

bvolume format

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The **bvolume format** is a format for saving and naming volumes of MRI data in which each anatomical slice is stored in its own binary file. If there are multiple planes or time-points associated with the anatomical slice (eg, as in an fMRI slice), then they are stored in the binary file as well. The files in the volume are specified by three parameters: a stem, the number of slices, and type of bvolume. The name of the file for a slice is constructed from these parameters in the following way: *stem_XXX.btype*, *stem* is the stem, *XXX* is the three digit slice number, and *btype* is the type of bvolume. If the slice number does not have three digits then zeros are used to pad the slice number to three digits. The type can either be *bshort* or *bfloat*. The data are stored in 16 bit signed integer format in *bshort* files, whereas the data are stored in 32 bit floating point format in *bfloat* files.

A text header file is associated with every binary slice file; its name takes the form *stem_XXX.hdr*. The header file is a text file with four numbers which designate how the data in the binary bvolume are stored: (1) N_{rows} , number of rows, (2) N_{cols} , number of columns, (3) N_{tp} , number of time-points (or planes or frames or TRs), and (4) endianness. The endianness is either 0 (big-endian) or 1 (little-endian). The first N_{cols} elements make the first row. The next N_{cols} elements make the second row, etc, until the entire slice is accounted for after which the next time point starts.

The total number of values in a binary slice is equal to $N_v = N_{cols} * N_{rows} * N_{tp}$. The number of bytes in a *bshort* file equals $2 * N_v$ and $4 * N_v$ for a *bfloat* file. The number of elements in a plane or time-point is $N_p = N_{cols} * N_{rows}$.

There's also another header file called the *bhdr* file that accompanies a bvolume. Its name is *stem.bhdr*. Geometry information is stored in this file.