

Power and networking discussion

Sept 22, 2015

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Notes

- Started by trying to estimate the power in a small number of scenarios. RCE system (with ability to split between on-cryostat and in central underground area (CUA)), and a Felix design
- In the end, I also included
 - a design where we use computers a lot, but not like the Felix design (This is called the part-PCIe design), for now, estimates are very approximate.
 - the dual phase (called LBNO in table) estimate from Jacques Marteau.
 - Several scenarios of moving between on-cryo, in CUA, on surface. In most cases, these sum to the same amount (where they don't, some extra electronics to convert from copper to optical added).
- The blue cells are the ones that have been input. The dark blue ones are the ones with big uncertainty still. There may be more that need colouring dark blue.
- The brown cells are the ones I was copying over to the scenario table mostly
- The green cells on the scenario table are the ones I have been focusing on

	Max W/rack CUA&surface	3000							
	Power factor	0.8							
Element	Power per 10kt	Multiplier (racks)		Power per rack	Space in U (per rack)	Multiplier (per rack)	Element in U	Power in VA per element	Power estimate (W)
Ethernet switch	15000	75	200	2	2	1	100	80	S
SSP+calib	29531	75	394	7	7	1	56	45	
DUNE timing	3750	75	50	4	1	4	50	40	
MPOD	56250	75	750	9	1	9	750	600	
Rack protection	0	75	0	1	1	1	0	0	0
Totals for Det	104531	75	1394	23					
ATCA shelf	46875	75	625	5	1	5	625	500	
Boardreader CPU SSP	18750	75	250	2	1	2	250	200	
Boardreader CPU RCE	18750	75	250	2	1	2	250	200	
Trigger node	2500	1	2500	20	10	2	250	200	
Server node	2500	1	2500	16	8	2	313	250	
Central 1G switch	500	1	500	5	5	1	100	80	
Central 10G switch	300	1	300	1	1	1	300	240	
Data storage node	1563	1	1563	10	5	2	313	250	
Totals for RCE DAQ	91738		875	52					
SubTotal move things	7363								
Felix receiver comp	281250	75	3750	16	4	4	938	750	4
Copper2Optic at flange	56250	75	750	16	4	4	188	150	C
Less RCE stuff	-65625	75	-875	-7					
Delta for Felix	271875		3625	25					
Part-PCIe receiver comp	140625	75	1875	8	2	4	938	750	2
Copper2Ethnet at flange	56250	75	750	16	4	4	188	150	S
Local switch	7500	75	100	1	1	1	100	80	
Less RCE stuff	-65625	75	-875	-7					
Delta for Part-PCIe	138750		1850	18					
DualPhase uTCA	180000	20	9000	72	12	6	750	600	
DualPhase FE	6000	20	300	0	12	0	25	20	
DualPhase BE	25000	20	1250	0	1	0	1250	1000	
DualPhase Online	125000	1	125000	0	1	0	125000	100000	
Total for DualPhase	336000		10550	72					
Delta for Dual Phase	244263								
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Spec sheet says 58W max for 24-port, BTU more like 100W

4 x 100W PCIe cards + 1 x 200W computer, PSU efficiency factor 80%

Complete guess, no idea if this is correct

2 x 10W network cards + 1 x 200W computer, PSU efficiency factor 80%

Same wild guess as for Felix system for now

480

16

800

80000 Single estimate for now, not broken down

Estimates for different options

Power in VA		Total power/10kt (kW)	At Flange			Data transfer/10kt from cavern to CUA	At CUA		Data transfer CUA-surface	At Surface	
			Non-DAQ power/10kt at flange	Non-DAQ U/flange at flange	DAQ power/10kt at flange		DAQ U/flange at flange	DAQ power/10kt at CUA		DAQ power/10kt at surface	#racks/10kt at surface
A. Logic and LC at flange TC at CUA	1. RCE design	196,269	104,531		84,375			7,363	3		0
	2. LBNO design	440,531	104,531		211,000			125,000	42		0
	3. Part-PCIe design	316,269	104,531		204,375			7,363	3		0
	4. Felix design	449,394	104,531		337,500			7,363	3		0
B. Logic and LC at flange TC at Surface	1. RCE design	196,269	104,531		84,375			0	0	7,363	3
	2. LBNO design	440,531	104,531		211,000			0	0	125,000	42
	3. Part-PCIe design	316,269	104,531		204,375			0	0	7,363	3
	4. Felix design	449,394	104,531		337,500			0	0	7,363	3
C. Logic at flange, LC and TC at CUA	1. RCE design	196,269	104,531		65,625			26,113	9		0
	3. Part-PCIe design	316,269	104,531		63,750			147,988	50		0
	4. Felix design	449,394	104,531		56,250			288,613	97		0
	1. RCE design	196,269	104,531		65,625			18,750	7	7,363	3
D. Logic at flange, LC at CUA and TC at Surface	3. Part-PCIe design	316,269	104,531		63,750			140,625	47	7,363	3
	4. Felix design	449,394	104,531		56,250			281,250	94	7,363	3
	1. RCE design	196,269	104,531		65,625			0	0	26,113	9
	3. Part-PCIe design	316,269	104,531		63,750			0	0	147,988	50
E. Logic at flange, LC and TC at Surface	4. Felix design	449,394	104,531		56,250			0	0	288,613	97
	1. RCE design	196,269	104,531		65,625			0	0	26,113	9
	3. Part-PCIe design	316,269	104,531		63,750			0	0	147,988	50
	4. Felix design	449,394	104,531		56,250			0	0	288,613	97
F. Logic, LC and TC at CUA	1. RCE design	252,519	104,531		75,000			72,988	25		0
G. Logic and LC at CUA, TC at Surface	1. RCE design	252,519	104,531		75,000			65,625	22	7,363	3
H. Logic at CUA,, LC and TC at surface	1. RCE design	252,519	104,531		75,000			46,875	16	26,113	9
I. Logic, LC and TC at surface	1. RCE design	179,531	104,531		75,000			0	0		0