Level 3, ScriptRunner, Filters and Tools

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L3 Filters and Tools...

- L3 and ScriptRunner overview
- Filter / Tool summary
- Online testing
SR Overview

L3 FilterShell

ScriptRunner

- L2bit 0
  - L3bit 0
    - filter 1
    - filter 2
  - L3bit 1
    - filter 3
    - filter 4
- L2bit 1
  - L3bit 2
    - filter 1

L3 Node

output streams

- L2bit 0
  - L3bit 0
    - filter 1
    - filter 2
  - L3bit 1
    - filter 3
    - filter 4
- L2bit 1
  - L3bit 2
    - filter 1

Events

L3 FilterShell

ScriptRunner
L3 Filters

Basic filters
• L3FJet
• L3FTrack
• L3FEle
• L3FPhoton
• L3FTau
• L3FMEt
• L3FMuon
• L3FMuoHitCoinc

Higher level filters
• L3FAcol
• L3FHt
• L3FInvMass
+ various other wrapper filters for testing tools
<table>
<thead>
<tr>
<th>Unpack tools</th>
<th>Reconstruction tools</th>
<th>Physics tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>L3TCalUnpTool</td>
<td>L3TCalCluster</td>
<td>L3TEle</td>
</tr>
<tr>
<td>L3TCFTunpack</td>
<td>L3TCPS</td>
<td>L3TPhoton</td>
</tr>
<tr>
<td>L3TMuoUnpack</td>
<td>L3TsmtCluster</td>
<td>L3TJet</td>
</tr>
<tr>
<td>L3TSmtUnpack</td>
<td>L3TCFTTrack</td>
<td>L3TMuon</td>
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<tr>
<td>Calibration tools</td>
<td>L3TMuoLocal</td>
<td>L3TauHadronic</td>
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<tr>
<td>L3TCalCalibTool</td>
<td>L3TMuoCentralMatch</td>
<td>(Blue = ported to NT)</td>
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<tr>
<td></td>
<td>L3TGlobalTracker</td>
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<td>L3TPrvtx</td>
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<td></td>
<td>L3TMuoHitCoinc</td>
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</tbody>
</table>
Tool documentation

http://www-d0/d0dist/dist/releases/p06.00.01/

- L3TCalCluster  l3fcalcluster/doc/index.html
- L3TEle  l3femtools/doc/L3TEle_overview.html
- L3TPhoton  l3femtools/doc/L3TPhoton_overview.html
- L3TJet  l3femtools/doc/L3TJet_overview.html
- L3TSmtUnpack  l3fsmtunptool/doc/userguide.html
- L3TsmtCluster  l3fsmtcluster/doc/userguide.html
- L3TCFTUnpack  l3fcftunpack/doc/userguide.html
- L3TCFTTrack  l3ftrack_cft/doc/L3CFTTrack.html
- L3TGlobalTracker  l3ftrack_global/doc/index.html
- L3TCPS  l3fcps/doc/index.html
- L3TauHadronic  http://www-d0/~gusbroo/L3Tau_short.html
- L3TCalMEt  http://www-d0/~sawyer/L3CalMEt_short.html
Online testing and integration

• Initial ScriptRunner testing
  – downloading the trigger programming
  – verify that output-streaming is operational

• Preparation for full integration
  – rate + stability testing for SR and unpack tools
  – SigEvtSys + ErrorLogger testing
Single run tests...

run1 → 11/l2bit1 → l3bit1
       /      \          M&P1 → l3_test_1
      /  \     \        M&P2 → l3_test_2
     /    \     (other) → l3_test_unk

run1 ← 11/l2bit1 → l3bit1 → M&P1 → l3_test_1
       \       11/l2bit2 → l3bit2 → M&P2 → l3_test_2
                \                              (other) → l3_test_unk
Single run tests...

- run1
  - 11/l2bit1 → l3bit1
  - 11/l2bit2 → l3bit2

  - M&P1 → l3_test_1
  - M&P2 → l3_test_2
  - M&P3 → l3_test_3
  - M&P4 → l3_test_4
  - (others) → l3_test_unk
Multi-run tests...

run1 $\rightarrow$ l1/l2bit1 $\rightarrow$ l3bit1

run2 $\rightarrow$ l1/l2bit2 $\rightarrow$ l3bit2

M&P1 $\rightarrow$ l3_test_1
M&P2 $\rightarrow$ l3_test_2
M&P3 $\rightarrow$ l3_test_3
M&P4 $\rightarrow$ l3_test_4

(other) $\rightarrow$ l3_test_unk
Multi-run tests...

run1 → 11/l2bit1 → l3bit1

run2 → 11/l2bit2 → l3bit2

run3 → 11/l2bin3 → l3bit3

M&P1 → l3_test_1
M&P2 → l3_test_2
M&P3 → l3_test_3
M&P4 → l3_test_4
M&P5 → l3_test_5
M&P6 → l3_test_6
(others) → l3_test_unk
Rate and stability tests…

- tfw crate with M&P
  - 70,000 events @ ~20Hz (1hr)
  - pushed farm001 to the limit
  - slight memory leak ~100 bytes/event

- 1 muon scintillator crate + tfw with M&P
  - 30,000 events @ ~10Hz (50 mins)
  - based on CPU usage node could reach 18-20Hz
  - memory leak still present ~100 bytes/event
Conclusions

• PrimitiveAlgo in l3streaming works correctly
• Multi-run functionality tested
  – L3Supervisor and ScriptRunner (for M&P) work
• Mark and Pass at 20Hz on farm001
  – lots of debug output and non-optimised
• Stable over at least one hour and 10s thousands of events

Tests were 100% successful!
Rate testing

• New SB/ETG allows much higher rates
• Mark and Pass with 3 crates + tfw
  – 53Hz sustained over 302,000 events
• Mark and Pass with 8 crates + tfw
  – up to 14Hz observed without significant losses
  – same as observed when running without SR
• MuonUnpacking with 3 crates + tfw
  – up to 8Hz pass rate observed
Stability testing

• Several long runs have been taken with several crates
• SR survived crates going bad without crash
• Longest run so far: 302k events.
Conclusions

• Initial integration issues:
  – able to download trigger programming
    • some problems with parsing and error handling
    • download sequence not quite correct
  – writing of events to streams successfully tested
  – multiple clients per nodes successfully tested
Conclusions...

• Rate testing:
  – In context of detector commissioning studies:
  – SR doing MarkAndPass keeps up with DAQ
  – Need to understand why running with unpackers is slow
Conclusions

• Stability testing:
  – SR has run for several hours over several hundred thousand events, surviving front-end crashes, missing crates etc.
  – No significant memory leaks seen in main code

• SigEvtSys + ErrorLogging
  – successfully sent error and informational messages to the alarm server.
Next steps...

- Go to full integration of SR for remaining commissioning tasks
- resolve remaining issues with
  - download of trigger programming
  - correct handling of error logging
- finish porting filters and tools to NT and begin certification and optimisation on NT platform