Rack Layout: Criteria

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- Minimise the overall latency
- Ergonomics, Maintainability
- Cable routing paths
- Holes in shielding wall
- Allow for future flexibility

Rack Layout: Latency

Current Critical Path

- Furthest (which?) FE electronics [60m$\rightarrow$]
- Receiver stations [10m?$\rightarrow$]
- PreProcessor Modules [7.5m$\rightarrow$]
- Jet/Energy Modules [7.5m?$\rightarrow$]
- Energy Sum Merger Modules [7.5m?$\rightarrow$]
- Central Trigger Processor [?]
- TTC Distribution [?]
- Critical (eg LAr) TTC Crates [?]
- Longest TTC Fibres [80m$\rightarrow$FE]

Less Critical Paths

- Muon and Cluster Processors (about 2–4 BC to spare, ie 10–20m of cable)

Rack Layout: Cable Routing

External Rules

- Route to/from detector is via four (small, slanted) holes in shielding wall The proposed layout is **far** from ideal, going to both sides of both floors) Try to renegotiate with safety group
- Meanwhile TC would like to increase the maximum length!
- The path from rack to rack is normally down and under the false floor...
- ...but front panel to front panel is OK
- (Almost) no cables between floors (except via long route)

Rack Layout:
Cable Routing

Internal Requirements

- Receiver crates will have all +ve or -ve eta; and either barrel or endcap
- Each PPM crate spans all of eta and needs input from four receiver crates
- Each PPM crate feeds three CPM and three JEM crates
- Each CPM/JEM crate takes input from six PPM crates

Rack Layout: Front/Back Panels

Input and output connectors of the various trigger modules (along the trigger data path) are as follows:

Module	Input	Output
Receivers	Back?	Front?
PPMs	Front	Back
CPMs	TBD	N/A
JEMs	Front	N/A
CMMs	Front	Front
SMMs	Front	Front
CTP	Front	Front
TTC	Front	Front

Front panel inputs are more easily disturbed, but might offer shorter cable runs.

Rack Layout: Ergonomics

- Would like no more than two 9U crates per rack
- Centrally located for easy access and maintenance
- Other services (6U crates, bulk cabling, DCS, scopes, computers, monitors, network) above, between or below
- Quadrant architecture suggests a 2*2 layout is ideal...
- ...and doesnt take much extra cable path (because of the fanout to multiple crates)
- The (probably) eight crates of receiver modules are also likely to be naturally arranged in pairs rather than threes
- Separate racks for each system during installation and commissioning phase

Rack Layout:
Flexibility

- Critical latency path might change
- Maybe more subdetectors will want TTC crates close to CTP
- We might need more nearby crates than we expect
- ...
- Aim for a layout which can accommodate some growth