Status of BCM1F TDC DIP publishing

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DESY

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BLT_arrays: crash

- BLT_arrays (publish BLT via DIP) crashing less than 2 hours of running with error:
  terminate called after throwing an instance of 'std::bad_alloc'
  what(): St9bad_alloc
- Investigating the error pointed to an inability to allocating memory for the arrays.

BLT_arrays: crash debugging

- BLT done without DIP:
  +24h running without crashing (I forced the job to stop);
- BLT done with DIP but only time stamp being published:
  +24h running without crashing (I forced the job to stop);
- Ditto + histograms hits_per_orbit (array size 16384):
  Crashed after 10h running!
- Ditto + hits_in_orbit histograms (array size 115200):
  Crashes in less than 2 hours!
- Problem on DIP side!
- Is there something accumulating in the memory?

BLT_arrays: crash debugging

- Dip publishing

```
DipData *HistoData = dip->createDipData();
...
HistoData -> insert(TimeStamp, "time");
HistoData -> insert(Dminzhitsperorbit,
BLTMAX, "MinZHitsperOrbit");
...
```

- Crash occurs at

```
pub[0] -> send(*HistoData, time);
```

BLT_arrays: crash debugging

- **Solution:**

```
...
pub[0] -> send(*HistoData, time);
delete HistoData;
return 0;
```

- BLT_arrays, with ALL histograms being published, running **without crash** for more than **5 hours! :-)**

BLT_arrays: CPU usage

- BLT_arrays uses > 30% of the CPU!
  Not related with DIP!
- CPU usage of ~35% is due to `sleep(1)`.
  Otherwise it is ~100%.

```
top - 17:00:05 up 33 days,  5:40,  3 users,  load average: 0.30, 0.31, 0.27
Tasks:  98 total,   1 running,  97 sleeping,   0 stopped,   0 zombie
Cpu(s):  2.4% us,  6.4% sy,  0.0% ni, 91.0% id,  0.2% wa,  0.0% hi,  0.0% si
Mem:   4144668k total,  4113884k used,    30784k free,    55788k buffers
Swap:  1052248k total,      192k used,  1052056k free,  3868912k cached

  PID USER      PR  NI  VIRT  RES  SHR S %CPU %MEM    TIME+  COMMAND
31184 brmpro    17   0 98.2m  14m 9508 S   35  0.4 549:50.80 BLT_arrays
    1 root      16   0  3532  540  460 S    0  0.0   0:00.89 init
    2 root      RT   0     0    0    0 S    0  0.0   0:01.66 migration/0
    3 root      34  19     0    0    0 S    0  0.0   0:00.09 ksoftirqd/0
    4 root      RT   0     0    0    0 S    0  0.0   0:01.43 migration/1
```

BLT_arrays: CPU usage

- The high CPU usage due to saving histograms, otherwise ≲1% CPU used.
- Would another way of saving the histograms reduce the CPU usage? ROOT?

```
Tasks:  95 total,   1 running,  94 sleeping,   0 stopped,   0 zombie
Cpu(s):  0.1% us,  0.1% sy,  0.0% ni, 99.8% id,  0.0% wa,  0.0% hi,  0.0% si
Mem:   4144668k total,   506452k used,  3638216k free,   107292k buffers
Swap:  1052248k total,      192k used,  1052056k free,   238768k cached

  PID USER      PR  NI  VIRT  RES  SHR S %CPU %MEM    TIME+  COMMAND
17675 root      20   0 78320 9.8m 5748 S    1  0.2  74:00.46 xdaq.exe
21665 brmpro    16   0  121m  17m 9804 S    1  0.4   0:03.76 BLT_arrays
    1 root      16   0  3532  540  460 S    0  0.0   0:00.89 init
```

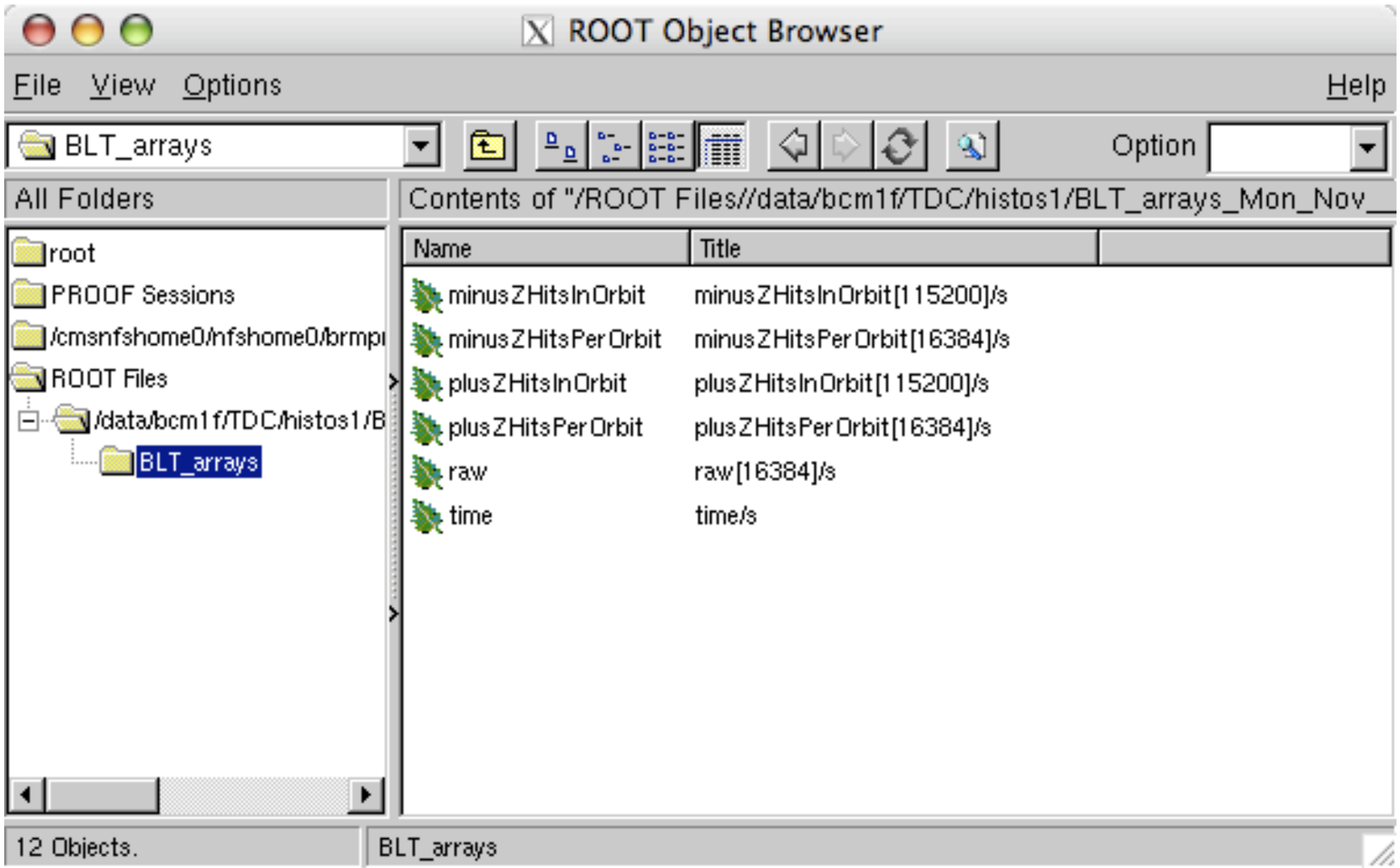
BLT_arrays: CPU usage

- Saving histograms in ROOT file: CPU usage ~3%!

```
Tasks:  98 total,   2 running,  96 sleeping,   0 stopped,   0 zombie
Cpu(s):  0.5% us,  0.2% sy,  0.0% ni, 99.3% id,  0.0% wa,  0.0% hi,  0.0% si
Mem:   4144668k total,   543380k used,  3601288k free,   110896k buffers
Swap:  1052248k total,      192k used,  1052056k free,   268964k cached

  PID USER      PR  NI  VIRT  RES  SHR S %CPU %MEM    TIME+  COMMAND
 6459 brmpro    17   0  125m  19m  10m S    3  0.5   0:04.11 BLT_arrays
17675 root      20   0 78320 9.8m 5748 S    0  0.2  74:13.24 xdaq.exe
    1 root      16   0  3532  540  460 S    0  0.0   0:00.89 init
```

BLT_arrays: ROOT tree



BLT_arrays: DISK usage

- Saving histograms in text files also consumes more disk space than a single root file containing a tree.
- Root file uses ≲10% of disk space than txt files.

```
 45K Nov  2 12:28 BLT_arrays_Mon_Nov__2_12.28.47_2009_283525.root
135K Nov  2 12:31 tdc_raw_data_Mon_Nov__2_12.31.59_2009_819983.txt
3.8K Nov  2 12:31 tdc_nrHits_perOrbit_Mon_Nov__2_12.31.59_2009_819983.txt
451K Nov  2 12:32 tdc_Hits_inOrbit_Mon_Nov__2_12.31.59_2009_819983.txt
```

Summary

- Crash of BLT_arrays solved. But I am still checking for other possible flaws.
- BLT_arrays CPU usage is quite large (>30%) due to saving histograms in text files. CPU usage saving a ROOT tree ~3%.
- ROOT file size < 10% of the text files size.
- Modifications still in private directory.
  To be implemented soon in "official" directory.
- To do: Still need to further investigate client side of DIP.