Containerized workflow uses new TFTP container which instead of providing files present on the proxy, routes TFTP requests as HTTP requests through local proxy to Uyuni Server.

Containerized proxy is not a Salt client, it is not possible to call `image-sync` state.

Once POS image is build and made available on Uyuni Server, it is immediately available to the Saltboot clients as well. Image synchronization is not needed, nor available. This may have implications on how images are deployed to production.

The following sections differentiate between containerized and regular workflow. Both are assuming proxy (containerized or in form of Uyuni for Retail Branch Server) are available.

Containerized workflow:

1. Build POS image
2. Configure DHCP server for PXE booting for given network
3. Create `Saltboot group` and configure it for existing containerized proxy
4. Boot system to be deployed

Non-Containerized workflow:

1. Build POS image
2. Configure and apply Retail formulas on Uyuni for Retail Branch server
3. Apply `highstate` state on the Branch server
4. Create `branch group` with the name of Branch ID as set in retail formulas
5. Apply `image-sync` state on configured Uyuni for Retail Branch server
6. Boot system to be deployed

10.3.5. Validating Saltboot group configuration

`Containerized Saltboot` utilizes `Cobbler` system underneath for managing PXE and UEFI configuration.

When new PXE image is built (such as Uyuni for Retail POS_Image_JeOS images) `cobbler distro` and `cobbler profile` are automatically generated for this image.

For example when first image `POS_Image_JeOS` version `7.0.0` is build under organization with number 1 `cobbler list` will show:

```
# cobbler list

distros:
   1-POS_Image_JeOS7-7.0.0-1

profiles:
   1-POS_Image_JeOS7-7.0.0-1
```

These entries contain information about kernel and initrd. These entries are however not yet available for PXE booting.

Only when `Saltboot group` is created, new Cobbler profile is created for this `Saltboot group` which points to `cobbler distro` based on default boot image configuration.

For example, when system group `B0001` is created and `Saltboot group formula` is assigned and configured for this group, new Cobbler profile is created.

```
# cobbler list

distros:
   1-POS_Image_JeOS7-7.0.0-1

profiles:
   1-POS_Image_JeOS7-7.0.0-1
   1-B0001
```

When inspecting this new group using command `cobbler profile report --name 1-B0001` details of this profile reveal configuration of this Saltboot group.

```
# cobbler profile report --name 1-B0001

Name                           : 1-B0001
Comment                        : Saltboot group B0001 of organization SUSE
default profile
Distribution                   : 1-POS_Image_JeOS7-7.0.0-1
Kernel Options                 : {'MASTER': ['downloadserver.example.org'],
'MINION_ID_PREFIX': ['B0001']}
```

Kernel options in example are always present and are internal for Saltboot functionality.

With this information `Cobbler` is able to generate required PXE and UEFI Grub configurations which can be checked in `/srv/tftpboot/pxelinux.cfg/default` and `/srv/tftpboot/grub/x86_64_menu_items.cfg`.

These files contain the end result which will be used by PXE client when determining what to boot and with what parameters.

10.4. Set Up the Uyuni for Retail Environment with shared network between terminals, branch servers and Uyuni

To set up the Uyuni for Retail environment, you will need to have already installed and configured:

- Uyuni for Retail Server
- one or more Uyuni for Retail branch server proxies
- one or more POS images built

10.4.1. Assumptions

This guide works only with non-containerized Uyuni for Retail branch proxy 4.3

In this example we consider architecture with shared network between POS terminals, branch server and Uyuni where branch server provides only PXE configuration and images.

In this example we provide `salt` on kernel command line option and `ftp` in pillar for Saltboot service discovery.

We assume to have one regular branch server with salt minion id `branch1.mystore.com`, which is equal to the branch server fully qualified domain name, and branch id `B0001`.

As a terminal we assume to have one terminal with hardware manufacturer `TerminalOEM` and model `T1000`.

For POS image we assume to have one with name `POS_Image_JeOS7`.

There is already existing external DHCP and DNS service. DHCP service is correctly configured to PXE boot from branch server.

10.4.2. Create required system groups

Follow guide **Reference › Systems** to create the system groups:

- `TERMINALS`
- `HWType:TerminalOEM-T1000`
- `B0001`

First group is generic optional group for collecting all POS terminals. Second group is hardware type group for our POS terminal. Third group is mandatory branch group.s

For more information about Saltboot groups, see **Retail › Retail-install-setup**.

10.4.3. Assign and configure formulas

We assign following formulas to the branch server:

- Branch Network
- Pxe
- Tftpd

Procedure: Assign formulas to the branch server

1. Select the `Formulas` tab for the system `branch1.mystore.com`
2. You should see list of formulas in `Configuration` sub-tab
3. In displayed list select `Branch Network`
4. In displayed list select `Pxe`
5. In displayed list select `Tftpd`
6. Save assigned formulas by clicking `[Save]` in top right corner

Procedure: Configure Branch Network formula

1. Select Branch Network formula from branch server formula list
2. Unselect `Dedicated Nic` check-box because we are not using dedicated network
3. Keep the rest with default values
4. In `Terminal Naming and Identification` section edit `Branch Identification` and set it to our branch id `B0001`
5. Save the formula

Procedure: Configure Pxe formula

1. Select Pxe formula from branch server formula list
2. At the end of `Kernel Command Line Parameters` append `MASTER=branch1.mystore.com`
3. Keep the rest with default values
4. Save the formula

Procedure: Configure Tftpd formula

1. Select Tftpd formula from branch server formula list
2. Set `Internal Network Address` to `0.0.0.0`, this way tftp will be listening on any IPv4
3. Set `TFTP base directory` to `/srv/saltboot`
4. Save the formula

Next two formulas are group formulas. Make sure you are editing those formulas in their respective groups.

Group formulas are visible as assigned also on system level, but editing them will create system specific setting instead of group setting.

Assign `Saltboot Group` formula to the `B0001` group and `Saltboot` formula to the `HWType:TerminalOEM-T1000` group.

Procedure: Assign Saltboot Group formula to Branch group

1. Navigate to **Systems › System Groups**
2. Select group `B0001, which is our branch group
3. Select the `Formulas` tab once in group details
4. You should see list of formulas in `Configuration` sub-tab
5. In displayed list select `Saltboot Group`
6. Save assigned formulas by clicking `[Save]` in the top right corner

Procedure: Configure Saltboot Group formula

1. Select Saltboot Group formula from `B0001` group formula list
2. Set `Image download server` to `branch1.mystore.com`
3. Unselect `Branch server is containerized proxy` because this is not containerized proxy
4. Save the formula

Procedure: Assign Saltboot formula to hardware type group

1. Navigate to **Systems › System Groups**
2. Select group `HWType:TerminalOEM-T1000`, which is our hardware type group
3. Select the `Formulas` tab once in group details
4. You should see list of formulas in `Configuration` sub-tab
5. In displayed list select `Saltboot`
6. Save assigned formulas by clicking `[Save]` in top right corner

Procedure: Configure Saltboot formula

1. Select Saltboot formula from `HWType:TerminalOEM-T1000` group formula list
2. Set `Disk Symbolic ID` to `Disk1`
3. Set `Device Type` to `DISK`
4. Set `Disk Device` to `*`
5. Set `Partition table type` to `gpt`
6. Click `[+]` to add a partition

- Set `Partition Symbolic ID` to `p1`
- Set `Partition Size (MiB)` to `512`
- Set `Device Mount Point` to `/boot/efi`
- Set `Filesystem Format` to `vfat`
- Set `Partition Flags` to `boot`

7. Click `[+]` to add a partition
   - Set `Partition Symbolic ID` to `p2`
   - Set `Device Mount Point` to `/`
   - Set `OS Image to Deploy` to `POS_Image_JeOS7`
8. Save the formula

After all procedures are done, apply highstate on the branch server.

10.4.4. Synchronize images

After highstate is applied, we proceed with synchronizing images as usual with apply `image-sync` state.

Terminal can now be started and will be automatically provisioned, pending salt key acceptance.

10.5. Set Up the Uyuni for Retail Environment with Dedicated Network for Terminal

To set up the Uyuni for Retail environment, you will need to have already installed and configured:

- Uyuni for Retail Server
- one or more Uyuni for Retail branch server proxies
- one or more POS images built

10.5.1. Assumptions

This guide works only with non-containerized Uyuni for Retail branch proxy 4.3.

In this example we consider architecture with dedicated network for POS terminals where branch server provides all required services including DHCP and DNS.

For dedicated network we assume `192.168.86.0/24` network.

In this example we provide `Salt` and `ftp` CNAMEs for Saltboot service discovery.

We assume to have one regular branch server with Salt minion id `branch1.mystore.com`, which is

equal to the branch server fully qualified domain name, and branch id `B0001`.

As a terminal we assume to have one terminal with hardware manufacturer `TerminalOEM` and model `T1000`.

For POS image we assume to have one with name `POS_Image_JeOS7`.

This example covers two configuration methods. Both of the methods achieve the same result.

10.5.2. Create Required System Groups

Manually setting up formulas requires manual creation of the needed system groups, unlike when using the provided tools. To create the system groups, see **Reference › Systems**.

You will need the following groups:

- `TERMINALS`
- `HWType:TerminalOEM-T1000`
- `B0001`

The first group is generic optional group for collecting all POS terminals. The second group is hardware type group for our POS terminal. The third group is mandatory branch group.

For more information about Saltboot groups, see **Retail › Retail-install-setup**.

10.5.3. Assign and Configure Branch Server Formulas

We assign the following formulas to the branch server:

- Branch Network
- Dhcpd
- Bind
- Pxe
- Tftpd

Procedure: Assign Formulas to the Branch Server

1. Select the `Formulas` tab for the system `branch1.mystore.com`
2. You should see list of formulas in `Configuration` sub-tab
3. In displayed list select `Branch Network`
4. In displayed list select `Pxe`
5. In displayed list select `Dhcpd`
6. In displayed list select `Tftpd`

7. In displayed list select `Bind`
8. Save assigned formulas by clicking `[Save]` in top right corner

Procedure: Configure Branch Network formula

1. Select Branch Network formula from branch server formula list
2. Keep `Dedicated Nic` check-box selected, because we are using dedicated network for terminals
3. Keep the rest with default values
4. In the `Terminal Naming and Identification` section edit `Branch Identification` and set it to our branch id `B0001`
5. Save the formula

Procedure: Configure Pxe formula

1. Select Pxe formula from branch server formula list
2. At the end of `Kernel Command Line Parameters` append `MASTER=branch1.mystore.com`
3. Keep the rest with default values
4. Save the formula

Procedure: Configure Dhcpd formula

1. Select Dhcpd formula from branch server formula list
    - Set the `Domain Name` to the `branch1.mystore.com`
    - Set the `Domain Name Server` to the IP address of branch server `192.168.86.1`)
    - Set the `Listen Interfaces` to the `eth1`, which is network interface of branch server connected to dedicated terminal network
2. Navigate to the `Network Configuration (subnet)` section, and use these parameters for Network1:
    - In the `Network IP` field, enter the IP address of the terminal network `192.168.86.0`.
    - In the `Netmask` field, enter the network mask of the terminal network `255.255.255.0`.
    - In the `Domain Name` field, enter the domain name for the terminal network `branch1.mystore.com`).
3. In the `Dynamic IP Range` section, use these parameters to configure the IP range to be served by the DHCP service:
    - In the first input box, set the lower bound of the IP range `192.168.86.10`
    - In the second input box, set the upper bound of the IP range `192.168.86.250`
4. In the `Broadcast Address` field, enter the broadcast IP address for the terminal network `192.168.86.255`
5. In the `Routers` field, enter the IP address to be used as default route in the terminal network

`192.168.86.1`

6. In the `Next Server` field, enter the IP address of the branch server for PXE booting `192.168.86.1`
7. Set the `Filename` to the `/boot/pxelinux.0`
8. Set the `Filename Efi` to the `/boot/shim.efi`
9. Set the `Filename Http` to the `http://192.168.86.1/saltboot/boot/shim.efi`
10. Save the formula

Procedure: Configure Tftpd formula

1. Select Tftpd formula from branch server formula list
2. Set the `Internal Network Address` to `192.168.86.1`, this way tftp will be listening on any IPv4
3. Set the `TFTP base directory` to `/srv/saltboot`
4. Save the formula

Procedure: Configuring Bind with reverse name resolution

1. Select Bind formula from branch server formula list
2. In the `Config` section, select `Include Forwarders` so DNS server can forward queries to next DNS server
3. In the `Options` section clieck `+` to add an option
4. Set the `Option` to `empty-zones-enable`
    - Set the `Value` to `No`
5. In the `Configured Zones` section, use these parameters for Zone 1, which is our primary zone:
    - Set the `Name` to `branch1.mystore.com`
    - In the `Type` field, select `master`
6. Click `[Add item]` to add a second zone, and set these parameters for Zone 2, which is used for reverse name resolution:
    - Set the `Name` to `com.mystore.branch1`
    - In the `Type` field, select `master`
7. In the `Available Zones` section, use these parameters for Zone 1:
    - In the `Name` field, enter the domain name `branch1.mystore.com`
    - In the `File` field, type the name of your configuration file `branch1.mystore.com.txt`
8. In the `Start of Authority (SOA)` section, use these parameters for Zone 1:
    - In the `Nameserver (NS)` field, use the FQDN of the branch server `branch1.mystore.com`
    - In the `Contact` field, use the email address for the domain administrator

- Keep all other fields as their default values

9. In the `Records` section, in subsection `A`, use these parameters to set up an A record for Zone 1:
    - In the `Hostname` field, use the hostname of the branch server `branch1.mystore.com.`, notice trailing `.` which are required here
    - In the `IP` field, use the IP address of the branch server `192.168.86.1`
10. In the `Records` section, subsection `NS`, use these parameters to set up an NS record for Zone 1:
    - In the input box, use the branch server `branch1.mystore.com.`
11. In the `Records` section, subsection `CNAME`, use these parameters to set up CNAME records for Zone 1:
    - In the `Key` field, enter `salt`, and in the `Value` field, type the branch server `branch1.mystore.com.`
    - Click `[Add item]` to add another entry.
    - In the `Key` field, enter `ftp`, and in the `Value` field, type the branch server `branch1.mystore.com.`
12. Set up Zone 2 using the same parameters as for Zone 1, but ensure you use the reverse details:
    - The same SOA section as Zone 1.
    - Empty A and CNAME records.
    - Additionally, configure in Zone 2:
        - Set `Generate Reverse` to the network IP address `192.168.86.0/24`
        - Set `For Zones` to the domain name of your branch network `branch1.mystore.com`
13. Click `[Save Formula]` to save your configuration.
14. Apply the highstate.

10.5.4. Set Up Partitioning

Partitioning is specific to the hardware type and configured using `Saltboot` formula.

Procedure: Assign Saltboot Formula to Hardware Type Group

1. Navigate to **Systems › System Groups**
2. Select group `HWType:TerminalOEM-T1000`, which is our hardware type group
3. Select the `Formulas` tab once in group details
4. You should see list of formulas in `Configuration` sub-tab
5. In displayed list select `Saltboot`
6. Save assigned formulas by clicking `[Save]` in top right corner

Procedure: Configure Saltboot Formula

1. Select Saltboot formula from `HWType:TerminalOEM-T1000` group formula list

2. Set `Disk Symbolic ID` to `Disk1`
3. Set `Device Type` to `DISK`
4. Set `Disk Device` to `*`
5. Set `Partition table type` to `gpt`
6. Click `[+]` to add a partition
    - Set `Partition Symbolic ID` to `p1`
    - Set `Partition Size (MiB)` to `512`
    - Set `Device Mount Point` to `/boot/efi`
    - Set `Filesystem Format` to `vfat`
    - Set `Partition Flags` to `boot`
7. Click `[+]` to add a partition
    - Set `Partition Symbolic ID` to `p2`
    - Set `Device Mount Point` to `/`
    - Set `OS Image to Deploy` to `POS_Image_JeOS7`
8. Save the formula

After all procedures are done, apply highstate on the branch server.

10.5.5. Synchronize Images

After highstate is applied, we proceed with synchronizing images as usual with apply `image-sync` state.

Terminal can now be started and will be automatically provisioned, pending salt key acceptance.

10.6. Set Up the Uyuni for Retail Environment with dedicated network for terminal using bundled scripts

To set up the Uyuni for Retail environment, you will need to have already installed and configured:

- Uyuni for Retail Server
- one or more Uyuni for Retail branch server proxies
- one or more POS images built

10.6.1. Assumptions

This guide works only with non-containerized Uyuni for Retail branch proxy 4.3

In this example we consider architecture with dedicated network for POS terminals where branch server provides all required services including DHCP and DNS.

For dedicated network we assume 192.168.86.0/24 network.

In this example we provide `salt` and `ftp` CNAMEs for Saltboot service discovery.

We assume to have one regular branch server with salt minion id `branch1.mystore.com`, which is equal to the branch server fully qualified domain name, and branch id `B0001`.

As a terminal we assume to have one terminal with hardware manufacturer `TerminalOEM` and model `T1000`.

For POS image we assume to have one with name `POS_Image_JeOS7`.

This example covers two configuration methods with both of them achieving same result.

10.6.2. Quick set up of Uyuni for Retail using for Retail tools

- Uyuni for Retail provides command line tool `retail_branch_init`
- Uyuni for Retail provides mass import command line tool `retail_yaml`

The branch server can be configured automatically using the `retail_branch_init` command, as shown in this section.

Procedure: Configuring Branch Server Formulas With a Helper Script

1. Run following command on Uyuni Server:

```
retail_branch_init branch1.mystore.com --dedicated-nic eth1 \
                                        --branch-prefix B0001 \
                                        --server-domain
branch1.mystore.com \
                                        --branch-ip 192.168.86.1 \
                                        --dyn-range 192.168.86.10
192.168.86.250 \
                                        --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 Uyuni Web UI branch server system formulas.
3. Apply highstate on the branch server.

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:
  branch1.mystore.com:
    branch_prefix: B0001
    server_domain: branch1.mystore.com
    nic: eth1
    dedicated_nic: true
    configure_firewall: true
    branch_ip: 192.168.86.1
    netmask: 255.255.255.0
    dyn_range:
        - 192.168.86.10
        - 192.168.86.250
```

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

2. Import branch information from YAML file to Uyuni

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

3. Verify that your changes have been configured correctly by checking the Uyuni 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 Uyuni Web UI through branch server formulas.

10.6.3. Setup partitioning

Follow **Reference › Systems** to create `HWType:TerminalOEM-T1000` system group.

Partitioning is specific to the hardware type and configured using `Saltboot` formula.

Procedure: Assign Saltboot formula to hardware type group

1. Navigate to **Systems › System Groups**
2. Select group `HWType:TerminalOEM-T1000`, which is our hardware type group
3. Select the `Formulas` tab once in group details
4. You should see list of formulas in `Configuration` sub-tab
5. In displayed list select `Saltboot`
6. Save assigned formulas by clicking `[Save]` in top right corner

Procedure: Configure Saltboot formula

1. Select Saltboot formula from `HWType:TerminalOEM-T1000` group formula list

2. Set `Disk Symbolic ID` to `Disk1`
3. Set `Device Type` to `DISK`
4. Set `Disk Device` to `*`
5. Set `Partition table type` to `gpt`
6. Click `[+]` to add a partition
    - Set `Partition Symbolic ID` to `p1`
    - Set `Partition Size (MiB)` to `512`
    - Set `Device Mount Point` to `/boot/efi`
    - Set `Filesystem Format` to `vfat`
    - Set `Partition Flags` to `boot`
7. Click `[+]` to add a partition
    - Set `Partition Symbolic ID` to `p2`
    - Set `Device Mount Point` to `/`
    - Set `OS Image to Deploy` to `POS_Image_JeOS7`
8. Save the formula

After all procedures are done, apply highstate on the branch server.

10.6.4. Synchronize images

After highstate is applied, we proceed with synchronizing images as usual with apply `image-sync` state.

Terminal can now be started and will be automatically provisioned, pending salt key acceptance.

Chapter 11. Best practices

11.1. Deploying new images

This file describes how to deploy a new image on selected terminals first, test it, and then deploy it to all terminals.

The hardware type group (i.e. `HWTYPE` group) is used for booting new terminals, while already deployed terminals can be moved to any group that provides the Saltboot formula. This flexibility allows for testing of new images or configurations.

Procedure: Dual group image deployment

1. Build new image. Use image synchronization formula to synchronize the image to all Branch Servers.
2. Create a test group.
    - Name the group, for example, `TEST:POSVendor-Terminal`. The name can be chosen freely.
    - Add the Saltboot formula to this group. Use the same configuration as in the original hardware type group (`HWTYPE`), except for the image version. Use the name and version of the new image.
3. Move selected terminals.
    - Identify the terminals you want to test the new image on.
    - Transfer these terminals from the group `HWTYPE:POSVendor-Terminal` group to the newly created group `TEST:POSVendor-Terminal`. It is recommended to use System Set Manager for this task.
4. Reboot terminals.
    - Power on the selected POS terminals. They should boot the new image.
5. Verify and evaluate.
    - Monitor the terminals in the `TEST:POSVendor-Terminal` group.
    - Check if the new image performs as expected and if there are any issues or errors encountered.
6. Update `HWTYPE` group.
    - Once you have confirmed that the new image works correctly, the `HWTYPE` group can be updated.
    - Modify the image version in the `HWTYPE:POSVendor-Terminal` group to match the tested and approved version.
    - This ensures that all other terminals receive the new image.

11.1.1. Controlling image versions

By default, Saltboot formula selects the specified image name and version or selects the highest one if the version is not specified.

There are multiple methods to control the image version within the `HWTYPE` and `TEST` groups:

- Specify exact version.
  - In both the `HWTYPE` and `TEST` groups, specify explicitly the exact version of the image to be deployed.
  - Make sure that the specified image version is already synchronized.
- Mark new image as `Inactive`.
  - In the `HWTYPE` group, do not specify the image version.
  - Mark the new image as `Inactive` after building and before synchronizing it to Branch Server.
  - The `Inactive` flag ensures, that the image is not auto-selected when the image version is not specified.
  - After testing, remove the `Inactive` flag so the image can be auto-selected in the `HWTYPE` group.
  - The `Inactive` flag can be accessed through the API. For more information, see **Retail › Retail-image-pillars**.
- Utilize `Freeze Image` flag.
  - In the `HWTYPE` group, omit the image version.
  - Before synchronizing the new image, set the `Freeze Image` flag in Saltboot formula in `HWTYPE` group. This ensures that the already deployed terminals in this group will keep the old image.
  - Synchronize and test the new image in the `TEST` group.
  - Reset the `Freeze Image` flag in `HWTYPE` group, so the terminals in this group will be updated to the new image too.

Do not use the whitelist in Image Synchronization formula to control which terminal boots which image. It does not provide the required granularity and does not work with containerized Branch Server.

Chapter 12. What Next?

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

12.1. More Documentation

For Uyuni documentation, visit https://documentation.suse.com/suma/4.3/.

Legacy documentation is available upon request for information purposes only. Note, however, that Uyuni for Retail documentation supersedes legacy information.

12.2. 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 Uyuni for Retail environment, contact the SUSE Consulting team.

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