Preliminary Results

• Ultra DPS looks promising
• Reasonable agreement with David
  – We were not really trying to duplicate the results per se
• Some interesting features noted
• Some improvements in modeling to come
Assumptions

- We assumed the ‘new baseline’
  - 2 SRC’s (8 bit)
  - Advertised L2P improvements
  - Corresponds to study ‘3b’ 2 weeks ago
    - SVT as it is currently (160441)
- 80 kHz L1A input
  - 70 kHz component `prescaled`
    - Tried n >= 2, 3 and 4 EMPTY L2 buffers
  - 10 kHz component requires n>=1
# ModSim Studies

<table>
<thead>
<tr>
<th>Scenario 3b</th>
<th>EMPTY Buffers</th>
<th>Unprescaled</th>
<th>`Prescaled'</th>
<th>Deadtime</th>
<th>L2A</th>
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<tbody>
<tr>
<td></td>
<td>L1A input</td>
<td>L1A</td>
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<td>(Hz)</td>
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<td>(kHz)</td>
<td>(kHz)</td>
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</table>
Interesting Consequence

• With Ultra-DPS enabled:
  – CDF_L1A/FRED_L1A > Livetime/Runtime
• This should NOT be a surprise
  – Ultra-DPS breaks the random nature of the trigger selection such that triggers are sent to the DAQ system (the TS) preferentially when the system is `live’.
• Not an issue: we do not use the ratio of L1A’s (above) to determine the `live’ luminosity
  – We check each BC for >=1 EMPTY L2 buffer
Some Remaining Issues

• Current simulation has no `trigger table’
  – Same L2 rejection ratio for both components
    • Based on L2A target rate/unprescaled L1A rate
    • But L2A rate and Readout Deadtime small

• Current simulation does not take into account any effects due to hardware implementation
  – Expect a ~ 2 µsec delay in feedback of buffer status information from TS crate into FRED
  – At 100 kHz → 20% chance for stale information
  – For n>=3 condition this should probably be OK
Conclusions

• David has made an inspired suggestion
• ModSim results look good so far
• Would like to complete our studies before taking the next step
• Extracting the feedback signal from the TS crate should not be a problem (firmware is in hand for an upgrade)
• The rest of the work is in the Trigger Table