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# Resource Requirement Evolution
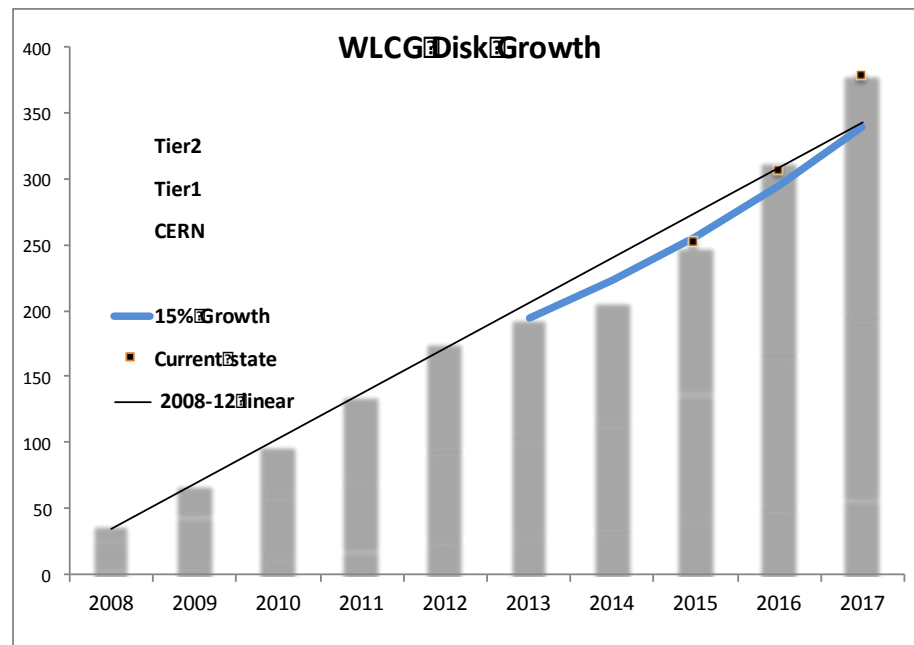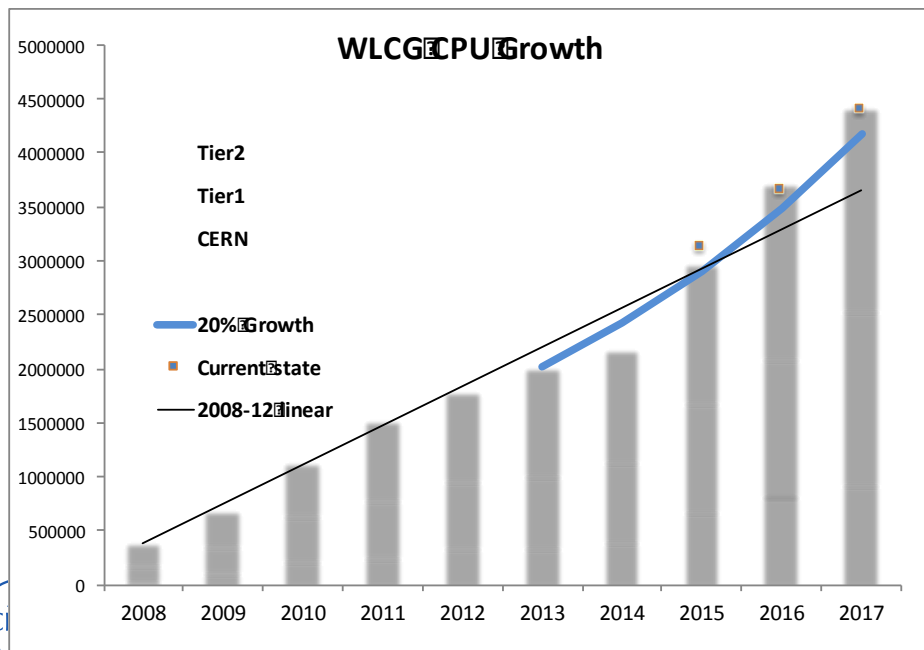
# Evolution of requirements

The reliability of resource predictions is continually improving, the largest uncertainties being the LHC running conditions.

Funding guidance: flat budgets for computing

Slide from 2014

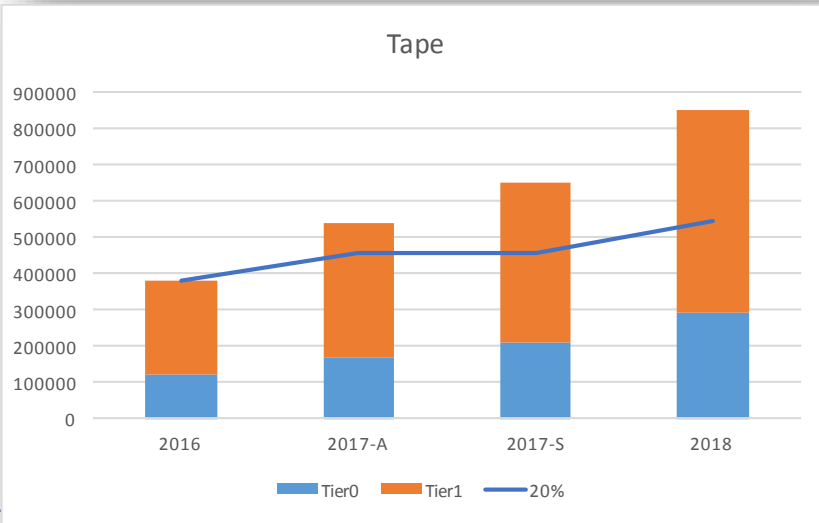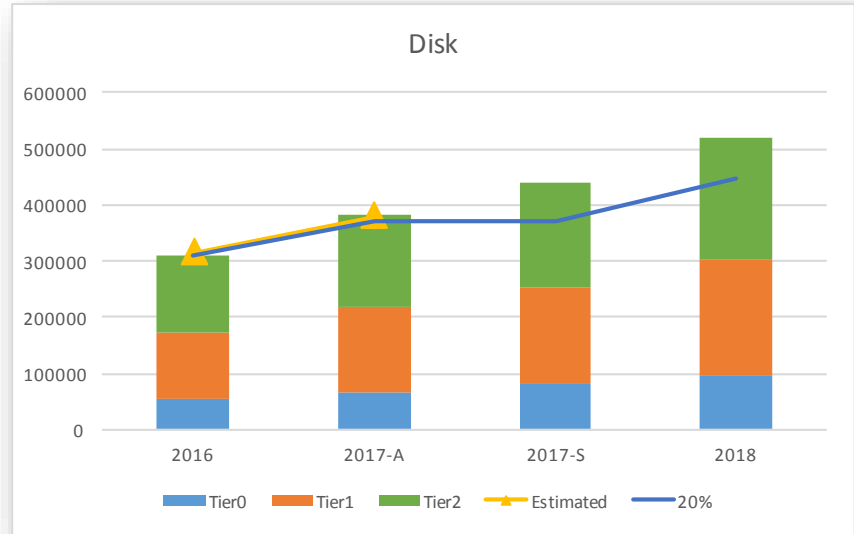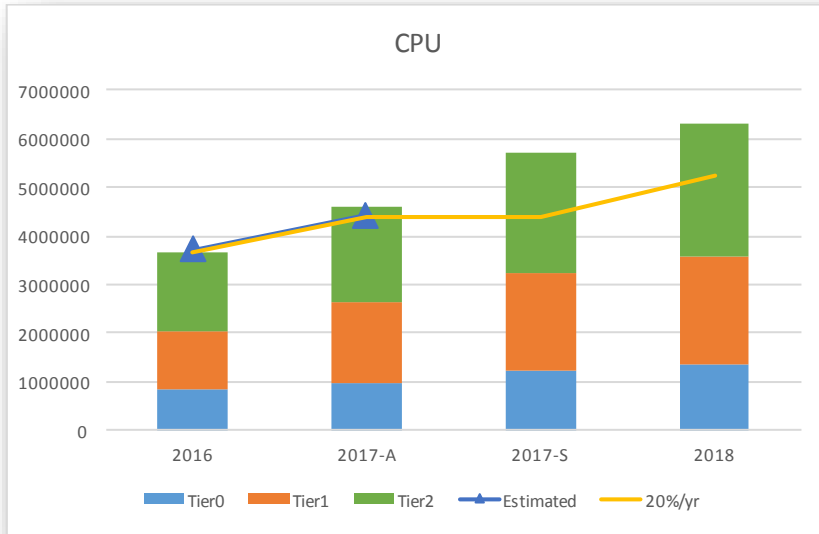Estimated evolution of requirements 2015-2017

2008-2013: Actual deployed capacity



WLCG CPU Growth

Tier2
Tier1
CERN

—— 20% Growth
■ Current state
—— 2008-12 linear



WLCG Disk Growth

Tier2
Tier1
CERN

—— 15% Growth
■ Current state
—— 2008-12 linear

WLCG

# Run2: Increased computing needs

❑ LHC performance is above expectations
❑ Computing needs driven by (mainly):
- LHC live time (37% → > 60%)
- Luminosity ($1.0 \times 10^{34}$ → $1.2 \times 10^{34}$ or better)
- Pile-up (CMS, ATLAS) (21 → 33 on average)

❑ All have increased above anticipated levels
❑ For 2016, the available resources will be sufficient
- More tapes at CERN have been bought

❑ Re-analysis for 2017,18
- Just done in time for RRB
- Not yet scrutinized by RSG
- But: expectations are increased requirement above previous estimates of 15-30%

# Re-assessment of needs



CPU



Disk

Estimated: Estimates made in 2014 for Run 2 up to 2017

20%: Growth of 20%/yr starting in 2016 ("flat budget")

Tape

# Strategy?

❑ Have warned funding agencies about the increase for 2017

❑ Expect discussion at the RRB (end Oct)

❑ How should we manage a short fall in resources? Should be prepared for the RRB

▪ What are the strategies to be followed?

▪ Have already reduced replicas, re-processing, software performance, etc. Hard to find additional savings?

▪ Parking data? – Until when?

▪ Or?