# Failure of INTT combiner production

- Combiner production = making Rawhit from evt file
- At the software/tracking meeting, there are multiple runs where the INTT productions were failed. We are asked to investigate it and fix it.
  - Joseph and I are working on this

# Failure of INTT combining production

| File | Reason |
|---|---|
| DST_INTT_EVENT_run2pp_new_2024p002-00047141-00000 | Run Number mismatch, run is 47141, INTT_4 reads 1719810582 |
| DST_INTT_EVENT_run2pp_new_2024p002-00047137-00000 | Run Number mismatch, run is 47137, INTT_6 reads 1719804583 |
| DST_INTT_EVENT_run2pp_new_2024p002-00047114-00000 | Run Number mismatch, run is 47114, INTT_2 reads 1719773943 |
| DST_INTT_EVENT_run2pp_new_2024p002-00047103-00000 | Run Number mismatch, run is 47103, INTT_4 reads 1719761428 |
| DST_INTT_EVENT_run2pp_new_2024p002-00047084-00000 | Run Number mismatch, run is 47084, INTT_2 reads 1719732051 |
| DST_INTT_EVENT_run2pp_new_2024p002-00047069-00000 | Run Number mismatch, run is 47069, INTT_2 reads 1719724882 |
| DST_INTT_EVENT_run2pp_new_2024p002-00047053-00000 | Run Number mismatch, run is 47053, INTT_2 reads 1719696413 |
| DST_INTT_EVENT_run2pp_new_2024p002-00047038-00000 | Run Number mismatch, run is 47038, INTT_7 reads 1719668710 |
| DST_INTT_EVENT_run2pp_new_2024p002-00047033-00000 | Run Number mismatch, run is 47033, INTT_3 reads 1719663750 |
| DST_INTT_EVENT_run2pp_new_2024p002-00047032-00000 | Run Number mismatch, run is 47032, INTT_3 reads 1719662712 |
| DST_INTT_EVENT_run2pp_new_2024p002-00047008-00000 | Run Number mismatch, run is 47008, INTT_3 reads 1719635260 |
| DST_INTT_EVENT_run2pp_new_2024p002-00047006-00000 | Run Number mismatch, run is 47006, INTT_6 reads 1719632735 |
| DST_INTT_EVENT_run2pp_new_2024p002-00047003-00000 | Run Number mismatch, run is 47003, INTT_6 reads 1719631629 |

- All files are done : "script done" at the last line of the log file

- Common error
  - Run Number mismatch, run is 47003, INTT_6 reads 1719631629
    You are likely reading files from different runs, do not do that

- Other error (but not the cause of the failure)
  - 47173 INTT has 8 evt files from 8 FELIX. all files are not included in the production

2024/7/3

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# Log file from the failed production

Run number error

```
/home/phnxbld/sPHENIX/gcc-12.1.0/new/source/coresoftware/offline/framework/fun4allraw/Fun4AllStreamingInputManager.cc:1166:  Run Number mismatch, run is 47003
, INTT_6 reads 1719631629
You are likely reading files from different runs, do not do that
--------------------------------
Single Streaming Input Manager GL1_0 reads run 47003 from file /sphenix/lustre01/sphnxpro/physics/GL1/physics//GL1_physics_gl1daq-00047003-0000.evt
Single Streaming Input Manager INTT_0 reads run 47003 from file /sphenix/lustre01/sphnxpro/physics/INTT/physics//physics_intt0-00047003-0000.evt
Single Streaming Input Manager INTT_1 reads run 47003 from file /sphenix/lustre01/sphnxpro/physics/INTT/physics//physics_intt2-00047003-0000.evt
Single Streaming Input Manager INTT_2 reads run 47003 from file /sphenix/lustre01/sphnxpro/physics/INTT/physics//physics_intt3-00047003-0000.evt
Single Streaming Input Manager INTT_3 reads run 47003 from file /sphenix/lustre01/sphnxpro/physics/INTT/physics//physics_intt4-00047003-0000.evt
Single Streaming Input Manager INTT_4 reads run 47003 from file /sphenix/lustre01/sphnxpro/physics/INTT/physics//physics_intt5-00047003-0000.evt
Single Streaming Input Manager INTT_5 reads run 47003 from file /sphenix/lustre01/sphnxpro/physics/INTT/physics//physics_intt6-00047003-0000.evt
Single Streaming Input Manager INTT_6 reads run 1719631629 from file /sphenix/lustre01/sphnxpro/physics/INTT/physics//physics_intt7-00047003-0000.evt
total 5300
```

List file error

```
00.evt /sphenix/lustre01/sphnxpro/physics/GL1/physics//GL1_physics_gl1daq-00047003-0000.evt
Add /sphenix/lustre01/sphnxpro/physics/INTT/physics//physics_intt0-00047003-0000.evt to intt0.list
Add /sphenix/lustre01/sphnxpro/physics/INTT/physics//physics_intt2-00047003-0000.evt to intt2.list
Add /sphenix/lustre01/sphnxpro/physics/INTT/physics//physics_intt3-00047003-0000.evt to intt3.list
Add /sphenix/lustre01/sphnxpro/physics/INTT/physics//physics_intt4-00047003-0000.evt to intt4.list
Add /sphenix/lustre01/sphnxpro/physics/INTT/physics//physics_intt5-00047003-0000.evt to intt5.list
Add /sphenix/lustre01/sphnxpro/physics/INTT/physics//physics_intt6-00047003-0000.evt to intt6.list
Add /sphenix/lustre01/sphnxpro/physics/INTT/physics//physics_intt7-00047003-0000.evt to intt7.list
Add /sphenix/lustre01/sphnxpro/physics/GL1/physics//GL1_physics_gl1daq-00047003-0000.evt to gl1.list
-rw-r--r-- 1 sphnxpro sphenix 85 Jun 29 10:08 gl1.list
-rw-r--r-- 1 sphnxpro sphenix 81 Jun 29 10:08 intt0.list
-rw-r--r-- 1 sphnxpro sphenix  0 Jun 29 10:08 intt1.list
-rw-r--r-- 1 sphnxpro sphenix 81 Jun 29 10:08 intt2.list
-rw-r--r-- 1 sphnxpro sphenix 81 Jun 29 10:08 intt3.list
-rw-r--r-- 1 sphnxpro sphenix 81 Jun 29 10:08 intt4.list
-rw-r--r-- 1 sphnxpro sphenix 81 Jun 29 10:08 intt5.list
-rw-r--r-- 1 sphnxpro sphenix 81 Jun 29 10:08 intt6.list
-rw-r--r-- 1 sphnxpro sphenix 81 Jun 29 10:08 intt7.list
-rw-r--r-- 1 sphnxpro sphenix  0 Jun 29 10:08 mvtx0.list
```

No intt1.list

The size of  intt1.list is zero

- List file error is not the main cause of the failure because there are more runs having this error but not failed

# Investigating RunNumber issue

- Run47003
  - Strange run number is seen only at the last event.
  - Seen at all the FELIX's
    - List of runnumber at the last event
    - 1719631627 1719631627 1719631628 1719631629 1719631628 1719631627 1719631629 1719631629
- Run47007 (not failed)
  - The run processing successfully also shows the strange runnumber at the end
    - **47007** 1719634346 **47007** 1719634348 1719634347 **47007 47007** 1719634346
  - This implies the strange runnumber may not be the cause of the problem
- "Runnumber" in the data
  - Every events have a "run number" variable
  - Strange value is seen at the last event only
    - (I checked the 5 runs which are the failed runs)

```
#ifndef __EVT_STRUCTURES_H
#define __EVT_STRUCTURES_H

#include "phenixTypes.h"

typedef struct evt_data
{
    unsigned int evt_length;
    int evt_type;
    int evt_sequence;
    int run_number;
    int date;
    int time;
    unsigned int reserved[2];
    PHDWORD data[99999];
} *evtdata_ptr;
```

# OFFLINE QA

- We are asked to prepare the offline QA plots from the DST production
  - Some people from tracking group are working on this topics
  - Good / Bad examples are also needed as reference.

- Genki's QA list
  - InttRawHit level
    - Hit rate: per FELIX or per ladder after clone hit rejection
    - Clone hitrate
    - BCO timing (Peak position of time timing plot (GTM BCO%0x7f - FPHX BCO) per ladder
    - Nbad channel per run
  - Trkr_hit level
    - Hit rate after bad channel rejection
    - ADC per ladder
    - Ratio of the number of Trkr_hit between the inner and the outer layer, South and north side
  - Trkr_cluster level
    - Ncluster rate per ladder
    - Cluster size, ADC distribution

- Some additional plots
  - INTT zvertex, INTT X-Y vertex (DCAxy)
  - INTT Ntracklets phi, theta
  - Correlations with other detectors
    - Nclusters with MVTX, EMC

Some raw level are ready
but cluster and higher level QA are not implemented