# Solaris disk naming conventions*

**Abstract**

This document briefly explains how Solaris/illumos name the disk partitions. And a comparison is made with GNU/Linux systems. Note that this is legacy, newer operating system versions use ZFS and it is all new way of doing things which will be discussed in another document.

## Disk addressing conventions

On GNU/Linux systems SATA disks are named sda, sdb, sdc ... so on. And the partitions on the disk are numbered from 1, i.e sda1, sda2, sda3 ... so on.

On Solaris/illumos systems the disks are named using a different convention. Combination of Disk **c**ontroller, SCSI **t**arget, **d**isk number, **s**lice number, and **p**artition number is used. Syntax for disk entries on Solaris is shown below:

**c**C [ **t**T ] **d**D **s**$S$ | **p**$P$

If you note above $t$ appears only if you have a *SCSI* disk.

Where *C, T, D, S,* and $P$ are non-negative decimal numbers. Actually, a disk entry is a complete address of a slice or a partition, and consists of two parts: logical device address formed by **c, t, d,** and slice **s** or partition **p** address on that device.

For example if you have a single SATA disk, your partitions might look like:

**/dev/rdsk/c1d0s1 ... /dev/rdsk/c1d0s16** or
**/dev/rdsk/c1d0p1 ... /dev/rdsk/c1d0p4**

**C** is the logical controller number, i.e. the number of an IDE adapter (actually its channel), SCSI host bus adapter or the like. It is assigned by disks utility, or by devfsadm on newer systems. First time the utility is run during Solaris installation, and consecutive numbers are assigned for particular disk controllers, so that IDE controllers take precedence before SCSI ones. The utility may be invoked later during system reconfiguration or manually by the superuser to add new disks. Then, consecutive numbers are

*http://multiboot.solaris-x86.org/iv/3.html

assigned to the new controllers found on the system. E.g. if Solaris is installed on a machine with only primary IDE channel being in use and one SCSI adapter they have numbers 0 and 1 respectively, when a new IDE device is attached to a free secondary channel it will get the number 2.

**T** is the target (logical unit number) of the SCSI device, i.e. the identification number of the device in a SCSI chain. Obviously, IDE disks have no t specified in their addresses.

**D** is the number of the disk attached to the controller. Note that in case of an IDE adapter, two IDE devices may be attached to a single channel, then 0 represents the master device, and 1 the slave one.

**S** is the number of the slice within a Solaris partition. Each Solaris partition can have up to 16 slices numbered 0 through 15. There are 21 special files per a disk device, 0 through 15 correspond to slices within the first Solaris partition on a disk (see Slices and VTOC).

**P** equal to 0 means entire disk, values 1, 2, 3, 4 represent consecutive partitions on a disk. These 5 entries correspond to disk special files 16 through 20. Pp is the FDISK partition number used by fdisk(1M).

## Slices and VTOC

Every Solaris partition is divided into smaller chunks called slices. They resemble x86 fdisk partitions of hard disk drive. Up to 16 slices may be defined per a Solaris partition. Only slices within the first Solaris partition can be addresses by s0 through s15. Note however that there are still up to 4 Solaris partitions per a disk allowed.

Some slices are reserved or have special meaning. Slice 2 is a backup slice representing entire Solaris partition. Slice 8 is a boot slice representing the first cylinder of the Solaris partition, containing partition boot block pboot, Solaris disk label, VTOC and boot manager program bootblk. Slices 2 and 8 are unmountable. Slice 9 is an alternates slice that uses 2 cylinders. Slices 2, 8 and 9 are reserved and should not be redefined. Slice 0 is usually a root slice containing the root file system. The following tags may be assigned to slices: swap, usr, stand, var and home (see fmthard man page).

There are 4 possible states of a slice. They are determined by two flags specified when the slice is defined. One determines if the slice is mountable, the other if it is read-only.

Slices can be defined using fmthard or interactive format utility. format always shows 0 through 9 slices, including undefined ones. To define a slice we need to specify its number, tag, flag, starting sector relative to Solaris partition and its size.

All the information about slices is kept in a Volume Table Of Contents, shortly VTOC. Together with Solaris disk label VTOC occupies the second and

third sector of a boot slice - the first cylinder of a Solaris partition. It can be printed out with prtvtoc utility. It is recommended to print and save all VTOCs[1] after the system is setup to have them handy in the case of emergency.

## Exercise

On your OpenIndiana machine run the command fdisk /dev/rdsk/c1d0p0 or maybe /dev/rdsk/c0d0p0 or maybe something else... try figuring out. Do not write anything to disk, just play around.

[1] http://illumos.org/man/1M/prtvtoc - for printing VTOC