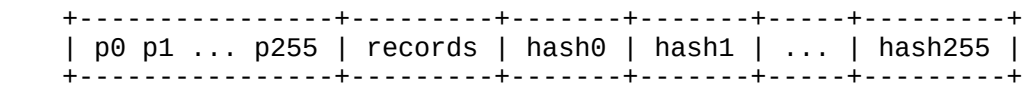
A structure for constant databases
19960914

D. J. Bernstein, djb@pobox.com

A cdb is an associative array: it maps strings (``keys'') to strings (``data'').

A cdb contains 256 pointers to linearly probed open hash tables. The hash tables contain pointers to (key,data) pairs. A cdb is stored in a single file on disk:



Each of the 256 initial pointers states a position and a length. The position is the starting byte position of the hash table. The length is the number of slots in the hash table.

Records are stored sequentially, without special alignment. A record states a key length, a data length, the key, and the data.

Each hash table slot states a hash value and a byte position. If the byte position is 0, the slot is empty. Otherwise, the slot points to a record whose key has that hash value.

Positions, lengths, and hash values are 32-bit quantities, stored in little-endian form in 4 bytes. Thus a cdb must fit into 4 gigabytes.

A record is located as follows. Compute the hash value of the key in the record. The hash value modulo 256 is the number of a hash table. The hash value divided by 256, modulo the length of that table, is a slot number. Probe that slot, the next higher slot, and so on, until you find the record or run into an empty slot.

The cdb hash function is ``h = ((h << 5) + h) ^ c'', with a starting hash of 5381.