Mappings from DPS to FEXes

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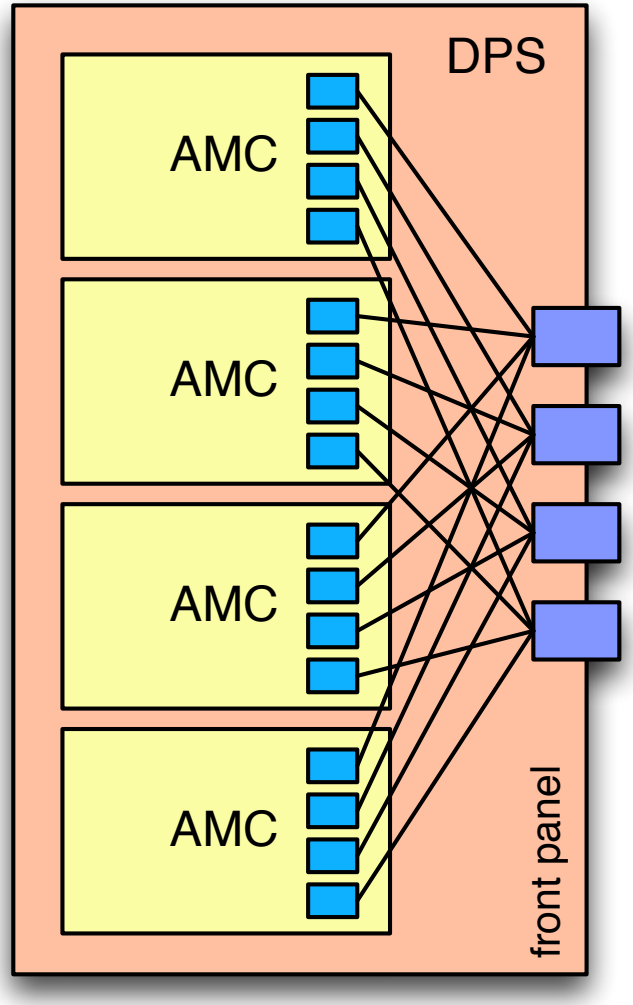
- DPS Outputs
- Impact of ~10 Gbit/s links on mappings and FEXes
- Number of LDPBs and AMCs?
- Merge HEC with EMEC forward (|eta|>2.4) AMCs?

DPS and AMC Outputs

- I had assumed AMC µPOD outputs would be grouped as shown
  - Same µPOD from all AMCs to one output
  - Group front panel outputs by function
    - Not by input eta*phi
- Sounds like this is very undesirable from LAr perspective
  - Hard to change one AMC on an LDPB
  - But not strictly impossible???
- Need to think about implications on optical plant between DPS and FEXes
  - We may come back to you on this one...



Notes on ~10 Gbit/s Links

- LAr and TDAQ TDRs agree to differ on link speeds
  - But all hoping for ~10 Gbit/s
  - Someday need to define exactly what speed
    - And exactly what we mean by that speed
- Meanwhile: impact of higher speeds on mappings?
  - No change for EM fibres to eFEX
    - Same number, different content (no BCMUX)
  - EM to jFEX and Hadronic fibres would change
    - Aim for 16 (instead of 8) towers per fibre
  - But this would allow jFEX to handle larger jets
    - Consider 1.7*1.7 size jets (instead of 0.9*0.9)
  - This would require more fanout (ie more copies) - only to jFEX
  - So only a small reduction in total number of fibres
    - EM barrel AMC to jFEX: 4 fibres * 2 copies = 8 fibres @ 6.4 Gbit/s
    - But 2 fibres * 3 copies = 6 fibres @ 10 Gbit/s

Number of AMCs & LDPBs

- My suggested use and count of AMCs
  - NB several EMEC forward (|eta|>2.4) and HEC variants
  - All variants assume 29 LDBPs (116 AMCs)
    - 24 LDPBs for EM barrel and EM standard endcap - all the same
    - 5 more for EM |eta|>2.4 (2), HEC (2) and FCAL (1)
  - Outputs marked with * require subsequent splitting
    - Not enough AMC outputs for required number of FEX inputs
    - At ~10 Gbit/s may avoid any splitting by merging HEC and EMEC forward
      - Less optical power loss => better for higher speed signals

Region	EM central |eta|<2.4	EMEC forward |eta|>2.4	HEC@6.4	HEC@10	EMECfwd+HEC@10	FCAL
Output 1	eFEX (core left + phi env)	eFEX (core + env)	eFEX*	eFEX	eFEX	jFEX
Output 2	eFEX (core right + phi env)	eFEX (core + env)	eFEX*	eFEX	eFEX	jFEX
Output 3	eFEX (eta environment)	Hardly used (few jFEX)	jFEX*	jFEX	jFEX	jFEX
Output 4	jFEX	jFEX	jFEX*	jFEX*	jFEX	jFEX
N.LDPBs	24	2?	2?	2?	4?	1?
N.AMCs	96	8?	8?	8?	16?	4?

Merge EMEC Fwd & HEC? (1)

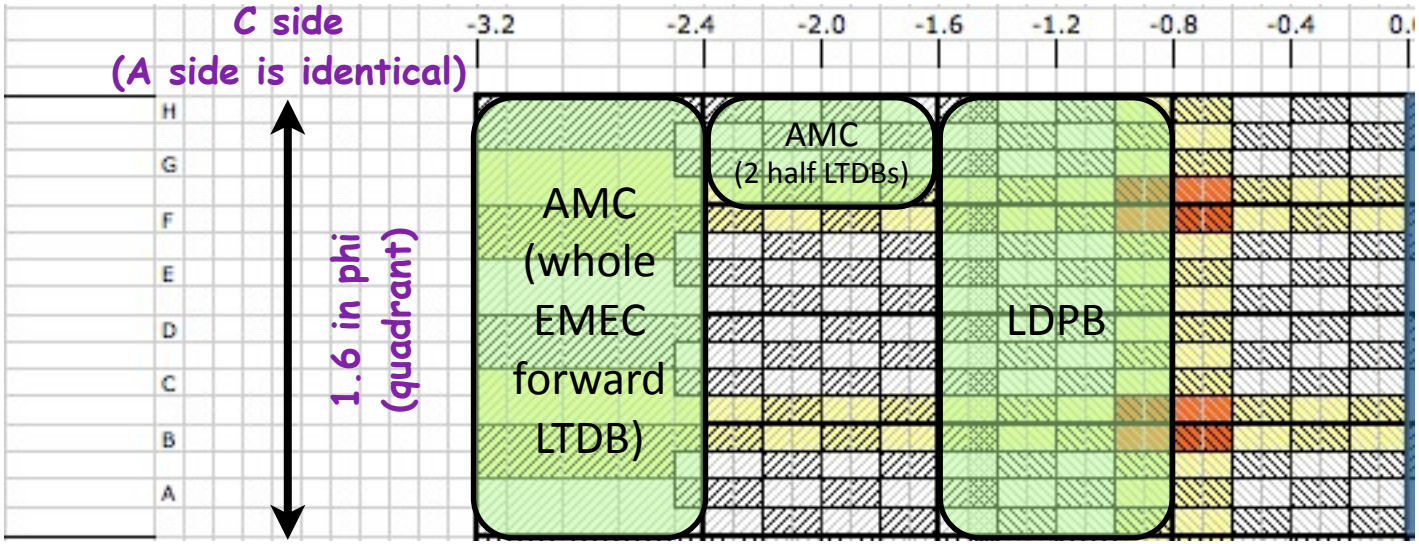
- My original assumption:
  - One LDPB (4 AMCs) for HEC (each end)
    - One AMC covers one quadrant (one whole HEC LTDB)
    - Extra optical splitting needed for both eFEX and jFEX
  - One LPDB (4 AMCs) for forward EMEC (|eta|>2.4)
    - One AMC covers one quadrant (one whole EMEC fwd LTDB)
      - These AMCs are underused - but more than half the available outputs are needed
- New suggestion:
  - One AMC has half a HEC LTDB plus half an EMEC fwd LTDB
  - Same total number of AMCs, different input mapping

Merge EMEC Fwd & HEC? (2)

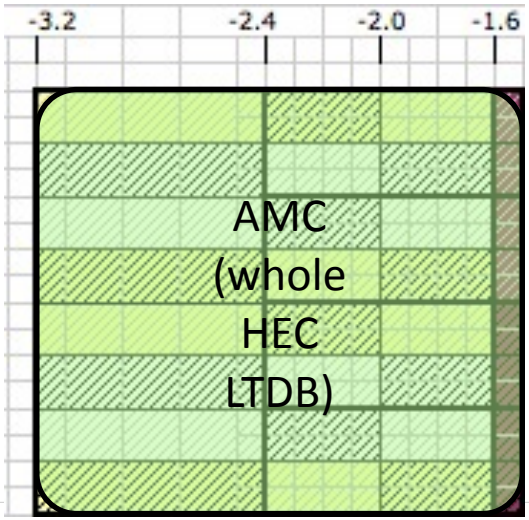
- Original assumption:

EM Barrel & Std Endcap < 2.4
One firmware mapping
36 fibres to eFEX
(not all used at any eta,phi)
8 fibres to jFEX
(or 6 fibres at 10 Gbit/s)

EMEC Forward > 2.4
~20 fibres to eFEX
~12 fibres to jFEX



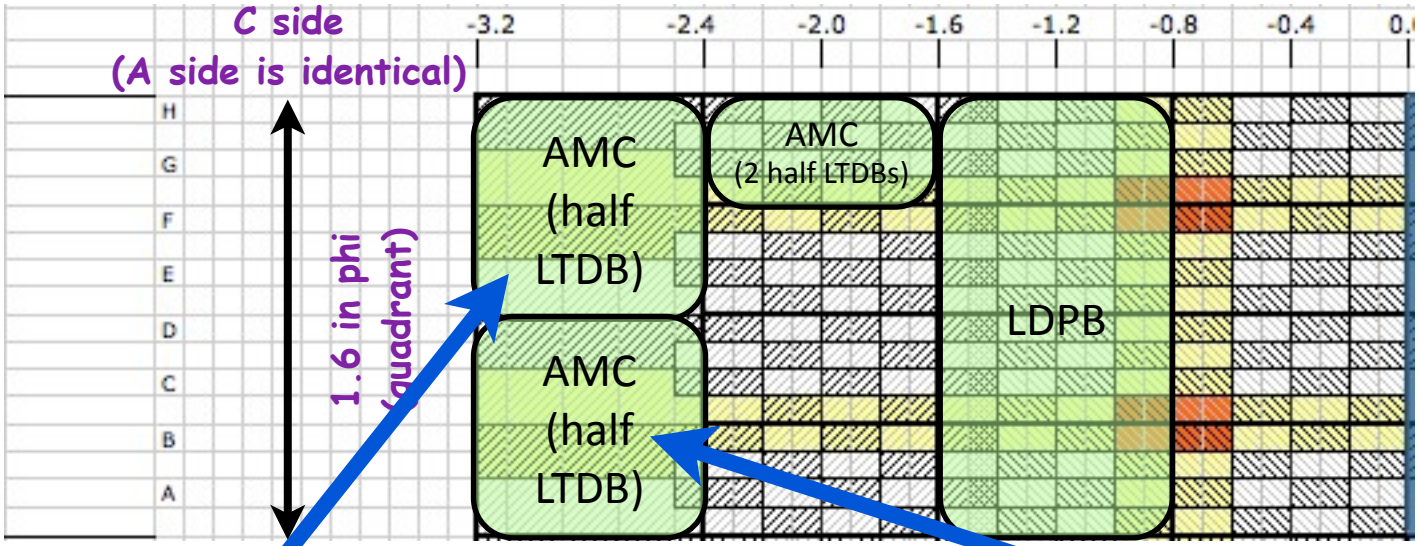
HEC: one AMC per quadrant
~40 fibres to eFEX
~48 fibres to jFEX
=> lots of extra splitting
Reduction at 10 Gbit/s:
~20 fibres to eFEX
~36 fibres to jFEX
=> still need some splitting



Merge EMEC Fwd & HEC? (3)

- New suggestion (mainly for 10 Gbit/s):

EM Barrel & Std Endcap < 2.4
One firmware mapping
36 fibres to eFEX
(not all used at any eta,phi)
8 fibres to jFEX
(or 6 fibres at 10 Gbit/s)



Combine EMEC fwd+HEC:
one AMC per octant
~30 fibres to eFEX
~36 fibres to jFEX
=> still need some splitting
Reduction at 10 Gbit/s:
~20 fibres to eFEX
~24 fibres to jFEX
=> no extra splitting needed!