

A diagram of the ALICE detector geometry, showing a fan-shaped arrangement of detector segments. The segments are shaded in various tones of gray, with the central segment being the darkest. The segments are arranged in a semi-circular pattern, with the central segment pointing downwards.

ALICE DAQ Simulation

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Outline

- ▶ ALICE DAQ Specification
- ▶ Full DDL Bandwidth
- ▶ Restricted DDL Bandwidth
- ▶ Simulation Performances

ALICE DAQ Specification

Model of whole ALICE DAQ System

- Trigger System (L0, L1, L2)
- Trigger and Tracking Detectors
- DAQ (with sub-event building, event building, storage)
- Parameters (buffer sizes, etc.)

Evaluation of Performances

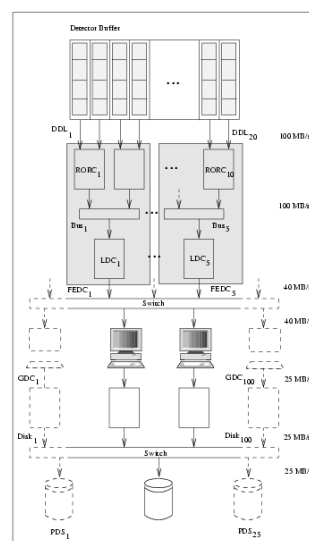
- Whole system: full DLL bandwidth / restricted bandwidth
- For each detector: buffer occupancy, bandwidth usage

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ALICE DAQ Sub-System

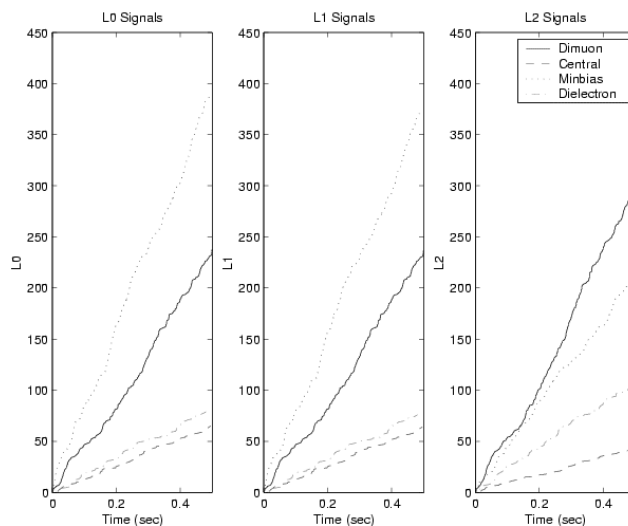
- Detectors Buffer: 4positions
- 397 DDLs: 100 Mbytes/s
- 299 RORCs: Size: 12 Mbytes
- 240 Bus: 100 Mbytes/s
- 240 LDCs: Size: 128 Mbytes
 - Sub-event building
- 100 GDCs: Size: 512Mbyte
 - Event Building
- 100 Disks: Files of 1 Gbytes
- 25 PDS: Infinite Buffer



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Full DDL Bandwidth (1)



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Full DDL Bandwidth (2)

L0 / L1 / L2 Signals

	L0	L1	L2
Central	137	133	92
Dimuon	462	457	585
Dielectron	159	152	197
Minbias	747	714	409
Misc	203	197	
Interaction	1997		

After 1 sec (6038 ev)
Expected at L2:

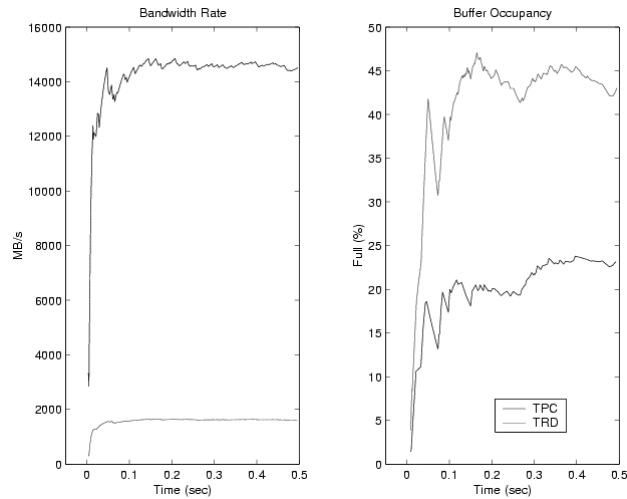
	Buffer Full	Bandwidth	Maximum	Usage
TPC	23	14279 MB/	18000 MB/	79
TRD	43	1585MB/	1800MB/	88

	C	MB	DM	DIEL	Total
L2	20 H	20 H	650 Hz	200 Hz	890 Hz

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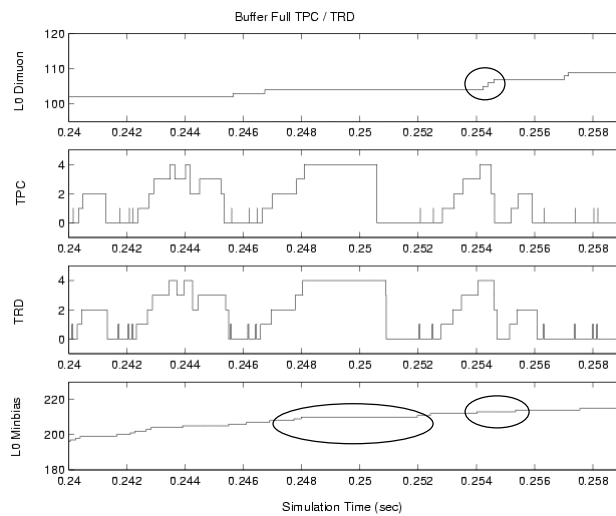
Full DDL Bandwidth (3)



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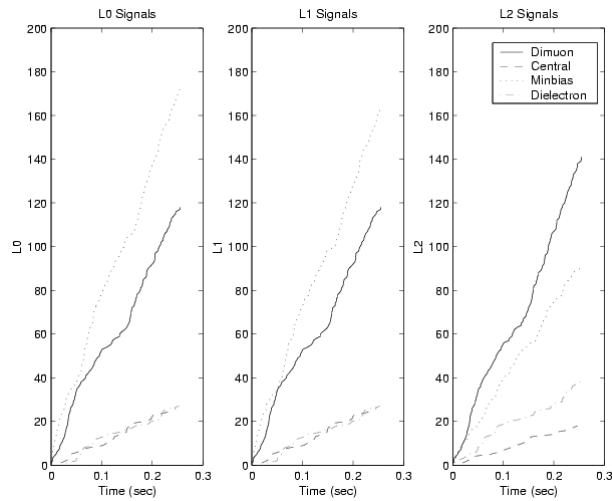
Full DDL Bandwidth (4)



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Restricted DDL Bandwidth (1)



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Restricted DDL Bandwidth (2)

L2 Signals (0.25s)

	L2	Disk
Central	18	0
Dimuon	141	9
Dielectron	38	0
Minbias	91	0

Bandwidth Rate (0.25s)

	Buffer Full	Bandwidth	Maximum	Usage
TPC	47	11558 MB/	18000 MB/	64.20
TRD	51	1276MB/	1800MB/	70.80

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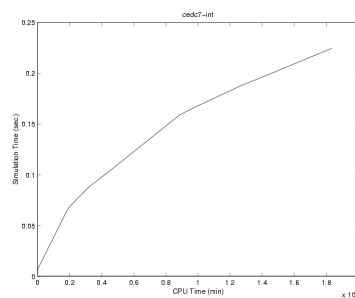
Simulation Performances

▶ Full DDL Bandwidth

- 5 min CPU Time => 1.0 s Simulation Time

▶ Restricted DDL Bandwidth

- 12 days CPU Time => 0.2 s Simulation Time



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Conclusion

- ▶ Formal Description of ALICE DAQ functionality
- ▶ Tool for ALICE DAQ Simulation
 - Tuning of Parameters
 - Exploration of Algorithms
- ▶ Limitation: Simulation is too slow

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