

SUSE Driver Concepts

The following is a reference of various terms, concepts, and constructs used by the SUSE Partner Linux Driver Program and referenced in the SUSE Driver Tools documentation.

Add-on Product

“Add-on products are system extensions. You can install a third party add-on product or a special system extension of SUSE Linux Enterprise Server (for example, a CD with support for additional languages or a CD with binary drivers). To install a new add-on, start YaST and select *Software+Add-On Products*. You can select various types of product media, like CD, FTP, USB mass storage devices (such as USB flash drives or disks) or a local directory. You can work also directly with ISO files. To add an add-on as ISO file media, select *Local ISO Image* then enter the *Path to ISO Image*. The *Repository Name* is arbitrary.”¹

Driver Kit

A Driver Kit is an add-on Product that contains kernel module updates to be installed on a given release of SUSE Linux Enterprise product. The driver kit add-on product can be installed during the initial installation of the SUSE Enterprise product by checking *Include Add-On Products from Separate Media* on the *Installation Mode* screen or installed afterwards using the YaST2 *Add-on Products* module. For further information refer to the “[SUSE Linux Enterprise Server Deployment Guide](#)”.

Bootable Driver Kit

A Bootable Driver Kit is an add-on product image that contains a boot loader section in addition to the add-on repository. The boot loader contains isolinux and UEFI loaders as well as a kernel and initrd containing a linuxrc that initiates the SUSE Linux Enterprise installation process. The Bootable Driver Kit only contains the first stage of the installation boot process.

Bootable Driver Kit Work-Flow

When booting from the a bootable driver kit, the following, initial stages of bootstrapping and installation preparation are performed:

¹“Installing Add-On Products” in *SUSE Linux Enterprise Server Deployment Guide*.

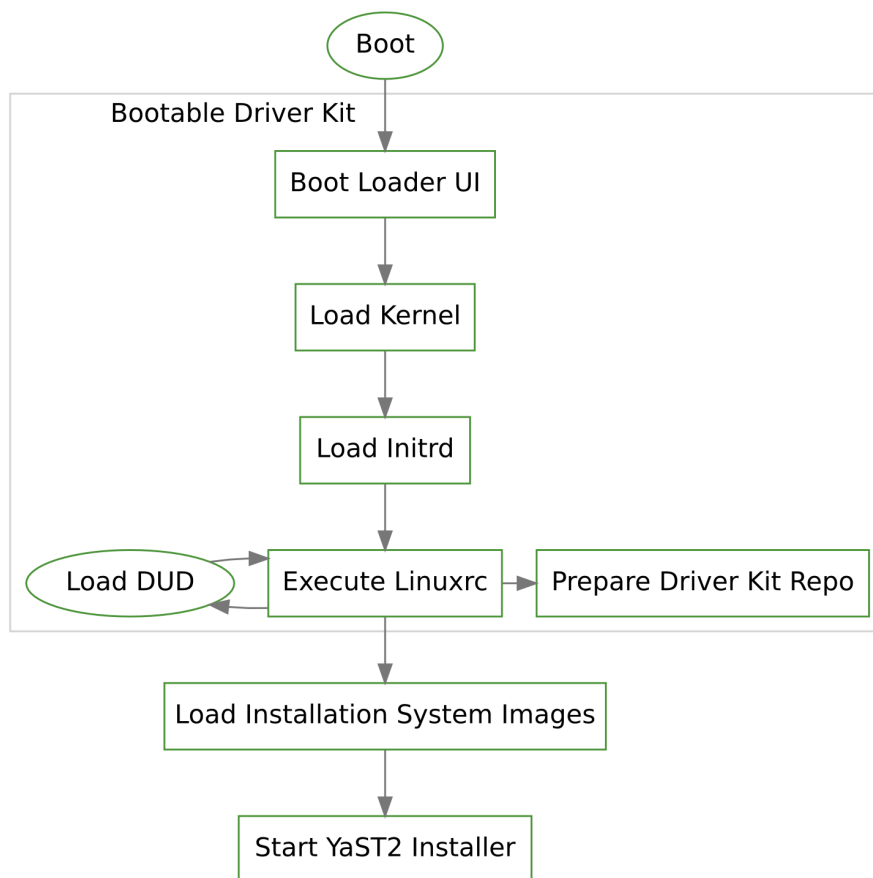


Figure 1:

The steps inclosed in the *Bootable Driver Kit* box are executed by the driver kit image. At the point of loading the installation system images, the linuxrc process will attempt to load the images from the installation repository location. When installing from optical media, linuxrc will prompt the user to insert disk #1 of the SUSE Linux Enterprise installation media. If a different installation repository URI was passed to linuxrc via the 'install=' boot option, then linuxrc will grab the images from that location and the installation will install as usual.

Prepare Driver Kit Repository

Before loading the installation system, linuxrc will execute a script that prepares the driver kit add-on repository for installation. The script performs the following steps:

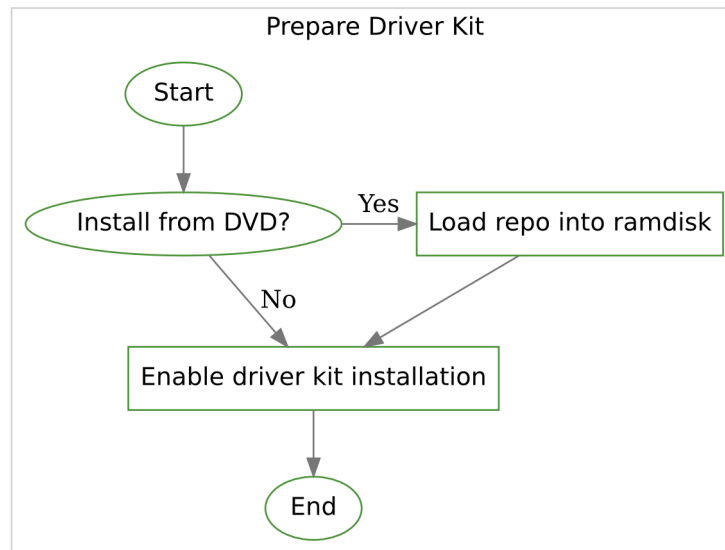


Figure 2:

First the script determines if the SUSE Product is to be installed from the same optical media device as the driver kit. If so, it loads the driver kit repository into the ram-disk to avoid the need for the user to swap media later in the install process.

The next step enables the driver kit for installation. This is achieved by creating an `add_on_products.xml` file that points to the location of the driver kit repository. During the installation, YaST2 will query this file and automatically include the driver kit repository as part of the installation.

If the update packages provided by the driver kit are not required for bootstrapping and installing SUSE Linux Enterprise on the target system, the installation

can be booted from the standard SUSE media and the driver kit installed as a post-install step like a standard add-on product.

Merged Driver Kit

SUSE Driver Tools allows one to *merge* the driver kit with the base SUSE Linux Enterprise installation media. This allows the delivery of SUSE Linux Enterprise plus driver kit on a single media, instead of multiple media as with the standard or bootable driver kits.

If the result is meant to be burned to optical media the total size of the SUSE product plus driver kit add-on needs to be taken into consideration. The merge process does not modify the original SUSE Linux product repository in any way. It simply creates a new ISO image containing both the SUSE product and driver-kit repositories.

Just as with the bootable driver kit, the merged media will automatically select the driver-kit add-on to be installed in tandem with the base SUSE product.

Update Media (aka DUD)

“The Driver Update is providing a possibility to install SuSE/UnitedLinux on devices that were not supported at the time the distribution was created and be able to boot the installed system afterwards without having to manually install the new device drivers after the installation. Even though linuxrc (the first stage of the installation process) has the ability to load driver modules from a separate modules floppy, these modules are not used for the installed system afterwards, because the YaST Installer installs a kernel RPM during the package installation. This driver update feature will use a provided kernel driver module during the installation process and will also place it into the installed system in order to be able to boot up the installed system later.”²

For more information on Update Media, please refer to [The Update-Media-HOWTO](http://ftp.suse.com/pub/people/hvogel/Update-Media-HOWTO/html/id_dud.html).

kISO

The kISO is similar to the bootable driver kit in that it integrates updated kernel and/or kernel module packages into a bootable ISO for use with bootstrapping a system for installation of a SUSE Linux Enterprise Product. The primary difference is that a kISO does not provide a proper add-on product repository for installation of the packages it provides. All packages are integrated into

²“Update Media Howto” last modified April 7, 2006, http://ftp.suse.com/pub/people/hvogel/Update-Media-HOWTO/html/id_dud.html.

the `initrd` of the boot system along with a simple bash script that installs the packages after standard product installation via YaST2 has completed and just before first boot.

kISO Limitations

The kISO standard predates the bootable driver kit and has several limitations that the bootable driver kit addresses. Because of these limitations, bootable driver kits are recommended over kISOs.

Packages Are Embedded in `initrd` Image

This makes it difficult for a user to inspect the packages provided by the kISO before installation, host them a separate repository, or re-install them at a later time. The user would need to unpack the `initrd` and extract the rpm packages.

The *bootable driver kit* provides packages to be installed in a standard YaST2 repository that can be easily read from the ISO image or network repository and easily integrated into installation servers.

Packages Are Not Installed Using the Standard Installer

The kISO installs its packages using a simple script that is called by the YaST2 installer just before reboot. This script installs each package using the `rpm` command. There are no package dependency checks at the repository level or feedback to the end user via the installer interface as is with the YaST/libzypp package management system. All package dependencies are hard-coded in the kISO package installer script, and failures are silent. This makes kISOs prone to unseen errors which are difficult to debug, and can render the system un-bootable after installation.

The *bootable driver kit* resolves this by providing the package in a standard add-on repository which is registered during system installation and package installation is handled together with the standard SUSE product packages. This results in a much more robust and reliable installation process where package dependencies and conflicts are managed by the SUSE Linux Enterprise package management system (libzypp).