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Red Hat Enterprise Linux Release 9.2 Manual Pages on 'systemd-gpt-auto-generator.8' command

$ man systemd-gpt-auto-generator.8

SYSTEMD-GPT-AUTO-GENERATORsystemd-gpt-auto-generaSYSTEMD-GPT-AUTO-GENERATOR(8)

NAME

systemd-gpt-auto-generator - Generator for automatically discovering and mounting root, /home/, /srv/, /var/ and /var/tmp/ partitions, as well as discovering and enabling swap partitions, based on GPT partition type GUIDs

SYNOPSIS

/usr/lib/systemd/system-generators/systemd-gpt-auto-generator

DESCRIPTION

systemd-gpt-auto-generator is a unit generator that automatically discovers root, /home/, /srv/, /var/, /var/tmp/, the EFI System Partition, the Extended Boot Loader Partition and swap partitions and creates mount and swap units for them, based on the partition type GUIDs of GUID partition tables (GPT), see UEFI Specification[1], chapter 5. It implements the Discoverable Partitions Specification[2]. Note that this generator has no effect on non-GPT systems, and on specific mount points that are directories already containing files. Also, on systems where the units are explicitly configured (for example, listed in fstab(5)), the units this generator creates are overridden, but additional implicit dependencies might be created. This generator will only look for the root partition on the same physical disk where the EFI System Partition (ESP) is located. Note that support from the boot loader is required: the EFI variable

LoaderDevicePartUUID of the 4a67b082-0a4c-41cf-b6c7-440b29bb8c4f vendor UUID is used to determine from which partition, and hence the disk from which the system was booted. If the boot loader does not set this variable, this generator will not be able to autodetect the root partition. See the Boot Loader Interface[3] for details.

Similarly, this generator will only look for the other partitions on the same physical disk as the root partition. In this case, boot loader support is not required. These partitions will not be searched for on systems where the root file system is distributed on multiple disks, for example via btrfs RAID.

systemd-gpt-auto-generator is useful for centralizing file system configuration in the partition table and making configuration in /etc/fstab or on the kernel command line unnecessary.

This generator looks for the partitions based on their partition type GUID. The following partition type GUIDs are identified:

Table 1. Partition Type GUIDs

Partition Type GUID	Name	Mount Point	Explanation
4f68bce3-e8cd-4db1-96e7-fbcaf984b709	SD_GPT_ROOT_X86_64 (x86-64)	/	The first partition with this type UUID, located on the same disk as the ESP, is used as the root file system / on AMD64 / 64-bit x86 systems.

??

?SD_GPT_ROOT_ARM64 ? Root Partition ? / ? The first ?

?b921b045-1df0-41c3-af44-4c6f280d3fae ? (64-bit ARM) ? ? partition with ?

? ? ? ? this type UUID, ?

? ? ? ? located on the ?

? ? ? ? same disk as the ?

? ? ? ? ESP, is used as ?

? ? ? ? the root file ?

? ? ? ? system / on ?

? ? ? ? AArch64 / 64-bit ?

? ? ? ? ARM systems. ?

??

?SD_GPT_ROOT_ALPHA SD_GPT_ROOT_ARC ? root partitions ? / ? The first ?

?SD_GPT_ROOT_ARM SD_GPT_ROOT_ARM64 ? for other ? ? partition with ?

?SD_GPT_ROOT_IA64 ? architectures ? ? the type UUID ?

?SD_GPT_ROOT_LOONGARCH64 ? ? ? matching the ?

?SD_GPT_ROOT_MIPS_LE ? ? ? architecture, ?

?SD_GPT_ROOT_MIPS64_LE ? ? ? located on the ?

?SD_GPT_ROOT_PARISC SD_GPT_ROOT_PPC ? ? ? same disk as the ?

?SD_GPT_ROOT_PPC64 ? ? ? ESP, is used as ?

?SD_GPT_ROOT_PPC64_LE ? ? ? the root file ?

?SD_GPT_ROOT_RISCV32 ? ? ? system /. For ?

?SD_GPT_ROOT_RISCV64 SD_GPT_ROOT_S390 ? ? ? the full list ?

?SD_GPT_ROOT_S390X SD_GPT_ROOT_TILEGX ? ? ? and constant ?

?SD_GPT_ROOT_X86 SD_GPT_ROOT_X86_64 ? ? ? values, see ?

?SD_GPT_USR_ALPHA SD_GPT_USR_ARC ? ? ? Discoverable ?

?SD_GPT_USR_ARM SD_GPT_USR_IA64 ? ? ? Partitions ?

?SD_GPT_USR_LOONGARCH64 ? ? ? Specification[2]. ?

?SD_GPT_USR_MIPS_LE ? ? ? ?

?SD_GPT_USR_MIPS64_LE ? ? ? ?

?SD_GPT_USR_PARISC SD_GPT_USR_PPC ? ? ? ?

?SD_GPT_USR_PPC64 SD_GPT_USR_PPC64_LE ? ? ? ?

?SD_GPT_USR_RISCV32 ? ? ? ?

?SD_GPT_USR_RISCV64 SD_GPT_USR_S390 ? ? ? ?

?SD_GPT_USR_S390X SD_GPT_USR_TILEGX ? ? ? ?

?SD_GPT_USR_X86 ? ? ? ?

??

?SD_GPT_HOME ? Home Partition ? /home/ ? The first ?

?933ac7e1-2eb4-4f13-b844-0e14e2aef915 ? ? ? partition with ?

? ? ? ? this type UUID on ?

? ? ? ? the same disk as ?

? ? ? ? the ESP is ?

? ? ? ? mounted to ?

? ? ? ? /home/. ?

??

?SD_GPT_SRV ? Server Data ? /srv/ ? The first ?

?3b8f8425-20e0-4f3b-907f-1a25a76f98e8 ? Partition ? ? partition with ?

? ? ? ? this type UUID on ?

? ? ? ? the same disk as ?

? ? ? ? the ESP is ?

? ? ? ? mounted to /srv/. ?

??

?SD_GPT_VAR ? Variable Data ? /var/ ? The first ?

?4d21b016-b534-45c2-a9fb-5c16e091fd2d ? Partition ? ? partition with ?

? ? ? ? this type UUID on ?

? ? ? ? the same disk as ?

? ? ? ? the ESP is ?

? ? ? ? mounted to /var/ ?

? ? ? ? ? under the ?

? ? ? ? condition its ?

? ? ? ? partition UUID ?

? ? ? ? matches the first ?

? ? ? ? 128 bit of the ?

? ? ? ? HMAC-SHA256 of ?

? ? ? ? the GPT type uuid ?

? ? ? ? of this partition ?

? ? ? ? keyed by the ?

? ? ? ? machine ID of the ?

? ? ? ? installation ?

? ? ? ? stored in ?

? ? ? ? machine-id(5). ?

??

?SD_GPT_TMP ? Temporary Data ? /var/tmp/ ? The first ?

?7ec6f557-3bc5-4aca-b293-16ef5df639d1 ? Partition ? ? partition with ?

? ? ? ? this type UUID on ?

? ? ? ? the same disk as ?

? ? ? ? the ESP is ?

? ? ? ? mounted to ?

? ? ? ? /var/tmp/. ?

??

?SD_GPT_SWAP ? Swap ? n/a ? All partitions ?

?0657fd6d-a4ab-43c4-84e5-0933c84b4f4f ? ? ? with this type ?

? ? ? ? UUID on the same ?

? ? ? ? disk as the ESP ?

? ? ? ? are used as swap. ?

??

?SD_GPT_ESP ? EFI System ? /efi/ or /boot/ ? The first ?

?c12a7328-f81f-11d2-ba4b-00a0c93ec93b ? Partition (ESP) ? ? partition with ?

? ? ? ? this type UUID ?

? ? ? ? located on the ?

? ? ? ? same disk as the ?

? ? ? ? root partition is ?

? ? ? ? mounted to /boot/ ?

? ? ? ? or /efi/, see ?

? ? ? ? below. ?

??

?SD_GPT_XBOOTLDR ? Extended Boot ? /boot/ ? The first ?

?bc13c2ff-59e6-4262-a352-b275fd6f7172 ? Loader Partition ? ? partition with ?

? ? ? ? this type UUID ?

? ? ? ? located on the ?

? ? ? ? same disk as the ?

? ? ? ? root partition is ?

? ? ? ? mounted to ?

? ? ? ? /boot/, see ?

? ? ? ? below. ?

??

This generator understands the following attribute flags for

partitions:

Table 2. Partition Attribute Flags

??

?Flag ? Applicable to ? Explanation ?

??

?SD_GPT_FLAG_READ_ONLY ? /, /home/, /srv/, ? Partition is ?

?0x1000000000000000 ? /var/, /var/tmp/, ? mounted read-only ?

? ? Extended Boot ? ?

? ? Loader Partition ? ?

??

?SD_GPT_FLAG_NO_AUTO ? /, /home/, /srv/, ? Partition is not ?

?0x8000000000000000 ? /var/, /var/tmp/, ? mounted ?

? ? Extended Boot ? automatically ?

? ? Loader Partition ? ?

??

?SD_GPT_FLAG_NO_BLOCK_IO_PROTOCOL ? EFI System ? Partition is not ?

?0x0000000000000002 ? Partition (ESP) ? mounted ?

? ? ? automatically ?

??

The /home/, /srv/, /var/ and /var/tmp/ partitions may be encrypted in LUKS format. In this case, a device mapper device is set up under the names /dev/mapper/home, /dev/mapper/srv, /dev/mapper/var and /dev/mapper/tmp. Note that this might create conflicts if the same partition is listed in /etc/crypttab with a different device mapper device name.

When systemd is running in the initrd the / partition may be encrypted in LUKS format as well. In this case, a device mapper device is set up under the name /dev/mapper/root, and a sysroot.mount is set up that mounts the device under /sysroot. For more information, see bootup(7).

The root partition can be specified by symlinking /run/systemd/volatile-root to /dev/block/$major:$minor. This is especially useful if the root mount has been replaced by some form of volatile file system (overlayfs).

Mount and automount units for the EFI System Partition (ESP) are generated on EFI systems. The ESP is mounted to /boot/ (except if an Extended Boot Loader partition exists, see below), unless a mount point directory /efi/ exists, in which case it is mounted there. Since this generator creates an automount unit, the mount will only be activated on-demand, when accessed. On systems where /boot/ (or /efi/ if it exists) is an explicitly configured mount (for example, listed in fstab(5)) or where the /boot/ (or /efi/) mount point is non-empty, no mount units are generated.

If the disk contains an Extended Boot Loader partition, as defined in the Boot Loader Specification[4], it is made available at /boot/ (by means of an automount point, similar to the ESP, see above). If both an EFI System Partition and an Extended Boot Loader partition exist the latter is preferably mounted to /boot/. Make sure to create both /efi/ and /boot/ to ensure both partitions are mounted.

When using this generator in conjunction with btrfs file systems, make

sure to set the correct default subvolumes on them, using btrfs subvolume set-default.

systemd-gpt-auto-generator implements systemd.generator(7).

KERNEL COMMAND LINE

systemd-gpt-auto-generator understands the following kernel command line parameters:

systemd.gpt_auto, rd.systemd.gpt_auto

Those options take an optional boolean argument, and default to yes. The generator is enabled by default, and a negative value may be used to disable it.

root=

When used with the special value "gpt-auto", automatic discovery of the root partition based on the GPT partition type is enabled. Any other value disables this generator.

rw, ro

Mount the root partition read-write or read-only initially.

Note that unlike most kernel command line options these settings do not override configuration in the file system, and the file system may be remounted later. See systemd-remount-fs.service(8).

SEE ALSO

systemd(1), systemd.mount(5), systemd.swap(5), systemd-fstab-generator(8), systemd-cryptsetup@.service(8), machine-id(5), cryptsetup(8), fstab(5), btrfs(8)

NOTES

1. UEFI Specification

   https://uefi.org/specifications

2. Discoverable Partitions Specification

   https://systemd.io/DISCOVERABLE_PARTITIONS

3. Boot Loader Interface

   https://systemd.io/BOOT_LOADER_INTERFACE

4. Boot Loader Specification

   https://systemd.io/BOOT_LOADER_SPECIFICATION