

Automated Installation Using Agama

WHAT?

This article describes how to automatically install SUSE Linux Enterprise Server using Agama. The information presented here applies to unattended installation of the product on both bare metal and virtual machines.

WHY?

Read this article to understand the process of automatically installing SUSE Linux Enterprise Server using Agama.

EFFORT

You may need 30 minutes to read and understand the most important sections of this article. The time required for customization of Agama profiles and storage configuration depends on deployment requirements.

GOAL

Learn how to perform automated or unattended installation of SUSE Linux Enterprise Server using Agama.

REQUIREMENTS

A bare metal server or a virtual machine. For server installations without any desktop environment, SUSE recommends a minimum of 1 CPU, 2 GB memory and 32 GB storage (which includes storage for Btrfs snapshots in the root partition, swap space, and storage for software packages).

An image file for the product you want to install, downloaded

from the SUSE Customer Center.

An active registration code for the product you want to install.

You can generate a registration code for the product and activate its subscription for your organization at the SUSE Customer Center.



Note: Optional registration

Certain images that are signed with the developer's key may allow you to skip registration before or while installation. Besides, certain images may contain all installable packages for your operating system that you can use as an offline package repository. In such cases, you may not need an active registration code before installation. However, if you use software packages from the official online repositories, SUSE recommends registering your product with the SUSE Customer Center.

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Contents

- 1 Introduction to automated installation using Agama 4
- 2 Understanding Agama installation profiles 6
- 3 Details of an Agama installation profile 9
- 4 Using AutoYaST profiles with Agama 27
- 5 Initiating automated installation using Agama 30
- 6 Activating multipath during installation of SUSE Linux Enterprise using Agama 32
- 7 Advanced storage configuration using Agama profiles 37
- 8 Compatibility between AutoYaST and Agama profiles 50
- 9 For more information 64
- 10 Legal Notice 65
- A GNU Free Documentation License 65

1 Introduction to automated installation using Agama

This article describes how to use Agama for automated and unattended installation of SUSE Linux Enterprise Server. You can use JSON *profiles* describing different aspects of intended system, and Agama installs accordingly. While not a fully backward compatible replacement for AutoYaST, it simplifies the task of automated installation and provides multiple clients for interactive and automated installation.

1.1 What is Agama

Agama as a service-based Linux installer capable of performing both interactive and unattended installations. You can provide Agama a JSON profile file detailing the initial system state, such as user authentication, partitioning, networking and software selection. On receiving the profile and instruction for installation from one of its supported clients, Agama installs your target system accordingly. Users can interact with and control the installation process using Agama's web-based user interface, command-line interface and HTTP API, facilitating automation and integration into existing workflows.

While Agama reuses many principles and internal components from previous SUSE installers like YaST and AutoYaST, and offers a high level of backwards compatibility for unattended installations, it is not a 100% compatible drop-in replacement for all AutoYaST features. Agama focuses only on the installation process rather than being a general configuration tool.

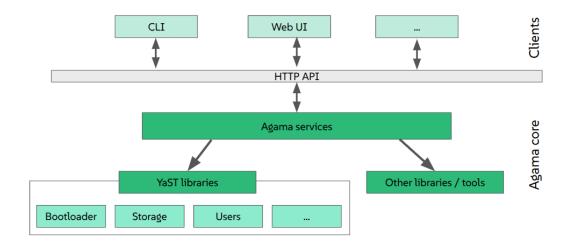


FIGURE 1: AGAMA SERVER CLIENT ARCHITECTURE

1.2 Why use Agama for automated installation

Agamaoffers its installation service by exposing an HTTP API, which you can use interactively from a web-based interface and a command-line interface (CLI), or provide a JSON profile to Agama for automated installation of a target system. Using the HTTP API you can also integrate with custom scripts and deployment tools. The benefits of using Agama for automated installation are as follows:

Focus on core installation

Agama focuses on core installation tasks such as user authentication, network configuration, storage setup and software installation, delegating further configuration to other tools such as Ansible Salt, Cockpit or OpenSCAP.

Profile based installation

You can define installation parameters for the target system in an easily readable and editable JSON or Jsonnet profile. Existing XML based AutoYaST are also supported with some exceptions.

Comprehensive profile configuration

The profile allows detailed setup including user authentication, product registration, network connections, storage (drives, partitions, LVM, RAID, encryption, resizing, deleting), software selection by patterns and packages, localization (language, keyboard, timezone) and many other aspects of the target system that are not exposed in the graphical or webbased interface. This helps in a more granular control over the installation parameters.

Dynamic profiles

Agama supports dynamic profiles using Jsonnet, injecting hardware information that can be processed at runtime. This avoids reliance on AutoYaST's rules or ERB for dynamic configurations.

AutoYaST compatibility

Agama offers a mechanism to reuse existing AutoYaST profiles to a great extent. It supports some dynamic features such as pre-scripts, rules/classes, and Embedded Ruby (ERB) when using AutoYaST profiles. A legacyAutoyastStorage section allows direct use of the AutoYaST profile's partitioning section for backwards compatibility.

Custom scripts

Profiles can define pre-installation, post-partitioning, chroot, and init scripts that run at specific stages. You can include scripts by URL, location in the hard drive, or embed the script content in the profile itself.

Easy initiation

The typical way to start an unattended installation from an ISO image is using the <u>inst.auto</u> kernel boot option, pointing to the profile URL or it's location in the hard drive. You can also use the <u>agama profile import</u> command from the Agama CLI to load a profile, followed by the <u>agama install</u> command. The CLI also allows inspection, modification, validation of the profile, and subsequent monitoring of the installation process.

2 Understanding Agama installation profiles

For automated installations, Agama relies on a *profile*, which is a configuration file that specifies how the system should be set up. This profile describes various aspects of the installation, including partitioning, networking, software selection, and other options. The concept of using a profile for automated installation is similar to AutoYaST. Agama focuses specifically on the installation process itself and delegates further system configuration to other tools. Agama aims for a high level of backward compatibility with AutoYaST profiles for automated installations.



Note: Difference between Agama and AutoYaST profiles

Agama and AutoYaST profiles are largely compatible for all common use cases. However, Agama profiles are not fully compatible with AutoYaST profiles, and cannot be used as a drop-in replacement without checking the compatibility. There are certain aspects of the AutoYaST profiles that are currently supported in Agama profiles, or may be supported in the future. However, there are certain other aspects that are neither currently supported in Agama profiles, nor will be supported in the future. For more information, refer to the section *Section 8, "Compatibility between AutoYaST and Agama profiles"*.

2.1 Introduction to the Agama profile structure

Agama profile configuration is defined using a JSON document. It contains several sections that are necessary for describing the installation parameters for a customized system. At a high level, the profile consists of the following sections:

```
"product": {}, 1
  "root": {}, 2
  "user": {}, 3
  "localization": {}, 4
  "hostname": {}, 6
  "software": {}, 6
  "storage": {}, 7
  "bootloader": {}, §
  "network": {}, 9
  "security": {}, 10
  "scripts": {}, 11
  "files": {}, 12
  "legacyAutoyastStorage": {}, 13
  "iscsi": {}, 14
  "dasd": {} 15
}
```

- product: Identifies the OS/product to be installed.
- 2 root: Root credentials for administrative access.
- 3 user: First non-root user account.
- 4 localization: Language, keyboard, and timezone settings.
- 6 hostname: Static/transient hostname settings.
- **6** software: Packages and patterns to be installed.
- storage: Partitioning and mount configuration.
- 8 bootloader: Bootloader config and kernel params.
- o network: Network interface configuration.
- 10 security: SSL certs and other security settings.
- 11 scripts: Pre/post install scripting.
- 12 files: Inject additional files post-install.
- 13 legacyAutoyastStorage: Support for legacy AutoYaST JSON-style storage.
- 14 iscsi: iSCSI disk/target configuration.

15 dasd: DASD disk support for IBM Z (s390x).

You can also describe profiles using Jsonnet, which is a superset of JSON. Jsonnet offers features like variables, functions and more convenient syntax, making profiles more readable, concise, and dynamic for injecting hardware information at runtime.

For more information on the JSON and Jsonnet profiles, refer to the resources mentioned in the *Section 9, "For more information"* section. The upstream resources usually contains most updated information and examples about the profiles.

2.2 A minimal example of an Agama profile

A minimal Agama JSON profile must at least include sections for product identification, product registration, and credentials for the root user. Agama uses the defaults for the rest of the profile. As a best practice, you should also configure the following as a best practice:

A hostname

A non-root user

Minimal localization settings

EXAMPLE 1: A MINIMAL AGAMA PROFILE FOR AUTOMATED INSTALLATION

```
"product": {
 "id": "SUSE Linux Enterprise Server 16.0",
 "registrationCode": "REGISTRATION-CODE",
  "registrationEmail": "EMAIL",
},
"hostname": {
  "static": "STATIC-HOSTNAME",
  "transient": "TRANSIENT-HOSTNAME"
},
"root": {
  "hashedPassword": true,
 "password": "HASHED-ROOT-PASSWORD", 1
  "sshPublicKey": "SSH-PUBLIC-KEY", 2
},
"user": {
  "hashedPassword": false,
 "autologin": false,
  "fullName": "FULL-NAME",
 "userName": "USERNAME",
  "password": "PLAINTEXT-PASSWORD"
},
"localization": {
```

```
"language": "LANGUAGE",
    "keyboard": "KEYBOARD-LAYOUT",
    "timezone": "TIMEZONE"
}
```

1 You can generated a hashed password by running the following command:

```
> sudo openssl passwd -6
```

2 You can generate an SSH public key by running the following command:

```
> sudo ssh-keygen -t rsa -b 4096 -C "YOUR-EMAIL@EXAMPLE.COM"
```

Based on your requirements, choose the key type and the key size. However, it's better to adopt a stronger security.

To evaluate the correctness of the profile, run the following command:

```
> sudo agama profile validate AGAMA-PROFILE.json
```

3 Details of an Agama installation profile

The Agama profile contains various sections to configure different aspects of the system installation. For real deployments where you would want to simultaneously install multiple systems with the same initial configuration, prepare a customized profile with all the necessary details. You can start with the template of the minimal example and add details progressively. This section gives you an idea of the most useful details you should consider for real deployments.

3.1 Product configuration for an Agama installation profile

The <u>product</u> section defines the SUSE product to be installed and includes optional registration data and add-on modules. This is essential for systems requiring access to subscription repositories or additional functionality.

EXAMPLE 2: SAMPLE product CONFIGURATION FOR AN AGAMA INSTALLATION PROFILE

```
"product": {
   "id": "SUSE Linux Enterprise Server 16.0",
   "registrationCode": "REGISTRATION-CODE",
```

This section contains the following fields:

id

The product identifier used to select the base SUSE product to be installed.

registrationCode

The registration code for the product obtained from SUSE Customer Center, and used to activate repositories and receive updates.

registrationEmail

The email address associated with the registration account used during product activation.

registrationUrl

The full URL of the registration server. If you are using SUSE Customer Center, you can omit this field. However, it is useful when registering from a custom server.

addons

A list of optional add-on modules or extensions to be activated alongside the base product.

- id: Identifier of the add-on. For example, sle-ha for High Availability.
- version: Specific version of the add-on to be installed. This is required if multiple versions are available.
- registrationCode: Optional registration code for the add-on if separate activation is required.

3.2 Hostname configuration for an Agama installation profile

The hostname section sets the system's static and transient hostname. The static hostname is persistent across reboots, while the transient hostname is used temporarily at runtime and may be overridden by network services like DHCP.

EXAMPLE 3: SAMPLE hostname CONFIGURATION FOR AN AGAMA INSTALLATION PROFILE

```
"hostname": {
   "static": "STATIC-HOSTNAME",
   "transient": "TRANSIENT-HOSTNAME"
}
```

This section contains the following fields:

static

The persistent hostname written to /etc/hostname. This name remains consistent across system reboots and is used by default if no transient hostname is specified.

transient

A temporary hostname applied at runtime. This may be used during deployment or installation to reflect an ephemeral identity. For example, it can be set via DHCP or by installation tooling like Agama.

3.3 Root authentication for an Agama installation profile

The <u>root</u> section defines authentication settings for the system's <u>root</u> account. This includes a root password (either plain or pre-hashed) and an optional SSH public key for remote access.

EXAMPLE 4: SAMPLE root CONFIGURATION FOR AN AGAMA INSTALLATION PROFILE

```
"root": {
   "hashedPassword": true,
   "password": "HASHED-ROOT-PASSWORD",
   "sshPublicKey": "SSH-PUBLIC-KEY"
}
```

This section contains the following fields:

hashedPassword

Boolean flag indicating whether the <u>password</u> field contains a hashed value. If set to <u>true</u>, the password must be a SHA-512 crypt hash (starting with <u>\$6\$</u>). If <u>false</u> or omitted, the value is treated as plain text.

password

The root user's password. If hashedPassword is true, this must be a pre-generated hash (For example, using openssl passwd -6). Otherwise, plain text is accepted and will be hashed during installation.

You can generated a hashed password by running the following command:

```
> sudo openssl passwd -6
```

sshPublicKey

An optional SSH public key to be added to the root user's ~/.ssh/authorized_keys file. This allows passwordless root login over SSH. The key must be in OpenSSH format. For example, starting with ssh-rsa or ssh-ed25519.

You can generate an SSH public key by running the following command:

```
> sudo ssh-keygen -t rsa -b 4096 -C "YOUR-EMAIL@EXAMPLE.COM"
```

Based on your requirements, choose the key type and the key size. However, it's better to adopt a stronger security.

3.4 User configuration for an Agama installation profile

The <u>user</u> section defines the initial non-root user account created during installation. This includes the user's full name, login name, password (plain or hashed), and optional automatic login preference.

EXAMPLE 5: SAMPLE user CONFIGURATION FOR AN AGAMA INSTALLATION PROFILE

```
"user": {
   "hashedPassword": false,
   "fullName": "FULL-NAME",
   "userName": "LOGIN-NAME",
   "password": "USER-PASSWORD",
   "autologin": false
}
```

This section contains the following fields:

hashedPassword

Boolean flag indicating whether the <u>password</u> field contains a hashed value. If set to <u>true</u>, the password must be a pre-hashed SHA-512 crypt value. Otherwise, the plain text password will be hashed during installation.

fullName

The full name of the user, typically used for display purposes in graphical environments. For example, Jane Doe.

userName

The system login name for the user. This becomes their Linux username and home directory under /home. For example, jane.

password

The user's password, in plain text or pre-hashed depending on the hashedPassword flag. If plaintext is provided, it will be automatically hashed.

autologin

Optional boolean that determines whether the user should be automatically logged into a graphical session at boot. This setting is only relevant for desktop installations.

3.5 Localization configuration for an Agama installation profile

The <u>localization</u> section defines the system language, keyboard layout, and time zone settings. These parameters determine the default locale and input behavior after installation.

EXAMPLE 6: SAMPLE localization CONFIGURATION FOR AN AGAMA INSTALLATION PROFILE

```
"localization": {
   "language": "LANGUAGE-ID",
   "keyboard": "KEYBOARD-LAYOUT",
   "timezone": "TIMEZONE"
}
```

This section contains the following fields:

language

The system language and locale, specified as a locale string. For example, en_US.UTF-8 or de_DE. This controls messages, number formats, date formats, and default encoding.

keyboard

The default keyboard layout identifier. For example, <u>us</u> or <u>de</u>. This affects key mapping on both text consoles and graphical desktops.

timezone

The system time zone, using a region/location format. For example, <u>Europe/Berlin</u>. This sets the default system clock and affects date/time display.

3.6 Software configuration for an Agama installation profile

The <u>software</u> section defines which software components are installed on the system via SUSE's pattern and package management infrastructure.

EXAMPLE 7: SAMPLE software CONFIGURATION FOR AN AGAMA INSTALLATION PROFILE

```
"software": {
    "patterns": [
        "minimal_base",
        "app_server"
],
    "packages": [
        "vim",
        "htop",
        "curl"
]
```

This section contains the following fields:

patterns

A list of software patterns to be installed. Patterns are curated collections of packages designed to serve a functional role. For example, minimal_base, gnome, app_server. For a complete list of patterns available for SUSE Linux Enterprise Server and your target architecture, refer to the SUSE Customer Center.

packages

A list of individual packages to install in addition to those brought in by selected patterns. For example, <u>vim</u>, <u>htop</u> and <u>curl</u>. For a complete list of packages available from the official SUSE Linux Enterprise Server repositories for your target architecture, refer to the SUSE Customer Center.



Note: Trust the GPG key for the Package Hub repository

When enabling SUSE Package Hub during a manual installation, users are prompted to trust the repository's GPG key. To trust the key automatically during an unattended installation, use the following snippet:

```
f
product: {
  id: 'SLES',
  registrationCode: 'SLES_REG_CODE',
```

```
addons: [
        id: 'PackageHub',
    ]
  },
  questions: {
    policy: 'auto',
    answers: [
      {
        answer: 'Trust',
        class: 'software.import_gpg',
        data: {
          fingerprint: 'BF3F 9A67 D3A2 FF98 A73F 5E07 488C 583D 287A 0027',
          name: 'openSUSE Backports for SUSE Linux 16 sle-
backports-202500514@opensuse.org',
          id: '488C583D287A0027'
        }
      }
    ]
  }
}
```

3.7 Storage configuration for an Agama installation profile

The <u>storage</u> section defines the system's target disk layout, such as partitions, filesystems, and volume management, to be applied during installation. This field references the Agama storage schema, which is referenced from the profile schema.



Note: Advanced storage configuration

An exhaustive description of all possible storage configuration using Agama is beyond the scope of this section, as it will need a careful consideration of the storage model schema. For information on advanced storage configuration, refer to the section *Section 7*,

"Advanced storage configuration using Agama profiles".

EXAMPLE 8: SAMPLE storage CONFIGURATION FOR AN AGAMA INSTALLATION PROFILE

```
"storage": {
    "disks": [
    {
```

This section contains the following fields:

disks

A list of disks on which partitions will be defined.

- device: The full device path, such as /dev/sda.
- partitions: A list of partitions to create on the disk.
 - mountPoint: The mount point for the partition, or swap for swap areas.
 - fsType: Filesystem type, such as ext4 or swap.
 - size: Size of the partition (e.g., 20G).

3.8 Bootloader configuration for an Agama installation profile

The <u>bootloader</u> section defines boot-time behavior, including whether to pause at the boot menu and what extra kernel parameters to pass. It affects the installed system's GRUB configuration.

EXAMPLE 9: SAMPLE bootloader CONFIGURATION FOR AN AGAMA INSTALLATION PROFILE

```
"bootloader": {
   "stopOnBootMenu": false,
   "timeout": 5,
   "extraKernelParams": "KERNEL-PARAMETERS"
}
```

This section contains the following fields:

stopOnBootMenu

Boolean flag that, if set to <u>true</u>, forces the system to stop at the GRUB boot menu instead of proceeding automatically. This is useful for debugging or choosing alternate boot options manually.

timeout

Number of seconds the GRUB boot menu is shown before continuing with the default entry. Set to 0 to boot immediately.

extraKernelParams

Additional kernel command-line parameters to append to the default ones during boot. These are passed directly to the Linux kernel. For example, console=ttyS0 or quiettys0.

3.9 Network configuration for an Agama installation profile

The <u>network</u> section defines one or more network connections to be configured during installation. Each connection supports IP setup, interface binding, wireless settings, bonding, bridging, and optional enterprise-grade authentication mechanisms like IEEE 802.1X.

EXAMPLE 10: SAMPLE network CONFIGURATION FOR AN AGAMA INSTALLATION PROFILE

```
"network": {
  "connections": [
      "id": "ETHO-CONNECTION",
      "interface": "eth0",
      "method4": "manual",
      "addresses": ["192.168.100.10/24"],
      "gateway4": "192.168.100.1",
      "nameservers": ["1.1.1.1", "8.8.8.8"],
      "autoconnect": true
   },
      "id": "WIFI-HOME",
      "interface": "wlan0",
      "method4": "auto",
      "wireless": {
        "ssid": "MYSSID",
        "password": "MYWIFIPASSWORD",
        "security": "wpa-psk"
```

```
}
    },
    {
      "id": "BRIDGE0",
      "interface": "br0",
      "method4": "auto",
      "bridge": {
        "stp": true,
        "forwardDelay": 15,
        "ports": ["eth0", "eth1"]
      }
    },
    {
      "id": "BOND0",
      "interface": "bond0",
      "method4": "manual",
      "addresses": ["10.0.0.100/24"],
      "gateway4": "10.0.0.1",
      "bond": {
        "mode": "active-backup",
        "options": "miimon=100",
        "ports": ["eth2", "eth3"]
      }
    },
      "id": "SECURE-ETH",
      "interface": "eth4",
      "method4": "auto",
      "ieee-8021x": { 1
        "eap": ["peap"],
        "identity": "USERNAME",
        "password": "PASSWORD",
        "caCert": "/etc/certs/ca.pem"
      }
    }
  1
}
```



Note

Support for IEEE 802.1X authentication is intended for advanced enterprise deployments where authentication is required at the link layer, before IP is assigned. This commonly involves integration with RADIUS and certificate-based trust. Misconfiguration can result in complete network inaccessibility. Refer to systemd-networkd documentation for authoritative guidance.

This section contains the following connection attributes:

id

Unique name for the network connection.

interface

Name of the network interface to bind to (for example, eth0).

method4

IPv4 addressing method (auto, manual, etc.).

method6

IPv6 addressing method (auto, manual, etc.).

addresses

List of static addresses in CIDR format.

gateway4 / gateway6

IPv4 and IPv6 default gateway addresses.

nameservers

List of DNS server IPs.

autoconnect

Boolean. Whether the connection is brought up automatically.

wireless

Defines wireless-specific settings:

- ssid: Wi-Fi network name.
- password: Wi-Fi passphrase.
- security: Key management (for example, wpa-psk).

bridge

Defines bridge-specific settings:

- stp: Boolean. Enables Spanning Tree Protocol.
- forwardDelay: STP forwarding delay in seconds.
- ports: Interfaces to include in the bridge.

bond

Defines bonding configuration:

- mode: Bonding mode (for example, active-backup).
- options: Optional bonding parameters (for example, miimon=100).
- ports: List of interfaces in the bond.

ieee-8021x

Defines enterprise authentication settings:

- eap: List of EAP methods (for example, peap, tls).
- identity: Login identity (typically username).
- password: Authentication password (if needed).
- caCert: Path to trusted CA certificate.

3.10 Security configuration for an Agama installation profile

The <u>security</u> section allows you to add trusted SSL certificates to the installed system. This is useful when connecting to internal package mirrors, registration servers, or other TLS services that require non-default certificate authorities.

EXAMPLE 11: SAMPLE security CONFIGURATION FOR AN AGAMA INSTALLATION PROFILE

```
"security": {
    "sslCertificates": [
          {
               "fingerprint": "FINGERPRINT",
                "algorithm": "SHA256"
          }
          ]
          ]
}
```

This section contains the following fields:

sslCertificates

A list of custom SSL certificates to install into the system's trust store. Each item specifies the certificate's fingerprint and the hashing algorithm used.

- <u>fingerprint</u>: The cryptographic fingerprint of the certificate, formatted as a colon-separated hex string. For example, A8:DE:08:B1:57:52:FE:70:D-F:D5:31:EA:E3:53:BB:39:EE:01:FF:B9.
- algorithm: The fingerprint algorithm used to compute the hash. Supported values are SHA1 and SHA256.



Warning: Use SHA256 for better security

SHA1 is cryptographically broken and should not be used. Use SHA256 wherever possible.

To verify the fingerprint of a certificate in PEM format:

```
> sudo openssl x509 -in FILE.pem -noout -fingerprint -sha256
```

Trusted certificates can be installed permanently by placing them in /etc/pki/trust/anchors and then executing:

```
> sudo update-ca-certificates
```

3.11 Scripts configuration for an Agama installation profile

The <u>scripts</u> section allows you to define custom shell scripts to be executed at different stages of the SUSE installation lifecycle. These scripts can be embedded inline, fetched from a URL, and optionally executed in a chroot environment (where applicable).

EXAMPLE 12: SAMPLE scripts CONFIGURATION FOR AN AGAMA INSTALLATION PROFILE

```
"scripts": {
    "pre": [
        {
            "name": "PRE-CHECK-DISK.sh",
                "content": "#!/bin/bash\nif [ ! -e /dev/sda ]; then echo 'Disk not found' >&2; exit
1; fi"
        }
     ],
        "postPartitioning": [
        {
                "name": "CREATE-MOUNTS.sh",
                 "url": "http://EXAMPLE.COM/SCRIPTS/MOUNTS.sh"
```

```
}
],
"post": [
    {
        "name": "FINALIZE-INSTALL.sh",
        "content": "#!/bin/bash\necho 'Installation complete'",
        "chroot": true
    }
],
"init": [
    {
        "name": "FIRST-BOOT.sh",
        "content": "#!/bin/bash\necho 'System booted for the first time'"
    }
]
```

This section defines the following script categories:

pre

Scripts executed before the installation begins. Useful for pre-flight checks or environment preparation.

postPartitioning

Scripts run immediately after partitioning is completed, but before packages are installed.

post

Scripts run after installation finishes. These can optionally execute within the target system's root via chroot.

init

Scripts executed during the first boot of the installed system. These are useful for final configuration, logging, or notifications.

Each script object may contain one of the following keys:

name

File name used to identify the script on disk. Required for all scripts.

content

Inline script body. Must begin with a shebang (for example, #!/bin/bash).

url

HTTP/HTTPS location from which to fetch the script. Cannot be combined with content.

chroot

Boolean. If <u>true</u>, the script is executed inside the installed system's root via chroot. Applies only to post scripts.

3.12 Files configuration for an Agama installation profile

The <u>files</u> section allows deployment of custom user-defined files into the installed system. These files are written just before post-installation scripts run and can be useful for configuring services, dropping keys, or overriding system files.

EXAMPLE 13: SAMPLE files CONFIGURATION FOR AN AGAMA INSTALLATION PROFILE

This section contains an array of file definitions. Each entry supports the following fields:

destination

Required absolute path where the file will be written inside the target system. For example, /etc/MYAPP/CONFIG. YAML.

content

Inline string representing the content of the file. This field is mutually exclusive with url; one of the two must be present.

url

URL (relative or absolute) to fetch the file content from. Used instead of inline <u>content</u>. One of url or content is required.

permissions

Optional file mode string (octal), such as 0644 or 0755, to set on the created file.

user

Optional owner username to assign to the file. The user must already exist in the installed system.

group

Optional owner group to assign to the file. The group must already exist in the installed system.

3.13 Legacy AutoYaST storage configuration for an Agama installation profile

The <u>legacyAutoyastStorage</u> section allows reuse of AutoYaST-style storage definitions by expressing them in JSON. It accepts an array of opaque objects directly representing the legacy partitioning structure, allowing migration or backward compatibility for existing storage configurations.

EXAMPLE 14: SAMPLE legacyAutoyastStorage CONFIGURATION FOR AN AGAMA INSTALLATION PROFILE

```
"legacyAutoyastStorage": [
    "partitions": {
      "partition": [
       {
          "device": "/dev/sda1",
          "mount": "/",
          "size": "20G",
          "filesystem": "ext4"
        },
          "device": "/dev/sda2",
          "mount": "swap",
          "size": "4G",
          "filesystem": "swap"
        }
      ]
   }
 }
```

This section contains the following:

legacyAutoyastStorage

An array of JSON objects compatible with the XML structure used in AutoYaST's <u>partitioning</u> section. This allows experienced administrators to reuse complex partitioning logic without switching to Agama-native storage syntax.

3.14 iSCSI configuration for an Agama installation profile

The <u>iscsi</u> section defines parameters required for configuring iSCSI targets that should be discovered and mounted during system installation. This is particularly relevant for systems that boot from SAN or use iSCSI-based storage volumes.

EXAMPLE 15: SAMPLE iSCSI CONFIGURATION FOR AN AGAMA INSTALLATION PROFILE

This section contains the following configuration keys:

initiatorName

The iSCSI initiator name (IQN) of the client system. Must follow the iSCSI naming convention. For example, iqn.2025-05.com.suse:agama-client.

targets

An array of target definitions to connect to. Each target supports the following fields:

- address: IP address or hostname of the iSCSI target.
- port: TCP port of the target. Default is 3260.
- target: IQN of the iSCSI target to connect to.
- user and password: CHAP authentication credentials, if required by the target.
- <u>autoLogin</u>: Boolean flag indicating whether to automatically log in to the target during boot.

3.15 DASD devices configuration for an Agama installation profile

The <u>dasd</u> section is used to activate, configure, or format Direct Access Storage Device (DASD) volumes on IBM Z (s390x) systems. It is relevant only when installing SUSE on mainframe hardware.

EXAMPLE 16: SAMPLE dasd DEVICES CONFIGURATION FOR AN AGAMA INSTALLATION PROFILE

This section defines the following keys:

devices

A list of DASD devices to configure. Each device is represented as an object with the following fields:

- channel: Required. The device channel path, typically in the format 0.0.xxxx.
- <u>state</u>: Optional. Indicates whether the device should be made <u>active</u> or put <u>offline</u>. Defaults to active.
- <u>format</u>: Optional. Boolean indicating whether the device should be formatted. If unspecified, formatting happens only if necessary.
- diag: Optional. Boolean indicating whether the device should have its diagnostic (diag) flag set. If unspecified, the existing state is preserved.

4 Using AutoYaST profiles with Agama

Agama introduces a modern, declarative installation framework that diverges significantly from the legacy AutoYaST system, even though both aim to automate SUSE Linux Enterprise Server deployments. While partial reuse of existing AutoYaST profiles is possible, direct compatibility is limited due to schema differences, semantic mismatches, and architectural shifts. This topic outlines how to load AutoYaST profiles in Agama, identifies supported modules, and offers practical guidance for converting legacy profiles using recommended tools and conventions.

4.1 Benefits of using AutoYaST profiles in Agama

Reusing existing AutoYaST profiles in Agama provides a pragmatic starting point for teams migrating to the new installer without discarding prior investments. Although direct compatibility is limited, leveraging AutoYaST profiles accelerates transition efforts by retaining core configuration logic, organizational conventions, and validated deployment workflows.

Using AutoYaST profiles in Agama has the following benefits:

Reduced duplication of effort

Existing infrastructure-as-code assets can inform Agama profile structure, minimizing rework.

Faster onboarding

Administrators familiar with AutoYaST can map known modules to Agama fields incrementally.

Incremental migration

Supported AutoYaST elements can be reused while unsupported ones are refactored or omitted over time.

Validation of system assumptions

Reviewing legacy profiles helps surface deprecated patterns and adapt them to Agama's declarative model.

4.2 Limitations of using AutoYaST profiles in Agama

While reusing AutoYaST profiles in Agama may provide a head start during migration, it also introduces significant limitations. The fundamental differences in schema structure, execution model, and configuration philosophy mean that AutoYaST-based profiles can constrain the effectiveness and clarity of Agama workflows if carried over directly.

Using AutoYaST profiles in Agama has the following limitations:

Procedural bias

AutoYaST profiles often rely on execution order, embedded scripts, and imperative constructs, which have no counterpart in Agama's declarative design.

Semantic mismatch

Many AutoYaST modules encapsulate behavior or assumptions not explicitly modeled in Agama, leading to subtle incompatibilities or misconfigurations during reuse.

Reduced transparency

Profiles imported from AutoYaST tend to obscure the declarative simplicity of Agama, making troubleshooting and peer review harder.

Missed modernization opportunities

Clinging to legacy profiles may prevent users from fully adopting Agama's modular, readable, and cloud-native configuration style.

4.3 Loading AutoYaST profiles with Agama

Agama supports loading AutoYaST profiles as part of its transitional support for legacy automation systems. This allows administrators to reuse existing configuration assets while gradually migrating to the native Agama profile format. Several loading mechanisms are available depending on the deployment context and profile structure.

PROCEDURE 1: LOADING AN AUTOYAST PROFILE USING AGAMA

Use the following steps to load an AutoYaST profile in Agama. Profiles can be supplied either through kernel boot parameters or imported using the Agama CLI.

- 1. Select a method for providing the AutoYaST profile to Agama:
 - Load the profile using a kernel boot parameter. Add the <u>inst.auto</u> parameter to the kernel command line and specify the URL of the AutoYaST profile:

```
> sudo linux inst.auto=http://EXAMPLE.NET/AGAMA/SLES.xml
```

This method is commonly used in PXE boot setups or custom ISO builds.

• Import the profile using the Agama CLI. Run the following command to fetch and preprocess the AutoYaST profile:

```
> sudo agama profile import URL
```

Supported formats include:

- Agama profiles: .json, .jsonnet, .sh
- AutoYaST profiles: .xml, .erb, and directories such as rules/ or classes/

For more information on supported URL types, refer to https://agama-project.github.io/docs/user/urls ▶.

When importing AutoYaST content, the CLI automatically evaluates dynamic features such as:

- Rules and classes for conditional profile selection
- Embedded Ruby (ERB) for template-based profile generation
- Pre-installation scripts to dynamically modify profile content
- 2. Display the loaded or imported profile, or pip[e it to a JSON file:

```
> sudo agama config show > profile.json
```

4.4 Best practices for converting AutoYaST profiles to Agama profiles

Converting AutoYaST profiles to Agama profiles involves transforming the original XML into Agama's JSON or Jsonnet format. This procedure outlines the recommended steps using the Agama CLI.

1. Convert the AutoYaST profile to a JSON file by piping the CLI output to a destination file:

```
> sudo agama profile autoyast http://EXAMPLE.NET/AUTOYAST.xml > profile.json
```

This command fetches and processes the AutoYaST profile, then writes the resulting Agama-compatible JSON to the specified file.

2. Validate the converted profile:

```
> sudo agama profile validate profile.json
```

This ensures schema compliance and helps identify any unsupported or misconverted fields.

- **3.** Manually rework or remove unsupported sections, using Agama's schema documentation as a reference.
- **4.** If you require dynamic behavior, convert the profile to Jsonnet. You can then evaluate it into JSON:

```
> sudo agama profile evaluate profile.jsonnet > profile.json
```

5. Test the final profile by loading it into an Agama installation session:

```
> sudo agama config load profile.json
```

6. Make final edits to the loaded profile before starting installation:

```
> sudo agama config edit
```

5 Initiating automated installation using Agama

This topic guides you through starting an automated installation using Agama. You can initiate the process either by specifying boot parameters or by using the Agama command-line interface.

5.1 Initiating the unattended installation

PROCEDURE 3: INITIATING THE UNATTENDED INSTALLATION

1. Start the installation using kernel boot parameters.

Add the <u>inst.auto</u> parameter to the kernel command line to specify the location of the Agama profile:

```
> sudo inst.auto=http://example.net/profile.json
```

This method is suitable for PXE boot setups, custom ISO builds, or cloud-init workflows.

- 2. If you want to access the Agama CLI later, you need to log in as root using a text console. For that purpose, set a password using the live.password=PASSWORD boot parameter.
- 3. Log in as root through a text console, using the password set earlier by editing the boot parameters. If using a software such as the Virtual Machine Manager, use the *Send Keys* menu to send the signal Ctrl Alt F1 for a text console. To return to a graphical console, use Ctrl Alt F2 or Ctrl Alt F7.

After logging in as root using a text console, you will have the Agama CLI available.

- 4. Start the installation using the Agama CLI.
 - a. Load the profile with the following command:

```
# agama config load profile.json
```

b. Edit the profile configuration with the following command:

```
# agama config edit profile.json
```

c. Validate the profile:

```
# agama config validate profile.json
```

d. Initiate the installation with the following command:

```
# agama install
```

e. Monitor the installation with the following command:

```
# agama monitor
```

f. Finish the installation with the following command:

agama finish

6 Activating multipath during installation of SUSE Linux Enterprise using Agama

This topic guides you to activate multipath for storage devices while installing SUSE Linux Enterprise using Agama. You can force activation by modifying boot parameters, or conditionally activate it by modifying Agama profiles.

6.1 Understanding multipath activation during installation using Agama

Multipath in Linux is a device mapper framework that provides redundancy and improved performance for storage devices by creating a single logical device from multiple physical paths to the same storage target. This architecture prevents storage I/O interruptions due to hardware failures while enabling load balancing across paths, and is commonly used in enterprise environments.

To enable this capability, the multipath subsystem must be activated by Agama during installation of SUSE Linux Enterprise. Once activated, multipath affects all devices system-wide, meaning all disks must be referenced exclusively by their corresponding multipath device names. Agama currently provides several mechanisms for users to activate multipath support.

6.2 Requirements

- The Agama installer, which is available with the <u>.iso</u> file you use for installing SUSE Linux Enterprise.
- For *forced* activation of multipath, access to command line boot parameters.
- For conditional activation of multipath, access to the Agama web interface, or the Agama CLI, or Agama profiles.

By default, you should have access to all the different ways of forced and conditional activation of multipath.

6.3 Activating multipath using boot parameters

If you are certain that the system uses multipath, the most reliable method to ensure that Agama activates the corresponding subsystems is to enable the environment variable LIBSTOR-AGE MULTIPATH AUTOSTART at the time of boot.

To enable multipath during installation, perform the following steps:

- 1. When the boot menu is displayed, select to edit the boot parameters.
- 2. Add the LIBSTORAGE_MULTIPATH_AUTOSTART parameter and set it to 1.



FIGURE 2: ACTIVATION OF MULTIPATH USING BOOT PARAMETERS

3. Select Ctrl - x or F10 to exit the edit window and continue with the boot.

6.4 Activating multipath using Agama web interface, CLI, or profiles

If multipath activation is not enforced through the boot parameter, Agama attempts to detect multipath devices in the system. When detected, Agama either prompts you to confirm multipath activation, or proceeds with unattended installation based on the answer provided in the Agama profile.



Warning: Unreliable multipath detection

Detection of multipath devices using Agama is not fully reliable. If you are sure that the system uses multipath devices, we recommend using the method of enabling the necessary boot parameters.

Depending on whether you are performing an interactive or an unattended installation, perform the necessary steps as described below.

- • In an **interactive** installation, Agama prompts you to confirm whether to activate multipath. The prompt can be answered interactively using the web interface, or in the command-line interface using the **agama questions** command.
 - If using the web interface, confirm when you see a prompt similar to the following:

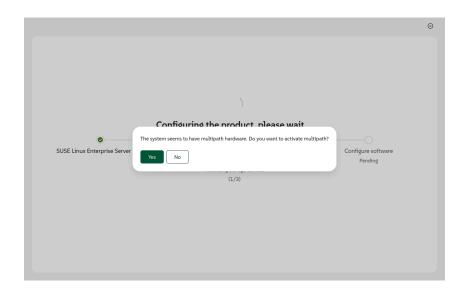


FIGURE 3: ACTIVATION OF MULTIPATH USING THE AGAMA WEB INTERFACE

- If using the Agama CLI, perform the following:
 - a. Edit the Agama profile to include the following JSON configuration:

b. Provide the path to answers of Agama questions using the following command:

```
# agama questions answers PATH/TO/JSON/FILE
```

- In an **unattended** installation, Agama looks for an answer to the question about multipath activation in the Agama profile.
 - a. Edit the Agama profile to include the following JSON configuration:

b. Provide the path to the Agama profile using the inst.auto=URL/PATH/TO/AGA-MA/JSON/PROFILE boot parameter.

6.5 Summary of multipath activation

If you are performing a manual installation of SUSE Linux Enterprise using Agama, you can activate multipath support by adding the LIBSTORAGE_MULTIPATH_AUTOSTART=1 boot parameter, or confirming multipath activation using the web or command-line interfaces of Agama during the installation process.

If you are performing an unattended installation using Agama, edit the Agama profile to include answer to the question of multipath activation, and pass the path to the profile as the value of the inst.auto boot parameter.

6.6 Troubleshooting multipath activation

Depending on the chosen method of multipath activation, use one of more of the following troubleshooting tips:

- If using forced activation, ensure that you correctly add the LIBSTORAGE_MULTIPATH_AU-TOSTART=1 boot parameter. After the boot, you can verify it in the content of the GRUB 2 configuration file of your system.
- If using answers to Agama questions, ensure that you have used the correct JSON snippet for multipath activation, by running the **agama config show** command.

7 Advanced storage configuration using Agama profiles

Storage configuration in Agama is one of the most powerful and flexible components of the automated installation process. It allows you to declaratively define everything from simple partition layouts to sophisticated combinations of LUKS encryption, Logical Volume Management (LVM), software RAID, and Btrfs subvolumes — all before the system is booted for the first time.

This topic primarily describes the Agama storage schema as described in https://github.com/agama-project/agama/blob/master/rust/agama-lib/share/storage.schema.j-son. Each section in this topic focuses on a specific capability or concept: basic partitions, encrypted volumes, nested logical volumes, RAID configurations, Btrfs setups, and advanced directives like preservation flags or formatting instructions. Together, they enable reproducible, secure, and scalable disk layout management suitable.

Although a minimal configuration might only need one disk and one mount point, a more detailed storage model enables production-ready deployment pipelines, disaster recovery consistency, and tight security controls from the first boot.

7.1 Top-level schema elements

At the highest level, the <u>storage</u> section in the Agama profile is an array of disk configuration objects. Each object describes a physical or virtual block device, and how partitions or logical volumes should be created on it. These objects live under the top-level <u>storage</u> key in the profile schema.



Note: Minimal top-level storage

The following example illustrates only the bare minimum needed to define a disk object. It does not reflect the full capabilities of the Agama storage model such as partitioning, encryption, volume management, or reuse behavior. These topics are covered in later sections.

7.2 Filesystems partitions

Standard partitions are used to create filesystems directly on a disk. These are the most common storage entities and are defined under the <u>partitions</u> array inside a disk object. Each partition can specify properties like mount points, filesystems type, format behavior, and reuse preferences.

The example below demonstrates a configuration that sets up two partitions: one EFI system partition and one root partition formatted with XFS.

EXAMPLE 18: PARTITIONED DISK WITH EFI AND ROOT FILESYSTEMS

```
{
  "type": "disk",
  "device": "/dev/sda",
  "wipe": true,
  "partitions": [
      "type": "efi",
      "size": 256,
      "mountPoint": "/boot/efi",
      "preserve": false,
      "format": true
    },
      "type": "partition",
      "mountPoint": "/",
      "fsType": "xfs",
      "size": 20480,
      "preserve": false,
      "format": true
    }
  ]
```

```
}
]
```

This section contains the following elements:

type

Either efi or partition. Determines how the partition is treated.

size

Size of the partition in MiB. If omitted, the remaining space is used.

mountPoint

Mount point inside the target filesystems. Must be specified unless the partition is unmounted.

fsType

Filesystems type, such as xfs, ext4, or btrfs. Required unless format is false.

preserve

Boolean flag. When true, existing data on this partition is preserved. Defaults to false.

format

Boolean flag. When true, the partition will be freshly formatted. Defaults to true unless preserve is set.

7.3 LUKS encryption

Agama supports encrypting block devices using LUKS. Encrypted devices can be used as mountable filesystems or as physical volumes in LVM setups. Each encrypted block must define its own passphrase or refer to a key file.

The example below shows a basic LUKS-encrypted root partition, created inside a disk and mounted as the system root.

EXAMPLE 19: ROOT FILESYSTEM ENCRYPTED WITH LUKS

```
"size": 256,
        "mountPoint": "/boot/efi",
        "format": true,
        "preserve": false
      },
        "type": "crypt",
        "name": "cryptroot",
        "cipher": "aes-xts-plain64",
        "keySize": 512,
        "password": "MY-SECRET-PASSWORD",
        "volume": {
          "type": "partition",
          "mountPoint": "/",
          "fsType": "xfs",
          "size": 20480,
          "format": true,
          "preserve": false
        }
      }
    ]
 }
]
```

This section contains the following elements:

type

Must be set to crypt to declare a LUKS encrypted volume.

name

Name for the mapped LUKS device, used in /dev/mapper.

cipher

Encryption cipher. For example, aes-xts-plain64.

keySize

Key size in bits. Common values are 256 or 512.

password

The passphrase used to unlock the encrypted volume. Can be replaced with <u>keyFile</u> if using an external key.

volume

The block device definition that will reside within the LUKS container. Often a single partition, but can also be a volume group.

7.4 Logical Volume Management (LVM)

Logical Volume Management allows aggregating multiple block devices or partitions into a single logical storage pool. In Agama, LVM setups are described using a <u>volumeGroup</u> type, under which logical volumes are listed.

EXAMPLE 20: LVM SETUP WITH A SINGLE LOGICAL VOLUME

```
[
  {
    "type": "disk",
   "device": "/dev/sda",
    "wipe": true,
    "partitions": [
      {
        "type": "partition",
        "size": 30720,
        "volume": {
          "type": "volumeGroup",
          "name": "systemvg",
          "volumes": [
            {
              "name": "home",
              "mountPoint": "/home",
              "fsType": "xfs",
              "size": 20480,
              "format": true,
              "preserve": false
            }
          ]
        }
      }
    ]
 }
]
```

This section contains the following elements:

type

Set to volumeGroup to define a new LVM volume group container.

name

Name of the volume group. Used for identifying the group in /dev/<vg-name>/.

volumes

List of logical volumes within this volume group. Each volume is defined using fields like name, mountPoint, fsType, and size.

7.5 RAID configuration

Agama allows defining software RAID arrays directly within the storage configuration using the mdraid type. You can specify the RAID level, involved devices, chunk size, and metadata version, among other options. These arrays can be used as mountable volumes or serve as physical volumes in LVM or encryption stacks.

EXAMPLE 21: BASIC RAID 1 SETUP WITH /HOME MOUNTED

```
{
    "type": "disk",
    "device": "/dev/sda",
    "wipe": true
 },
  {
    "type": "disk",
    "device": "/dev/sdb",
    "wipe": true
 },
    "type": "mdraid",
    "level": "1",
    "devices": ["/dev/sda", "/dev/sdb"],
    "volume": {
      "type": "partition",
      "mountPoint": "/home",
      "fsType": "xfs",
      "size": 10240,
      "format": true,
      "preserve": false
    }
 }
]
```

This section includes the following elements:

type

Must be set to mdraid to define a software RAID device.

level

The RAID level to use (e.g., 0, 1, 5, 6, or 10).

devices

List of block devices that participate in the array.

volume

The volume definition describing what should be created on top of the RAID array. It may be a regular filesystem partition, a LUKS container, or an LVM setup.

7.6 Btrfs layout

Agama supports configuring Btrfs subvolumes and mount points, allowing granular control over snapshot-aware filesystems. You can define a top-level Btrfs partition or volume, then define subvolumes under it, each optionally with its own mount point.

EXAMPLE 22: BTRFS SETUP WITH MULTIPLE SUBVOLUMES

```
{
    "type": "disk",
    "device": "/dev/sda",
    "wipe": true,
    "partitions": [
      {
        "type": "btrfs",
        "mountPoint": "/",
        "format": true,
        "subvolumes": [
          {
            "name": "@home",
            "mountPoint": "/home"
          },
            "name": "@log",
            "mountPoint": "/var/log"
      }
    ]
  }
]
```

This section includes the following elements:

type

Must be set to btrfs to define a Btrfs partition.

mountPoint

The mount point for the root of the Btrfs volume (e.g., /).

format

Whether to format the Btrfs partition. Must be set to true to create new filesystems.

subvolumes

List of Btrfs subvolumes. Each subvolume is an object with at least a <u>name</u>, and optionally a mountPoint.

- name: The name of the Btrfs subvolume (e.g., @home).
- mountPoint: Mount point for this subvolume (e.g., /home).

7.7 Partition flags and modifiers

Flags and attributes that influence partition behavior, naming, sizing, and boot compatibility.

EXAMPLE 23: EXAMPLE WITH PARTITION FLAGS AND METADATA

This section describes the following partition attributes:

grow

]

If set to <u>true</u>, this partition or volume will take up any leftover space after allocating other defined volumes.

esp

Marks the partition as an EFI System Partition. This is required for UEFI boot setups when using a separate /boot partition.

label

Human-readable label to assign to the partition or logical volume. For example, $\underline{\text{HOME}}$ or B00T.

id

Unique identifier used to reference this partition in other sections or mount relationships. Optional, but useful for referencing volumes in complex setups.

7.8 Reusing existing volumes

To preserve data or reuse partitions from a previous installation, Agama supports marking individual storage entries with preserve: true. This avoids reformatting or wiping the specified device or volume.

EXAMPLE 24: REUSING AN EXISTING / home PARTITION

```
[
    "type": "disk",
    "device": "/dev/sda",
    "wipe": false,
    "partitions": [
        {
            "mount": "/home",
            "preserve": true,
            "id": "home-partition"
        }
    ]
}
```

```
}
]
```

This section describes the relevant flag:

preserve

If <u>true</u>, the existing content of the volume will not be deleted or reformatted. This is useful when retaining data directories like <u>/home</u> or reuse across installations. The target must already be formatted with a valid filesystem.

7.9 Real-world example configurations

Here are several end-to-end examples illustrating common and practical storage layouts.

EXAMPLE 25: UEFI LAYOUT WITH ROOT, HOME, AND SWAP

```
[
 {
   "type": "disk",
   "device": "/dev/sda",
    "wipe": true,
    "partitions": [
        "mount": "/boot/efi",
        "size": 256,
        "filesystem": "vfat",
        "esp": true
      },
        "mount": "/",
        "size": 20480,
        "filesystem": "btrfs",
        "label": "R00T"
      },
        "mount": "/home",
        "size": 10240,
        "filesystem": "xfs",
        "label": "HOME"
      },
        "filesystem": "swap",
        "size": 4096
```

```
}
]
}
]
```

EXAMPLE 26: LVM-BACKED ROOT AND HOME PARTITIONS

```
[
 {
   "type": "disk",
   "device": "/dev/sda",
    "wipe": true,
    "partitions": [
       "type": "lvm",
       "id": "pv-system"
     }
   ]
 },
    "type": "lvm_vg",
    "id": "vg-system",
    "devices": ["pv-system"],
    "volumes": [
        "mount": "/",
        "size": 10240,
        "filesystem": "btrfs",
        "label": "R00T"
     },
      {
        "mount": "/home",
        "size": 20480,
        "filesystem": "xfs",
        "label": "HOME"
     }
    ]
 }
]
```

EXAMPLE 27: ENCRYPTED LUKS ROOT FILESYSTEM

```
"wipe": true,
    "partitions": [
      {
        "mount": "/boot",
        "size": 512,
        "filesystem": "ext4"
      },
      {
        "type": "luks",
        "id": "crypt-root"
    ]
 },
    "type": "luks_open",
    "id": "decrypted-root",
    "device": "crypt-root",
    "name": "cryptroot",
    "filesystem": "btrfs",
    "mount": "/",
    "label": "R00T"
 }
]
```

7.10 Partition type reference

The following types are valid values for the <u>type</u> field in the Agama storage schema. Each type describes a different layer or behavior in the storage stack.

disk

Represents a physical or virtual block device. It contains a list of partitions or other volume definitions.

partition

Represents a filesystem partition on a disk. Most commonly used for mount points like / boot, /home, or /.

luks

Marks a partition to be encrypted using LUKS. Must be opened later using luks_open.

luks_open

Refers to an encrypted volume defined via <u>luks</u>. It allows specifying filesystem and mount point on the decrypted device.

lvm

Initializes a partition as a physical volume (PV) for LVM. Used in combination with lvm vg.

lvm_vg

Defines a volume group that aggregates one or more PVs. Contains logical volumes with their own mount points and filesystems.

mdraid

Used to define software RAID arrays (e.g., RAID1, RAID5) over multiple disks or partitions.

btrfs subvolume

Defines a Btrfs subvolume and mount point within a Btrfs-formatted volume. Requires a parent Btrfs filesystem to exist.

7.11 Common pitfalls and edge cases

This section outlines frequently encountered mistakes and gotchas that can lead to installation failures or misconfigured systems when using Agama's storage schema.

- *Missing or incorrect* <u>id</u> *fields:* Every volume layer (disk, partition, luks, lvm, etc.) should have a unique and predictable <u>id</u>. Reusing IDs or leaving them out leads to ambiguous device paths during setup.
- *Forgetting to* mount the root volume: If no volume has a mount set to /, the system will not boot properly.
- Not marking a bootable ESP for EFI systems: UEFI-based installations must have an EFI System Partition (esp: true) mounted at /boot/efi.
- Overlapping device references: Using the same partition or device in more than one storage object (e.g., as both LUKS and plain partition) can result in failed setups.
- *Incorrect* vg *names in LVM:* Ensure that the vg names in LVM volumes match exactly with the defined id of their respective lvm_vg parent objects.
- *Using* preserve: true *without* id: Agama requires the preserved volume to be clearly referenced. Omitting id or device fields for preserved objects can break the reuse logic.
- *Inconsistent RAID configurations:* All RAID members must define the same <u>raid</u> group <u>id</u> and match in level and layout. Mismatches can silently fail or create invalid arrays.

8 Compatibility between AutoYaST and Agama profiles

AutoYaST has long been the standard for unattended and automated installations in SUSE Linux Enterprise Server systems. With the advent of the Agama installer, a new approach to system configuration and deployment has emerged—designed to be modular, declarative, and extensible using modern formats and APIs.

This section provides a detailed comparative view of the configuration models in AutoYaST and Agama, highlighting conceptual differences and offering practical guidance for transitioning to the Agama profile format. The goal is to equip experienced AutoYaST users with a clear roadmap for migrating existing profiles to the new Agama schema.

Where applicable, compatibility matrices are provided to indicate which AutoYaST modules and fields are currently supported, planned, undecided, or explicitly unsupported in Agama. These mappings are based on the upstream reference maintained by the Agama project.

8.1 Conceptual differences

This table highlights the fundamental differences in design philosophy and approach between AutoYaST and Agama.

TABLE 1: AUTOYAST VS AGAMA DESIGN COMPARISON

AutoYaST	Agama
XML-based, verbose syntax	YAML/JSON-based, declarative syntax
Feature-rich and legacy-compatible	Minimalist and cloud-native
Granular configuration of every detail	Relies on sane defaults and abstraction
Imperative and monolithic structure	Composable and modular design
Tightly coupled with YaST modules	Engineered independently with API support

8.2 Mapping AutoYaST sections to Agama schema

This section provides a detailed comparison and translation map between the major sections and modules of AutoYaST and their equivalents (or lack thereof) in the Agama profile schema. Each subsection addresses a particular functional area, indicating how configuration responsibilities are split or restructured in Agama, and clearly states where support is partial, planned, or unavailable.



Note: Granular support status for AutoYaST elements

For a more granular information on the compatibility and support status for AutoYaST elements in Agama profiles as compared to what is presented here, refer to the upstream documentation https://agama-project.github.io/docs/user/autoyast/reference.

8.2.1 System identity and localization

This section covers the basic configuration for setting the system's hostname, language, keyboard layout, timezone, and the installed product identity. These are foundational parameters during the installation and are typically mapped one-to-one between AutoYaST and Agama.

TABLE 2: SYSTEM IDENTITY AND LOCALIZATION MAPPING

AutoYaST element	Agama field	Support status	Comment
hostname	hostname.static / hostname.transient	Fully supported	Agama distinguishes static and transient hostnames.
language	localization.language	Fully supported	Uses standard locale codes (for example, en_US.UTF-8).
keyboard	localization.keyboard	Fully supported	Set using layout ID (for example, us, de).
timezone	localization.timezone	Fully supported	Timezone IDs follow the standard time- zone database names (for example, <u>Eu-</u> rope/Berlin).

AutoYaST element	Agama field	Support status	Comment
product / base	product.id	Fully supported	Matches product identifiers from the system's installed products metadata.
product / register	product.registra- tionCode, produc- t.registrationEmail, product.registra- tionUrl	Fully supported	Used for SUSEConnect-based registration. Add-ons can be declared under product.addons.

8.2.2 User management and authentication

TABLE 3: USER AND AUTHENTICATION MAPPINGS

AutoYaST element	Support status	Agama field	Comment
/root/password	Fully supported	root.password	Can be plain text or hashed using sup- ported schemes
/root/hashed_pass- word	Fully supported	root.hashedPassword = true	Indicates password is hashed
/root/ssh_autho- rized_keys	Fully supported	root.sshPublicKey	Single key string; no support for multiple entries
/users/user	Fully supported	user	Only one non-root user supported di- rectly
/users/user/encrypt-ed	Fully supported	user.hashedPassword	Same semantics as root
/users/user/pass- word	Fully supported	user.password	Plain or hashed password

AutoYaST element	Support status	Agama field	Comment
/users/user/user- name	Fully supported	user.userName	Login name
/users/user/fullname	Fully supported	user.fullName	Human-readable full name
/users/user/autolo- gin	Fully supported	user.autologin	Primarily used in desktop environments
/users/user/uid, gid, shell, home	Not supported		Agama does not cur- rently support these fine-grained user pa- rameters

8.2.3 Network configuration

This section details how network settings are defined in AutoYaST and Agama, covering interface setup, DHCP/static addressing, bonding, bridging, and other advanced networking configurations.

TABLE 4: NETWORK CONFIGURATION MAPPING

AutoYaST element	Agama field	Support status	Comment
network/config	network.interfaces	Fully supported	Supports configuring individual interfaces with static or DHCP settings.
network/dns	network.dns	Fully supported	Includes configura- tion of nameservers and search domains.
network/routing	network.routes	Fully supported	Static route configuration is supported per interface.

AutoYaST element	Agama field	Support status	Comment
network/hostname	hostname	Fully supported	System hostname can be set independently of network block.
network/bridge	network.inter- faces[].type: bridge	Fully supported	Bridge devices are supported using dedi- cated interface types.
network/bonding	network.inter- faces[].type: bond	Fully supported	Bonding configuration supports mode, primary interface, and slaves.
network/ieee8021x	network.inter- faces[].ieee8021x	Partially supported	Supports basic 802.1x authenti- cation with identi- ty, password, and method. Certificate support is limited.
network/proxy	_	Not supported	No native proxy configuration support in Agama. Should be handled post-install.

8.2.4 Storage and partitioning

This section compares the storage configuration capabilities of AutoYaST and Agama. It covers traditional partitions, logical volumes, filesystems, encryption, RAID, and other storage-specific aspects of system setup.

TABLE 5: STORAGE CONFIGURATION MAPPING

AutoYaST element	Agama field	Support status	Comment
partitioning	storage.devices[].par- titions	Fully supported	Traditional partitioning with labels, mount points, and

AutoYaST element	Agama field	Support status	Comment
			formats are fully supported.
filesystems	storage.devices[].par- titions[].filesystem	Fully supported	Common filesystems such as ext4, xfs, and btrfs are supported with mount and format options.
lvm	storage.devices[].par- titions[].lvm	Fully supported	Volume groups and logical volumes are fully supported using declarative syntax.
raid	storage.devices[].par- titions[].raid	Fully supported	Software RAID levels (0, 1, 5, etc.) are supported including metadata and spare settings.
btrfs	storage.devices[].par- titions[].btrfs	Fully supported	Subvolumes, compression, and btrfs-specific mount options are available.
encryption	storage.devices[].par- titions[].luks	Fully supported	Supports LUKS encryption with passphrase, key file, and reuse options.
reuse/initialize	storage.devices[].par- titions[].reformat / preserve	Fully supported	Reusing existing devices or forcing format is declaratively specified.
bootloader-location	_	Not supported	Installation location of the bootloader is

AutoYaST element	Agama field	Support status	Comment
			not configurable via storage profile.
partition-id type	storage.devices[].par- titions[].type	Fully supported	Allows specifying Linux native, EFI, swap, BIOS boot par- titions, etc.
partition flags	storage.devices[].par- titions[].flags	Fully supported	Supports marking partitions as bootable, ESP, hidden, etc.
complex criteria (e.g., by-id)	storage.de- vices[].match	Fully supported	Devices can be selected using labels, device paths, UUIDs, or custom match rules.

8.2.5 Software selection and patterns

This section maps how software selection is handled in AutoYaST and Agama, including individual package installation and pattern-based selections.

TABLE 6: SOFTWARE AND PATTERN MAPPING BETWEEN AUTOYAST AND AGAMA

AutoYaST element	Agama field	Support status	Comment
/autoinst/soft- ware/patterns	software.patterns	Fully supported	Pattern selection is supported directly via a list of strings.
/autoinst/soft- ware/packages	software.packages	Fully supported	Individual package names can be speci- fied as strings.
/autoinst/soft- ware/remove-pack- ages		Not supported	No mechanism currently exists in Aga-

AutoYaST element	Agama field	Support status	Comment
			ma to specify packages for removal.
/autoinst/soft- ware/do_online_up- date		Not supported	Agama does not support configuring online updates during installation.

8.2.6 Bootloader settings

This section maps bootloader configuration options between AutoYaST and Agama profiles.

TABLE 7: BOOTLOADER CONFIGURATION MAPPING

AutoYaST element	Agama field	Support status	Comment
bootloader—timeout	bootloader.timeout	Fully supported	Sets boot menu time- out before booting default entry.
bootloader—ker- nel_parameters	bootloader.extraKer- nelParams	Fully supported	Additional kernel command line parameters.
bootloader—flag (for example, no_timeout)	bootloader.stopOn- BootMenu	Fully supported	Controls whether the bootloader stops on the boot menu.
bootloader—location		Not supported	Agama currently does not support choosing GRUB installation location.
bootloader—gfx- mode / theme		Not supported	Graphical bootloader themes and resolu- tions are not yet con- figurable.

8.2.7 Security, certificates, and registration

This section compares how AutoYaST and Agama handle security settings, certificate deployment, and system registration during installation.

TABLE 8: SECURITY AND REGISTRATION ELEMENT MAPPING

AutoYaST element	Agama field	Support status	Comment
security/sshd	security.ssh.enable	Fully supported	Enables or disables the SSH service.
security/certificates	security.trustedCer- tificates	Fully supported	Supports placement of trusted root certificates in /etc/pki/trust/anchors.
security/ssh_im- port_authorized_keys	root.authorized- Keys / user.autho- rizedKeys	Fully supported	SSH public keys can be configured per user for key-based authentication.
register / suse_regis- ter	product.registration	Fully supported	Handles system registration to SUSE Customer Center (SCC) or RMT.
security/selinux		Not supported	Agama currently does not offer SELinux configuration; SUSE systems use AppArmor by default.

8.2.8 Pre-install, post-install, and init scripts

This section maps the script execution phases between AutoYaST and Agama profiles.

TABLE 9: SCRIPT PHASES IN AUTOYAST VS. AGAMA

AutoYaST element	Agama field	Support status	Comment
pre-scripts	scripts.pre	Fully supported	Runs before installation begins.
postpartition- ing-scripts	scripts.postPartition- ing	Fully supported	Executed immediately after disk partitioning.
post-scripts	scripts.post	Fully supported	Runs after installation finishes, with optional chroot control.
init-scripts	scripts.init	Fully supported	Executes on first boot of the target system.

8.2.9 File deployment and customization

This section compares how custom files can be deployed during installation using AutoYaST and Agama profiles.

TABLE 10: COMPARISON OF FILE DEPLOYMENT ELEMENTS

AutoYaST element	Agama field	Support status	Comment
files	files	Fully supported	Supports deployment of custom files with content, permissions, and ownership.
sysconfig		Not supported	Environment-specific configuration via sysconfig is not directly handled in Agama.
etc	_	Not supported	Configuration drop- ins for /etc are not

AutoYaST element	Agama field	Support status	Comment
			explicitly mapped in
			Agama.

8.2.10 Miscellaneous hardware-specific sections

This section covers specialized hardware-related configuration elements from AutoYaST and their equivalents (or lack thereof) in Agama.

TABLE 11: HARDWARE-SPECIFIC CONFIGURATION MAPPING

AutoYaST element	Agama field	Support status	Comment
dasd	dasd	Fully supported	Required for IBM Z (s390x) environments. Allows activation and formatting of DASD devices.
iscsi	iscsi	Fully supported	Supports target discovery, authentication, and login configuration for iSCSI volumes.
zipl		Not supported	Bootloader configuration on s390x is partially handled by other fields like bootloader but no direct equivalent for zipl.
kdump	_	Not supported	Agama does not currently support configuring kdump crash kernels.
udev	_	Not supported	Custom udev rules are not handled

AutoYaST element	Agama field	Support status	Comment
			in Agama. Can be added post-install via scripts.

8.3 Unsupported AutoYaST profile elements in Agama

The following table lists AutoYaST profile sections that are currently not supported by Agama. These modules either have no equivalent functionality in Agama, are considered legacy or niche, or are planned for future implementation. This list is essential for users migrating from AutoYaST to avoid misconfiguration or unmet expectations.

TABLE 12: UNSUPPORTED AUTOYAST MODULES IN AGAMA

AutoYaST element	Support status	Comment
audit-laf	Not supported	Not planned; used for audit logging configuration.
auth-client	Not supported	No direct equivalent; should be handled post-install.
clientconfig	Not supported	Custom YaST client settings not exposed in Agama.
configuration_management	Not supported	No built-in support for Puppet, Chef, SaltStack, etc.
cron	Not supported	Scheduling tasks must be configured after installation.
deploy_image	Not supported	Image deployment not in scope for Agama profiles.
dhcp-server	Not supported	Service configuration is beyond the profile's scope.
dns-server	Not supported	No direct DNS service setup support in Agama.

AutoYaST element	Support status	Comment
fcoe-client	Not supported	FCoE setup must be done manually or via other tools.
firewall	Not supported	Firewall configuration is not managed by Agama.
firstboot	Not supported	No support for post-install first boot workflows.
ftp-server	Not supported	No FTP service configuration support.
general	Not supported	Legacy catch-all section no longer used.
groups	Not supported	Group creation must be done via post-install scripts.
host	Not supported	Deprecated; handled through hostname and networking.
http-server	Not supported	No direct Apache/lighttpd setup supported.
kdump	Support planned	Not yet implemented but on roadmap.
mail	Not supported	No MTA/MUA configuration support.
nfs	Not supported	Client NFS mounts must be configured later.
nfs_server	Not supported	NFS server setup is out of scope.
nis	Not supported	NIS authentication not available.
nis_server	Not supported	No equivalent configuration for NIS server.

AutoYaST element	Support status	Comment
ntp-client	Not supported	Time sync must be managed post-install.
printer	Not supported	No CUPS or printer configuration support.
proxy	Not supported	Proxy settings must be applied via scripts or after deployment.
report	Not supported	Install-time reporting is not implemented.
samba-client	Not supported	Samba integration must be manually configured.
sound	Not supported	No sound system setup.
squid	Not supported	Proxy server setup not applicable to installation profiles.
ssh_import	Not supported	SSH key import handled differently in Agama.
sysconfig	Not supported	Low-level sysconfig modifications not available.
tftp-server	Not supported	Service configurations are expected post-install.
udev	Not supported	Custom udev rules are not supported declaratively.
upgrade	Not supported	In-place upgrades are not part of the installer's job.
usersDefaults	Not supported	No support for user templates or defaults.

9 For more information

For more information on Agama and automated installation, refer to the following resources:



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- Agama user documentation (https://agama-project.github.io/docs/user) →: Organizes information by user perspective and covers a wide range of topics, including interactive installation, unattended installation, AutoYaST support, boot options, URLs, command-line reference, and remote access.
 - Agama boot options (https://agama-project.github.io/docs/user/boot_options) ♪: Explains the kernel boot parameters that can be used to influence the Agama installation process, including how to specify the URL for an unattended installation profile using inst.auto. It also mentions other useful options like inst.info, inst.register_url, inst.install_url and inst.finish.
 - Agama storage configuration (https://agama-project.github.io/docs/user/unattend-ed/storage) →: A deep dive into storage configuration of target deployments using Agama. Essential for users with complex storage devices and partitions.

 - Agama CLI reference (https://agama-project.github.io/docs/user/cli)
 [→]: A complete list of all the Agama commands.
- Agama project on GitHub (https://github.com/agama-project/agama) →: Contains source code
 for the Agama installer, which you can use to deep dive into the installer's internals.

- Agama profile schema (https://github.com/agama-project/agama/blob/master/rust/ agama-lib/share/profile.schema.json)
- Agama profile example in Jsonnet (https://github.com/agama-project/agama/blob/master/rust/agama-lib/share/examples/profile.jsonnet)
- Agama storage schema (https://github.com/agama-project/agama/blob/master/rust/ agama-lib/share/storage.schema.json)
- Agama storage examples (https://github.com/agama-project/agama/tree/master/rust/agama-lib/share/examples/storage)

 ✓
- For information on multipath support in Linux, refer to https://en.wikipedia.org/wiki/Linux_DM_Multipath

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