

Ian Bird

GDB; CERN, 8<sup>th</sup> May 2013

# Update of Computing & Software Models



March 6, 2013

Ian.Bird@cern.ch

# Background

- Requested by the LHCC in December: need to see updated computing models before Run 2 starts
- A single document to:
  - Describe changes since the original TDRs (2005) in
    - Assumptions, models, technology, etc.
  - Emphasise what is being done to adapt to new technologies, to improve efficiency, to be able to adapt to new architectures, etc.
  - Describe work that still needs to be done
  - Use common formats, tables, assumptions, etc
    - 1 document rather than 5

# Timescales

- Document should describe the period from LS1 – LS2
  - Estimates of evolving resource needs
- In order to prepare for 2015, a good draft needs to be available in time for the Autumn 2013 RRB, so needs to be discussed at the LHCC in September:
  - Solid draft by end of summer 2013 (!)

# Opportunities

- This document gives a framework to:
  - Describe significant changes and improvements already made
  - Stress commonalities between experiments – and drive strongly in that direction
    - Significant willingness to do this
    - Describe the models in a common way – calling out differences
  - Make a statement about the needs of WLCG in the next 5 years (technical, infrastructure, resources)
  - Potentially review the organisational structure of the collaboration
  - Review the implementation: scale, quality of service of sites/Tiers; archiving vs processing vs analysis activities
  - Raise concerns:
    - E.g. staffing issues; missing skills;

# Draft ToC

- Preamble/introduction
- Resource needs and expected evolution
- Technology review and outlook
  - → Bernd
- Challenges – the problem being addressed
  - Consequences for computing
- Experiment computing models
  - → Marco
- Distributed computing
  - → Ian
- Computing services
  - → Ian
- Software activities and strategies
  - → Federico
- Collaboration organisation and management

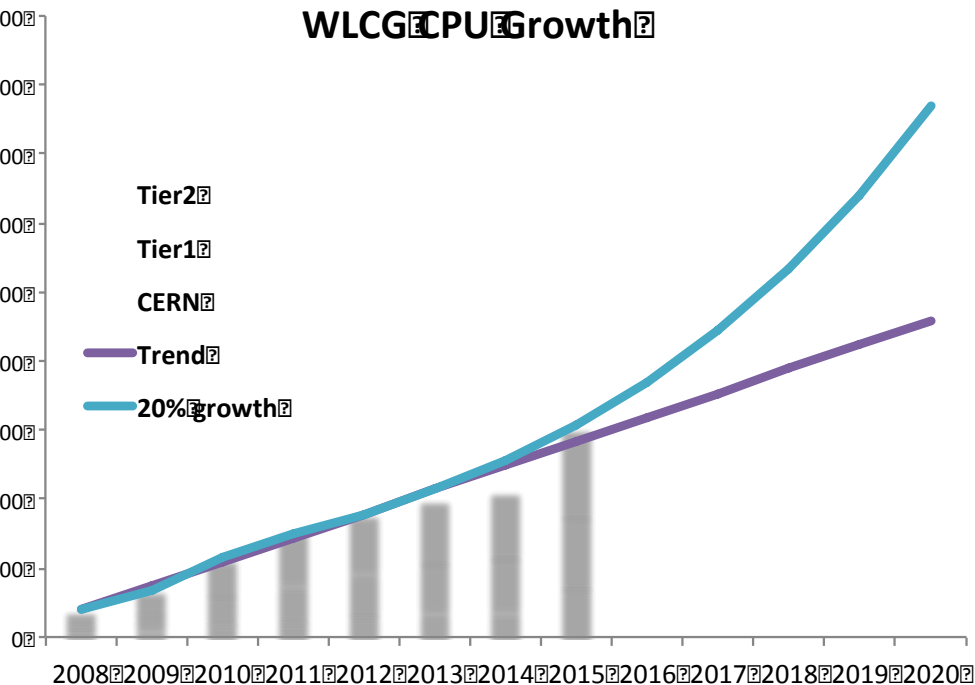
# Challenges

- What problem are we addressing?
  - Need to make the best use possible of available resources
  - Major investment in software needed
    - But missing skills, people, tools, infrastructure?
  - Need for flexibility in adapting the models to changing technologies
  - ...

# Resource Needs & Evolution

- 1) Basic assumptions:
  - Assumptions on running conditions
  - Desirable physics (trigger thresholds, rates, etc.)
  - Event parameters
- 2) Likely technology evolution
  
- Summary tables of resource requirements
  - Tape, disk, cpu, bandwidths
  - 2015-2018/19
    - This is hard and probably not reliable, but can make extrapolations and assumptions based on history since 2005, and likely budget scenarios

## WLCG CPU Growth



## CPU:

- Constant increase of 350 k HS06/yr
- 20%/year growth from 2012

Purple: linear extrapolation of what we actually did 2008-12

- ~best guess of what can be afforded?

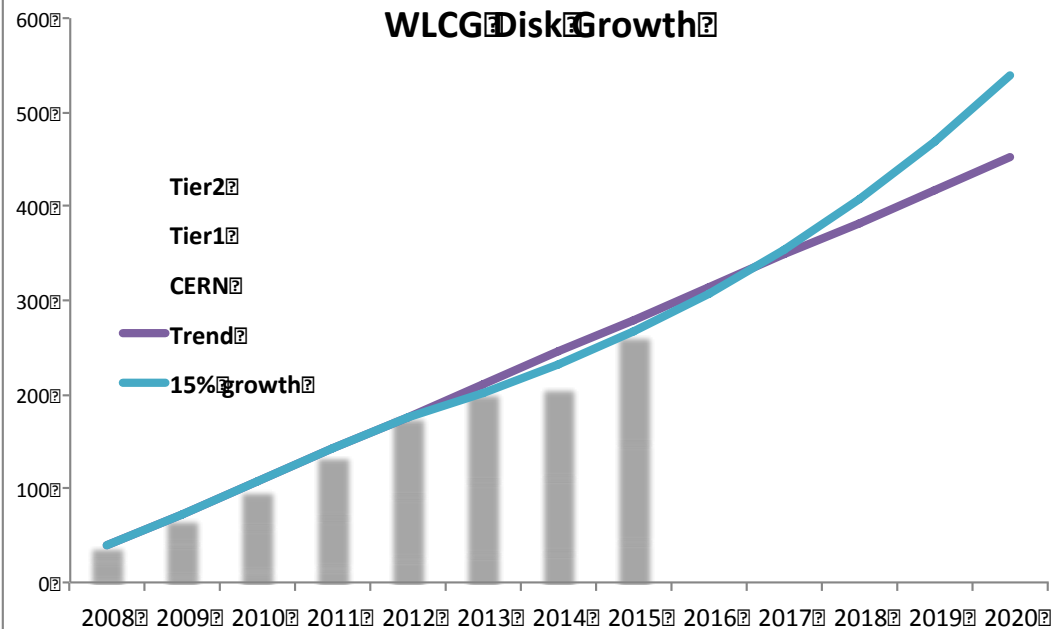
Blue: x%/yr growth starting in 2012 to reach 2015 need

- << what we can afford,
- << Moore's law

## Disk:

- Constant increase of 35 PB/yr
- 15%/year growth from 2012

## WLCG Disk Growth



April 22, 2013



# Collaboration Organisation & Management

- Opportunity to review the WLCG organisational structure and associated bodies
- Stress the need for building collaborative activities – in order to find the effort for needed developments, operations, etc.
- Describe the anticipated interactions with e-infrastructures (EGI/Horizon 2020, OSG, etc)
- Interaction with other HEP experiments – i.e. should the scope of WLCG broaden to support HEP more widely?