Requirements rollup

Graham Heyes

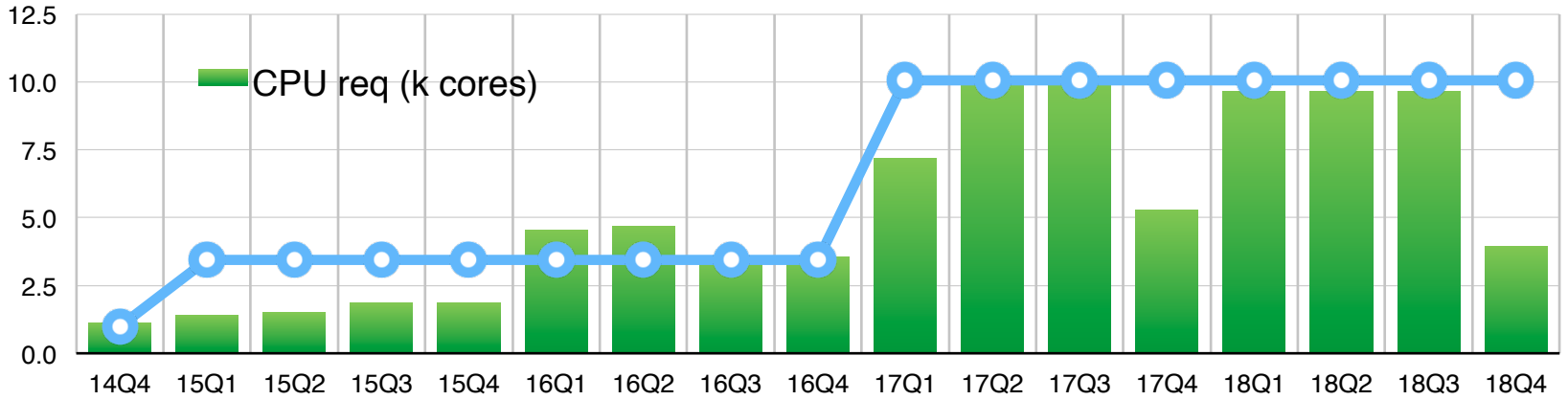
What has changed

- Running schedule:
  - Reduced of running per year.
  - CLAS12 delayed.
- Software improvements and more testing:
  - Better estimates of reconstruction and MC generation time per event.
- Hall-D commissioning run:
  - Real data to test software and measure rates.
  - Better estimate of GLUEX event size.
- Large upgrade to analysis cluster in fall of 2014:
  - Renormalize CPU requirements relative to 2.3 GHz Intel Xeon E5-2670v3 (Haswell) processor.

CPU requirements and cost

CPU requirements and cost

Fiscal quarter	14Q4	15Q1	15Q2	15Q3	15Q4	16Q1	16Q2	16Q3	16Q4	17Q1	17Q2	17Q3	17Q4	18Q1	18Q2	18Q3	18Q4
CPU req (k cores)	1.1	1.4	1.5	1.8	1.8	4.5	4.7	3.6	3.6	7.2	10.1	10.1	5.3	9.7	9.7	9.7	3.9
k cores to add	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cluster size (k cores)	1.0	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1
Upgrade cost	$349K	0	0	0	0	0	0	0	$533K	0	0	0	0	0	0	0	0



- Current cluster is adequate through the end of FY16.
- We have “banked” CPU time with HPC and can reclaim to cover the under provisioning in FY16.
- Computing requirements dominated by simulation.
- FY18 requirement is ½ of that quoted in last review

Disk requirements and cost

Disk total in PB

Fiscal quarter	15Q1	15Q2	15Q3	15Q4	16Q1	16Q2	16Q3	16Q4	17Q1	17Q2	17Q3	17Q4	18Q1	18Q2	18Q3	18Q4
Hall A - 6 Gev	50	50	50	50	50	50										
Hall C - 6 GeV	25	25	25	25	25	25										
6 GeV Total	75	75	75	75	75	75	0	0	0	0	0	0	0	0	0	0
Hall A - 12 GeV	18	18	18	18	41	41	41	41	46	46	46	46	68	78	78	78
Hall C - 12 GeV	0	27	27	27	27	41	41	41	41	41	41	41	41	41	41	41
Hall B - total	176	182	212	212	212	207	207	207	207	321	321	321	379	379	379	379
Hall D	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
12 GeV Total	394	427	457	457	480	489	489	489	494	608	608	608	688	698	698	698
Total PB	0.5	0.5	0.5	0.5	0.6	0.6	0.5	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.7	0.7

- Disk currently installed is 500 TB
- Current cost $16k for 85 TB useable.
- Disk requirement of 700 TB can be easily met within the annual Farm Ops. Budget, add ~200 TB each year.

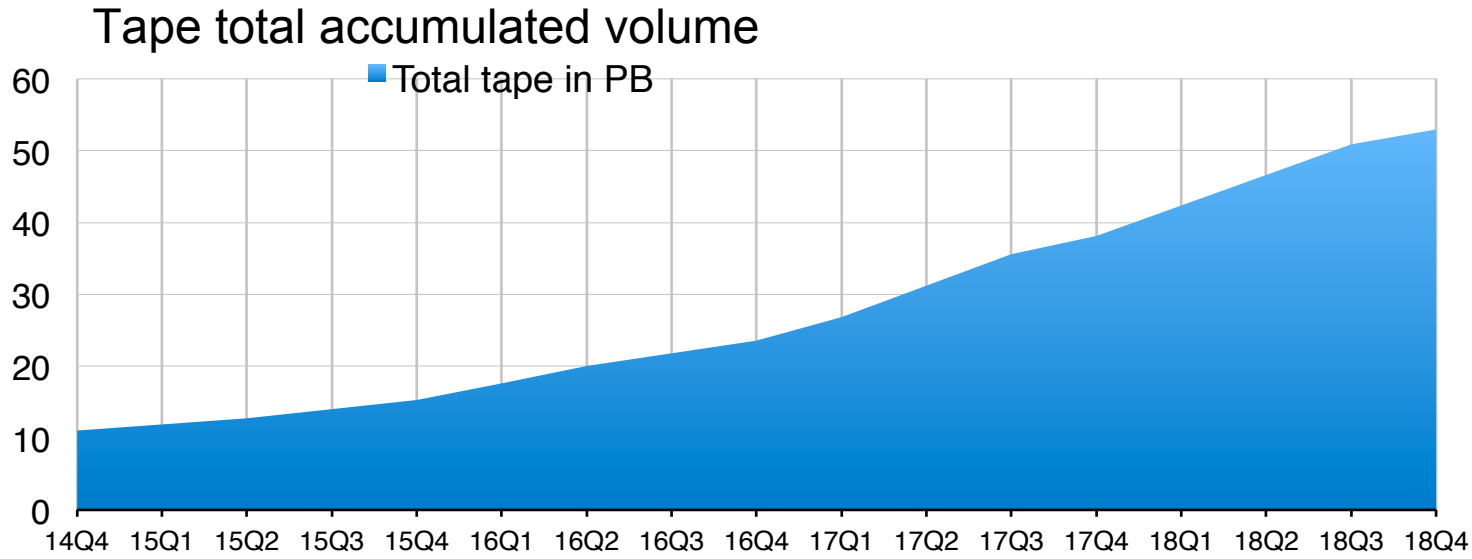
Tape requirements, media cost

Tape TB per year

Fiscal quarter	FY15	FY16	FY17	FY18
6 GeV	1600	800	0	0
Hall A	160	240	1000	1000
Hall C	0	1050	1400	1400
Hall B	2069	1912	5566	7743
Hall D	527	4214	6584	4741
Total/y in PB	4	8	15	15
Cost k$/y	52	99	175	179
Total tape in PB	15	24	38	53

- Tape media cost has two components, the media itself and the library slot to hold the tape.
- The table above only includes the media cost.

Tape requirements, library



- At the projected rate of accumulation of data, and assuming that we convert all existing data to LTO6 format we will fill the existing library sometime around mid FY17.

Summary

- The requirements have evolved since the last review and the overall cost has decreased.
- Tape media costs are reduced due to a combination of:
  - Increased media capacity and decreased cost.
  - Lower running days per year.
- A disk storage area about double the existing allocation is required with a projected total of less than 1PB. This is achievable within the existing annual disk budget.
- Meeting the CPU requirement requires a procurement around the end of FY16 to early FY17 (maybe one spread across fiscal year boundary).
  - Since this requirement is now dominated by simulation more effort is required to understand the CPU time per event and optimize.
  - CLAS12 has the capability to double the raw event rate to 20 kHz after FY18.