General Caches

- kmem_cache: internal cache of cache description objects
- size-N: Generic cache of size N
- size-N(DMA): Generic cache of size N for direct memory access use

Networking

- flow_cache: Generic flow cache
- **RPC**
  - rpc_buffers: RPC requests, data buffers
  - rpc_tasks: RPC requests, task structures
  - rpc_inode_cache: RPC requests, inodes
- **TCP/IP**
  - ip_fib_alias: IP Datagram forwarding
  - ip_fib_hash: IP Datagram forwarding
  - ip_mrt_cache: IP multicast routing
  - tcp_tw_bucket: Time Wait
  - tcp_bind_bucket: Socket-interface bindings
  - tcp_open_request: Open TCP requests
  - inet_peer_cache:Storage for permanent information about peers
  - arp_cache: Address resolution protocol caches
- **Sockets**
  - unix_sock: BSD Unix domain sockets
  - raw_sock: Raw socket
  - udp_sock: Unix Datagram Protocol sockets
  - tcp_sock: Transmission control protocol sockets
  - sock_inode_cache: Socket inodes
  - skbuff_head_cache: Socket buffers
  - sock: Sockets

Storage

- **Device Mapper**
  - dm_tio: Target I/Os
  - dm_io: Basic DM I/Os
  - dm_bvec_N: Device mapper block I/O vector of size N

    - dm-bvec-N: Device mapper block I/O vector of size N bytes.
    - dm-bio: Basic DM block I/O structures
- **SCSI**
    - scsi_cmd_cache: SCSI command pool
    - sgpool-N: SCSI queuing pool of size N bytes

Filesystems

- **General**
    - buffer_head: Filesystem buffers
    - bdev_cache: Filesystem block device cache
    - mnt_cache: Virtual filesystem mount caching
    - audit_watch_cache: Filesystem auditing
    - inode_cache: Index node caching
    - file_lock_cache: Generic filesystem file locking
    - dquot: Disk quota
    - dnotify_cache: Directory notifications
    - Directory entry caching
        - dentry_cache: Directory entry caches
        - filp: File pointer cache
        - names_cache: Pathname cache
    - **EXT2/3**
        - ext3_inode_cache: EXT3 I-Node cache
        - ext3_xattr: EXT3 extended attributes
        - ext2_inode_cache: EXT2 I-node cache
        - ext2_xattr: EXT2 extended attributes
    - **General Filesystem Journaling**
        - journal_handle:Journal identifier/handles cache
        - journal_head: Journal list heads
        - revoke_table: Revoked record tables
        - revoke_record: Revoked records

Asynchronous I/O

- kioctx: Asynchronous I/O context structures
- kiocb: Asynchronous I/O control blocks

I/O Scheduling

- crq_pool: Complete fairness queuing (CFQ) request pool

Common slabs objects

How to observ slab cache objects?

You can get raw statitics reading /proc/slabinfo or can use slabtop. Read the man, it's short and comprehensive http://man7.org/linux/man-pages/man1/slabtop.1.html

```
root@ip-192-168-172-53:~# slabtop -o -s c
 Active / Total Objects (% used)    : 435085 / 447064 (97.3%)
 Active / Total Slabs (% used)      : 13244 / 13244 (100.0%)
 Active / Total Caches (% used)     : 87 / 138 (63.0%)
 Active / Total Size (% used)       : 118774.38K / 124296.67K
(95.6%)
 Minimum / Average / Maximum Object : 0.01K / 0.28K / 16.00K

OBJS ACTIVE  USE OBJ SIZE  SLABS OBJ/SLAB CACHE SIZE NAME
 29700  27715  93%    1.05K    990       30     31680K
ext4_inode_cache
 28539  28201  98%    0.59K   1057       27     16912K inode_cache
 77049  74432  96%    0.19K   3669       21     14676K dentry
 56100  55629  99%    0.12K   1650       34      6600K
kernfs_node_cache
  7800   7800 100%    0.81K    200       39      6400K fuse_inode
  9940   8818  88%    0.57K    355       28      5680K
radix_tree_node
 49179  49179 100%    0.10K   1261       39      5044K buffer_head
   720    638  88%    5.81K    144        5      4608K task_struct
  3168   3140  99%    1.00K     99       32      3168K kmalloc-
1024
  5664   5645  99%    0.50K    177       32      2832K kmalloc-512
  4224   3839  90%    0.66K    176       24      2816K
proc_inode_cache
 11340  11090  97%    0.20K    567       20      2268K
vm_area_struct
  1088   1069  98%    2.00K     68       16      2176K kmalloc-
2048
   705    601  85%    2.06K     47       15      1504K
sighand_cache
  5376   3682  68%    0.25K    168       32      1344K kmalloc-256
  1312   1208  92%    1.00K     41       32      1312K
signal_cache
  1794   1641  91%    0.69K     78       23      1248K
shmem_inode_cache
 19520  19520 100%    0.06K    305       64      1220K
anon_vma_chain
   296    266  89%    4.00K     37        8      1184K kmalloc-
4096
  5754   5754 100%    0.19K    274       21      1096K cred_jar
 31872  31286  98%    0.03K    249      128       996K kmalloc-32
   496    496 100%    2.00K     31       16       992K mm_struct
   112    112 100%    8.00K     28        4       896K kmalloc-
8192
  9894   9894 100%    0.08K    194       51       776K anon_vma
  1058   1037  98%    0.69K     46       23       736K
```

```
sock_inode_cache
 11328  10712  94%    0.06K    177       64       708K kmalloc-64
   748    748 100%    0.94K     22       34       704K xfs_inode
  6636   5508  83%    0.09K    158       42       632K kmalloc-96
  1470   1470 100%    0.38K     70       21       560K kmem_cache
  2856   2856 100%    0.19K    136       21       544K kmalloc-192
 11832  11832 100%    0.04K    116      102       464K
ext4_extent_status
   621    621 100%    0.69K     27       23       432K files_cache
  2976   2849  95%    0.12K     93       32       372K kmalloc-128
  5950   5950 100%    0.05K     70       85       280K
ftrace_event_field
 15872  15872 100%    0.02K     62      256       248K kmalloc-16
  3304   3304 100%    0.07K     59       56       236K Acpi-
Operand
  1792   1792 100%    0.12K     56       32       224K pid
   288    288 100%    0.66K     12       24       192K ovl_inode
   483    483 100%    0.38K     23       21       184K mnt_cache
  1886   1886 100%    0.09K     41       46       164K
trace_event_file
  1156   1156 100%    0.12K     34       34       136K
jbd2_journal_head
  1536   1536 100%    0.06K     24       64        96K
kmem_cache_node
    45     45 100%    2.06K      3       15        96K dmaengine-
unmap-256
   102    102 100%    0.94K      3       34        96K RAW
   140    140 100%    0.56K      5       28        80K task_group
  1836   1836 100%    0.04K     18      102        72K Acpi-
Namespace
   216    216 100%    0.32K      9       24        72K taskstats
    78     78 100%    0.81K      2       39        64K bdev_cache
    32     32 100%    2.00K      2       16        64K TCP
```

Whats conclussian can we makes based on this output?
General output:

- **TOTAL SIZE—**tototal slab objects memory consumption in kb

Object specific output:

- **NAME—***there are SLABs for specific and generic use*.
- **CACHE SIZE—***Total size (KB) of active SLAB cache entries*.
  Constant: Monotoneous workload w.r.t specific SLAB cache entry.
  Increasing: The workload is active in using the specific SLAB cache entry. For specific SLABs, it means a specific activity for some part of the kernel.
  Decreasing: The specific or generic kernel code (including modules) are releasing allocated SLAB cache entries. This means that the generic or specific SLAB cache demand is decreasing generally indicating decrease in the workload

- **(OBJ- ACTIVE)*OBJ SIZE—***Total size (KB) of available SLAB cache entries*. **Constant:** Stable workload w.r.t. specific SLAB cache entry.
  Increasing: There is recent significant request on specific SLAB cache. It means the increase in use is quite recent so a specific workload might be causing this. This can also mean that there is a leak for the specific SLAB and it can be a defect in the kernel or a kernel module.
  Decreasing: Available entries for some other SLAB cache needed to enlarge and therefore this specific SLAB cache entries are shrank.

- **USE %—***Percentage (%) of active cache entries to the total available for specific SLAB*.
  Low: The specific SLAB cache has not been active for some time and there are a lot available SLABs. If there are a couple of low percentages constantly, a contention on SLAB cache is unlikely.
  High: For values near 100% it means that this SLAB cache cannot shrink and if columns ACTIVE and CACHE SIZE keep increasing this can be an agressive load or a leak on the specific SLAB.