

# Modules and Extensions Quick Start

This Quick Start gives you an overview of the modules and extensions available for the SUSE Linux Enterprise family. Learn about their purpose and features, and how to manage them.

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# 1 Introduction to modules and extensions

Starting with SUSE Linux Enterprise Server 15, the installation medium consists of only the Unified Installer: a minimal system for deploying, updating and registering SUSE Linux Enterprise Server. During deployment you can add functionality by selecting modules and extensions to be installed on top of the Unified Installer.

Technically, modules and extensions are very similar. Both can be managed with YaST or the command line tool **SUSEConnect**. Both modules and extensions add a set of online repositories (`main`, `update`, `source`, `debug`) containing all necessary packages. Additionally, both may add partitioning proposals and system roles that can be chosen during deployment.

However, there are significant differences between modules and extensions:

## Modules

Modules allow you to shape the product according to your needs. Each module has a clearly defined scope ranging from tools for Web Development and Scripting, through a Public Cloud, all the way to the SUSE Package Hub, offering community-managed packages.

Modules enable you to provide only the set of packages required for the machine's purpose, making the system lean, fast, and more secure. This modular approach also makes it easy to provide tailor-made images for container and cloud environments.

Modules can be added or removed at any time during the lifecycle of the system. This allows you to easily adjust the system to changing requirements.

Modules are part of your SUSE Linux Enterprise Server subscription and therefore free of charge. They differ from the base of SUSE Linux Enterprise Server only by their lifecycle. Except for the SUSE Package Hub module, SUSE provides L3 support for almost all packages provided by modules. For more information about the SUSE Linux Enterprise Server support statement refer to the [Release Notes \(https://www.suse.com/releasenotes/x86\\_64/SUSE-SLES/15-SP2/#Intro.Support\)](https://www.suse.com/releasenotes/x86_64/SUSE-SLES/15-SP2/#Intro.Support).

## Extensions

Extensions provide advanced capabilities for tasks such as live patching and high availability clustering to SUSE Linux Enterprise Server. They are offered as subscriptions and require a registration key that is liable for costs. Usually, extensions have their own release notes that are available from <https://www.suse.com/releasenotes>.

## 2 Modules for the SUSE Linux Enterprise Product Family


The following modules are available within the SUSE Linux Enterprise Product Family. Note that the availability of modules depends on the product (refer to the column *Available for*). For more information about lifecycle, release frequency, and the overlay support period, see <https://www.suse.com/lifecycle>.




### Note: L3 support


L3 support is generally provided for packages in modules. However, this excludes PackageHub and third-party modules. Use the `zypper info PACKAGE` command to check the support level for a specific package.

Name	Module depends on	Available for	Support
	Content		
Basesystem	None	Default on all products	<b>Lifecycle:</b> 10 yrs <b>Extended:</b> 3 yrs LTSS <sup>1</sup> <b>Level:</b> L3
	Adds a basic system on top of the Installer. It is required by all other modules and extensions. The scope of an installation that only contains the base system is comparable to the <u>minimal</u> system installation pattern of previous SUSE Linux Enterprise Server versions. This module is selected for installation by default and should not be deselected.		
Containers	Basesystem	SLES, SLES for SAP, SLE HPC	<b>Lifecycle:</b> By package; follows the upstream community of the respective package. <b>Extended:</b> None

Name	Module depends on	Available for	Support
	Content		
			<b>Level: L3</b>
	<p>Contains packages revolving around containers, including container engine and core container-related tools like on-premise registry.</p> <p> <b>Important: Docker Swarm is not supported</b></p> <p>SUSE does not provide any support related to use of Docker Swarm orchestration. Related packages are shipped for customer convenience only.</p>		
<b>Desktop Applications</b>	Basesystem	SLED (default), SLE WE (default), SLES, SLES for SAP, SLE RT (default), SLE HPC	<b>Lifecycle:</b> 10 yrs <b>Extended:</b> 3 yrs LTSS <sup>1</sup> <b>Level:</b> L3
	Adds a graphical user interface and essential desktop applications to the system.		
<b>Development Tools</b>	Basesystem, Desktop Applications	SLES, SLES for SAP, SLED, SLE RT (default), SLE HPC	<b>Lifecycle:</b> 10 yrs <b>Extended:</b> 3 yrs LTSS <sup>1</sup> <b>Level:</b> L3
	Contains compilers (including <code>gcc</code> ) and libraries required for compiling and debugging applications. Replaces the former Software Development Kit (SDK).		
<b>High Availability</b>	Basesystem	SLES, SLES for SAP (included), SLE HPC	<b>Lifecycle:</b> 10 yrs <b>Extended:</b> 3 yrs LTSS <sup>1</sup> <b>Level:</b> L3

Name	Module depends on	Available for	Support
	Content		
	Adds clustering support for mission-critical setups. Tools included are Hawk, crm, Pacemaker, and Corosync. High Availability support is included in subscription for SLES for SAP and therefore available as a module on this product. It is also available as an extension for SLES and SLE HPC (see below).		
High Performance Computing	Basesystem	SLE HPC (included)	<b>Lifecycle:</b> 10 yrs <b>Extended:</b> 1 yr ESPOS <sup>2</sup> , 3 yrs LTSS <sup>1</sup> <b>Level:</b> L3
	Contains tools and libraries related to High Performance Computing (HPC).		
Legacy	Basesystem, Server Applications	SLES, SLES for SAP	<b>Lifecycle:</b> 10 yrs <b>Extended:</b> 3 yrs LTSS <sup>1</sup> <b>Level:</b> L3
	<p>Helps you with migrating applications from earlier versions of SUSE Linux Enterprise Server and other systems to SLES 15 SP2, by providing packages which are discontinued on SUSE Linux Enterprise. Packages in this module are selected based on the requirement for migration and the level of complexity of configuration.</p> <p>This module is recommended when migrating from a previous product version.</p> <p>Please note that this module has a different lifecycle than some of its packages. Not all packages are supported for the complete lifecycle of the module but depending migration requirements and upstream lifecycles.</p>		

Name	Module depends on	Available for	Support
	Content		
NVIDIA Compute	Basesystem	SLES and SLE HPC on AMD64/Intel 64 and AArch64	Software in this module is provided by NVIDIA and is not supported by SUSE
	<p>Contains the NVIDIA CUDA (Compute Unified Device Architecture) drivers.</p> <p>The software in this module is provided by NVIDIA under the <a href="http://docs.nvidia.com/cuda/eula/">CUDA End User License Agreement (http://docs.nvidia.com/cuda/eula/)</a> and is not supported by SUSE.</p> <p> <b>Important: Do not use <b>SUSEConnect</b> to add this module</b></p> <p>Do not try to add this module with the <b>SUSEConnect</b> CLI tool. <b>SUSEConnect</b> is not capable of handling third-party repositories.</p> <p>During installation, select the module from the <i>Extension and Module Selection</i> screen. Within an installed system, run <b>yast registration</b>, select <i>Select Extensions</i>, then <u>NVIDIA Compute Module</u> and continue with <i>Next</i>. Verify and accept the NVIDIA repository GPG key.</p>		

Name	Module depends on	Available for	Support
	Content		
	 <b>Important: Combining Workstation Extension and NVIDIA Compute module is unsupported</b> <p>The <u>Workstation Extension</u> provides drivers for NVIDIA graphics cards. These drivers share some packages with CUDA, however versions may differ. It is therefore neither recommended nor supported to enable both the <u>NVIDIA Compute Module</u> and the <u>Workstation Extension</u> at the same time.</p>		
Public Cloud	Basesystem, Server Applications	SLES, SLES for SAP, SLE HPC	<b>Lifecycle:</b> 10 yrs <b>Extended:</b> 3 yrs LTSS <sup>1</sup> <b>Level:</b> L3
	<p>Contains all tools required to create images for deploying SUSE Linux Enterprise Server in cloud environments. For example: Amazon Web Services (AWS), Microsoft Azure, Google Compute Platform, or OpenStack.</p>		
Python 2	Basesystem	SLES, SLES for SAP, SLE HPC, SLED	<b>Lifecycle:</b> 3 yrs <b>Extended:</b> None <b>Level:</b> L3
	<p>SUSE Linux Enterprise Server 15 SP2 uses Python version 3. This module contains the Python 2 runtime and modules. The module has a different lifecycle than SUSE Linux Enterprise itself. Packages in this module are usually supported for three years.</p>		

Name	Module depends on	Available for	Support
	Content		
Real Time	Basesystem, Desktop Applications, Development Tools, Server Applications	SLE RT (included)	<b>Lifecycle:</b> 10 yrs <b>Extended:</b> None <b>Level:</b> L3
	<p>Aims to reduce the latency and increase the predictability and reliability of time-sensitive mission-critical applications.</p> <p>Packages in this module are generally supported until a newer version of the package is released or the package is dropped from the module.</p>		
SAP Applications	Basesystem	SLES for SAP (included)	<b>Lifecycle:</b> 10 yrs <b>Extended:</b> 3 yrs ESPOS <sup>2</sup> , 3 yrs LTSS <sup>1</sup> for last SP <b>Level:</b> L3
	<p>Contains packages specific to SLES for SAP.</p> <p>The module has a different lifecycle than SUSE Linux Enterprise itself. Subscriptions for SUSE Linux Enterprise Server for SAP Applications include 1.5 years of General Support plus 3 years of Extended Service Pack Overlap Support (ESPOS) for each service pack. This eliminates the need for customers to purchase Long Term Service Pack Support (LTSS) until the final service pack of a release.</p>		
Server Applications	Basesystem	SLES (default), SLES-for SAP, SLE RT (default), SLE HPC	<b>Lifecycle:</b> 10 yrs <b>Extended:</b> 3 yrs LTSS <sup>1</sup> <b>Level:</b> L3



Name	Module depends on	Available for	Support
	Content		
	Adds server functionality by providing network services such as DHCP server, name server, or Web server. This module is selected for installation by default; deselecting it is not recommended.		
SUSE Package Hub	Basesystem	All products	<b>Lifecycle:</b> None <b>Extended:</b> None <b>Level:</b> None
	Provides access to packages for SUSE Linux Enterprise Server maintained by the openSUSE community. These packages are delivered without L3 support but do not interfere with the supportability of SUSE Linux Enterprise Server. For more information, see <a href="https://packagehub.suse.com/">https://packagehub.suse.com/</a> .		
Transactional Server	Basesystem	SLES, SLES for SAP, SLED, SLE HPC	<b>Lifecycle:</b> 10 yrs <b>Extended:</b> 3 yrs LTSS <sup>1</sup> <b>Level:</b> L3
	Transactional Updates provide SUSE Linux Enterprise systems with a method of updating the operating system and its packages in an entirely ‘atomic’ way. Updates are either applied to the system all together in a single transaction, or not at all. This happens without influencing the running system. If an update fails, or if a successful update is deemed to be incompatible or incorrect, you can discard it immediately. This returns the system to its previous functioning state.		
Web and Scripting	Basesystem, Server Applications	SLES, SLES for SAP, SLE HPC	<b>Lifecycle:</b> 10 yrs <b>Extended:</b> 3 yrs LTSS <sup>1</sup> <b>Level:</b> L3

Name	Module depends on	Available for	Support
	Content		
	Contains packages intended for a running Web server.		

<sup>1</sup> LTSS: Long-Term Service Pack Support (<https://www.suse.com/products/long-term-service-pack-support/>) ↗

<sup>2</sup> ESPOS: Extended Service Pack Overlay Support (<https://www.suse.com/support/policy-products/#hpc>) ↗

### 3 Extensions for the SUSE Linux Enterprise Product Family

The following extensions are available within the SUSE Linux Enterprise Product Family. Note that the availability of extensions depends on the product (refer to the column *Available for*).

Name and Content	Module Dependency	Available for
SUSE Linux Enterprise High Availability ( <a href="https://www.suse.com/products/highavailability">https://www.suse.com/products/highavailability</a> ) ↗	Basesystem, Server Applications	SLES
SUSE Linux Enterprise Live Patching ( <a href="https://www.suse.com/products/live-patching">https://www.suse.com/products/live-patching</a> ) ↗	Basesystem	SLES
SUSE Linux Enterprise Workstation Extension ( <a href="https://www.suse.com/products/workstation-extension">https://www.suse.com/products/workstation-extension</a> ) ↗	Basesystem, Desktop Applications	SLES, SLED (default)



#### Warning: Unsupported Kernel Modules

The Workstation Extension installs the `kernel-default-extra` package, which includes additional kernel modules for desktop usage and enables loading of unsupported modules. If actually loaded, these modules may compromise your SLE support status.

Please evaluate if your hardware really requires additional kernel modules, and if so, test this expanded driver set in addition to the default set from the `kernel-default` package for possible configuration conflicts.

To prevent installation of the `kernel-default-extra` package, run `zypper addlock kernel-default-extra`.

## 4 Installing and Managing

Modules and Extensions can be installed when initially setting up the system and on an existing SUSE Linux Enterprise Server installation.

### 4.1 Installing Modules and Extensions During the Initial System Setup

Modules & extensions can easily be installed when setting up the system. The respective steps are part of the installation routine. Following the default installation path, this requires network access to contact the SUSE Customer Center or a local registration server (SUSE Manager (<https://www.suse.com/products/suse-manager/>) or Repository Mirroring Tool), which provide the respective repositories. Offline installation is supported, too. In that case an additional installation media is required. For detailed information refer to *Book "Deployment Guide", Chapter 8 "Installation Steps", Section 8.8 "Extension and Module Selection"*.

### 4.2 Installing and Managing Modules and Extensions from the Running System

To install modules & extensions from the running system, you need to make sure your system is registered with the SUSE Customer Center or a local registration server. If you have not done so during the installation, refer to *Book "Deployment Guide", Chapter 9 "Registering SUSE Linux Enterprise and Managing Modules/Extensions", Section 9.3 "Registering from the Installed System"* for instructions. After the system has been registered, modules can be added or removed. Refer to *Book "Deployment Guide", Chapter 9 "Registering SUSE Linux Enterprise and Managing Modules/Extensions", Section 9.4 "Managing Modules and Extensions in a Running System"* for details.

## 5 Module Membership of Packages

By default, tools for searching software packages (YaST Software Management or **zypper search**) are restricted to searching within active repositories. For an extended search including not yet activated remote repositories, you can run **zypper search-packages**. To find out which module a package belongs to, run

```
zypper search-packages PACKAGE
```

If the **search-packages** subcommand is not available on your system, install the package `zypper-search-packages-plugin`.



### Tip: Searching for Packages in the SUSE Customer Center

In case Zypper's package search command is not available on your system, you can also use the SUSE Customer Center Web interface (package search) to check the availability of packages and their respective modules. Visit <https://scc.suse.com/packages> for this purpose. A SUSE login is *not* required for this service.

To refine the search results, **zypper search-packages** offers the following options:

`-x, --match-exact`

Searches for exact matches.

`-g, --group-by-module`

Groups the search results by modules rather than by package name.

`-d, --details`

Additionally lists version numbers and repositories containing the package.

`--xmlout`

Generates XML output.

Below are a few examples of how to use **zypper search-packages**.

#### EXAMPLE 1: SIMPLE SEARCH

The following command searches for the packages `nodejs` and `hawk`. The first one is available in the `Web and Scripting` module, while the second one is part of the SUSE Linux Enterprise High Availability. Both packages are not yet installed:

```
> zypper search-packages openjdk nodejs
Following packages were found in following modules:
```

Package	Module or Repository
-----	-----
java-10-openjdk	Legacy Module (sle-module-legacy/15.2/x86_64) SUSEConnect --product sle-module-legacy/15.2/x86_64
java-11-openjdk	Basesystem Module (sle-module-basesystem/15.2/x86_64) SUSEConnect --product sle-module-basesystem/15.2/x86_64
nodejs10	Web and Scripting Module (sle-module-web-scripting/15.2/x86_64) SUSEConnect --product sle-module-web-scripting/15.2/x86_64
nodejs12	Web and Scripting Module (sle-module-web-scripting/15.2/x86_64) SUSEConnect --product sle-module-web-scripting/15.2/x86_64
[...]	

#### EXAMPLE 2: SEARCHING FOR EXACT MATCHES

If you know the exact package names, you can narrow the results down to exact matches by using the option `-x`:

```
> zypper search-packages -x java-11-openjdk nodejs12
Following packages were found in following modules:
```

Package	Module or Repository
-----	-----
java-11-openjdk	Basesystem Module (sle-module-basesystem/15.2/x86_64) SUSEConnect --product sle-module-basesystem/15.2/x86_64
nodejs12	Web and Scripting Module (sle-module-web-scripting/15.2/x86_64) SUSEConnect --product sle-module-web-scripting/15.2/x86_64
[...]	

#### EXAMPLE 3: SEARCHING FOR PACKAGES THAT ARE ALREADY INSTALLED OR AVAILABLE

If you search for packages that are already installed or are available in one of the modules that are available on your system, the search results differ. In the following example, the package `vim` is already installed. The package `emacs` is not installed, but is available for installation without having to add a module.

```
> zypper search-packages -x vim
Following packages were found in following modules:
```

Package	Module or Repository
-----	-----
vim	Basesystem Module (sle-module-basesystem/15/x86_64)
vim	Installed
vim	Available

```
> zypper search-packages -x emacs
Following packages were found in following modules:
```

Package	Module or Repository
-----	-----


emacs	Basesystem Module (sle-module-basesystem/15/x86_64)
emacs	Available

Instead of searching for packages, you can also view the list of packages that belong to a module or extension. Start the YaST *Software Management* module and click *View > Services*. Select an entry to display the list of packages that belong to this module or extension.

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