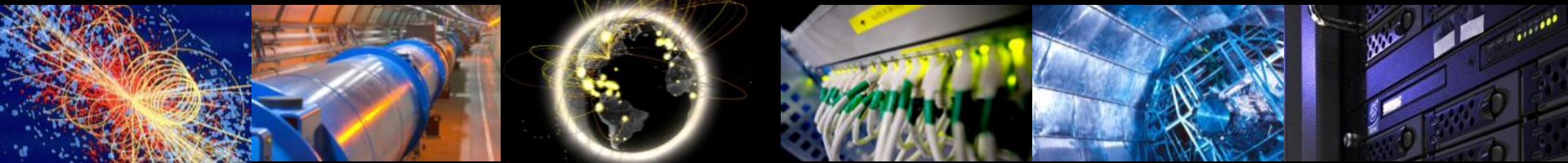


# Evolution of storage and data management

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# Discussion on evolving WLCG Storage and Data Management

- Background:
  - Experiments' concern with performance and scalability of access to data
    - Particularly for analysis
  - Concern over long term sustainability of existing solutions
  - Recognize:
    - Evolution of technology (networking, file systems, etc)
    - Huge amounts of disk available to experiments (on aggregate!)
    - Other communities exist that: have solved similar problems; will have similar problems soon
  - Short term concerns:
    - Performance, scalability, bottlenecks (e.g. SRM)
  - The MONARC model assumed networking was a problem
    - It is actually something we should invest more in

# Scope

- Focus on analysis use cases
  - Production is in hand ... Or maybe not; should benefit from developments
- Start from viewpoint of user access to data
  - Hide details of back-end storage systems and etc.
- Timescale for solutions in production – 2013 run
  - But with incremental working prototypes that address some of the short term concerns
- Should not be seen as a reason for new development projects
  - Must use available tools as far as possible – must keep long term sustainability in mind
  - Also care with choosing “working” tools that need huge integration investment
- Working model:
  - More network-centric than now
  - Can have fewer large archival repositories – long term data curation
  - “Cloud” of storage making optimal use of available capacity
- Should be a single effort of the community
  - Common low-level basic tools – complexity at the experiment level?
  - There may be funding opportunities – but we should make sure that they help us in our goals and obtaining what we need
- Must be driven by the real needs of the experiments ...
  - But we must learn the lesson of SRM – too many unrealistic “requirements” and no consensus on implementation

# Technical areas

- Data archives and storage cloud
  - Simplify so that “tape” is really an archive
  - Allow remote data access when needed
  - Look into peer-peer technologies
- Data access layer
  - E.g. Xrootd/GFAL + some intelligence to determine when to cache/when to use remote access
- Output datasets
  - Still need a service for (asynchronous) movement of datasets to an archive
- Global home directory facility
  - Model is a global file system. Industrial solutions available?
- “Catalogues”
  - Still need to locate data. Issue of consistency between different storage systems.
- Authorization mechanisms
  - For access to files in storage systems (archive + cloud), and quotas etc.

# Scope ...

- HEP (actually WLCG) should agree what it needs and what it can do...
- Only then should we look for commonalities with other communities
- Only then should we seek other funding opportunities
- But ... We should recognise that other communities do have (or soon will have) significant data management challenges
- And ... We should not need to have HEP-specific solutions (except where we need them...)

# Scope ... again

- Discussions here will have implications for job management (and other middleware)
- Ongoing work on virtualisation, etc (workshop next week)
- Pilot jobs (and pilot factories), VMs and cloud management software mean things can be done differently now:
- Must concern ourselves with long term supportability of middleware and etc.
- We will not digress into job management discussions here, but note issues and connections
- Organise a workshop on job management later to address these issues for the future?

# Jamboree Agenda

- Today
  - Explain strawman
  - Outline thoughts in each major area
- Background documents – input to supplement:
- Tomorrow
  - Jamboree – existing technologies, potential solutions
  - Discussion!!!
  - Identify areas for work; identify demonstrator prototypes
- Friday
  - Summarise – agree work plans and timescales
    - E.g. Prototypes 6 months; decision 1 year; prototype prod 2 years; full deployment 3 years
  - Write a short summary document – for use in discussions with ...
  - Agree demonstrators and prototypes

# Next steps

- Elaboration of a more concrete plan and timelines;
  - Friday ...
    - set up working groups; propose prototypes
  - Report back in July at WLCG workshop
- Develop demonstrator prototypes in each area – testing of components/technologies
- Experiment testing – integration into frameworks